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ORIGINAL RESEARCH OPEN ACCESS

The effects of planning and task on Chinese high school students' English language performance

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Abstract
Planning is the core of writing process and the key to successful English writing. This study examines the effects of planning type on language complexity, accuracy and fluency in two different English writing tasks (practical writing and integral writing) of Chinese high school students. The results show that online planning promotes students' language complexity and accuracy, while pre-task planning improves fluency. Planning and task types have an interaction effect in writing accuracy. This study promotes an understanding of planning mechanisms in high school students' English writing and has implications for high school English instruction.

Keywords planning; language performance; task type; Chinese high school students

1. Introduction

Since the 1980s, the research on writing process and writing model has garnered much attention, and planning has been believed to be of central importance in writing process and in language production (Ebrahimi et al., 2019). It was found that writers' language performance varies with different forms of planning and might be affected by other factors such as language proficiency, task type, and time (Ellis & Yuan, 2004; Tabari, 2016, 2021).

Writing is an essential skill in English learning, and a difficult one to acquire, especially for EFL learners. Chinses high school students generally have over 7 years of English learning experience and still have many problems in the subprocesses of English writing (Li, 2017), yet few studies are concerned with Chinese English learners' writing and planning. *Chinese English Curriculum Criteria for Regular High School* (2017) put writing instruction in three parts: pre-writing, while-writing and post-writing, and indicates the importance of cultivating the skills of planning and outlining in writing. This study focuses on Chinese high school students' different English writing tasks, and tries to explore the effects of planning on language accuracy, fluency and complexity in Chinese EFL high school students' English writing.

2. Literature Review

Writing process was once considered a linear model consisting of planning, writing and revision (Rohman, 1965). Since 1980s, researchers have taken writing as a recursive model involving constant information processing and problem-solving activities. Zimmerman's (2000) study on L2 writing model further indicates that L2 writers spend more time on revisions. In such a cognitive light, planning is believed to be "essentially a problem-solving activity; it involves deciding what linguistic devices need to be selected in order to affect the audience in the desired way" (Ellis, 2005, p. 3). The function of planning is also foregrounded in the various writing models (e.g., Bereiter & Scardamalia, 1987; Flower & Hayes, 1980; Hayes, 1996; Kellogg, 1996). It is argued that planning is necessary even in most natural and simple language production, helping the writer reduce the cognitive burden and seek proper expression and organization.

Yet at the same time, according to the cognitive models, attention resources and working memory capacity are limited. It is found that in the process of making a decision or accomplishing a task, one can choose to improve accuracy at the expense of time or achieve the goal at the expense of accuracy; thus speed-accuracy trade-off occurs. In L2 writing, a learner is faced up with the same choice. When the learner is overburdened with a complex task, accomplishment is prioritized while quality and accuracy are often neglected. On the contrary, when the attention and working memory are not stressed by task complexity or novelty, the learner may favor accuracy or complexity (Skehan, 1998). In writing process, planning, often serving as an advance organizer, can also place major demands on the central information executive, and the writer has to determine how and when to employ it in real writing context (Kellogg, 1996).

Researchers have long been interested in the effect of planning on language performance, and the relevant studies were mainly conducted along three dimensions, i.e.,

complexity, accuracy and frequency (CAF) (Skehan, 1998). Complexity is considered to be the degree of linguistic elaboration and selection. Accuracy is the ability to use language without errors in written or oral communication; and fluency means producing language in limited time without unnecessary pauses or hesitations (Wolfe-Quintero et al., 1998). Writing is essentially a complex and multi-faceted activity in second language learning. The three dimensions establish a complete and comprehensive framework for gauging writing quality, and its efficacy and validity have been acknowledged by most researchers (Housen & Kuiken, 2009; Skehan, 1998). The measurement of CAF in writing mainly employed the ratio of clauses per T-unit to measure syntactic complexity, and Bulté and Housen (2014) proposed using lexical complexity, average T-unit length, number of subordinate clauses per T-unit and phrase structure to further measure complexity of lexicon, sentences, subordinate clauses and phrases respectively. Linguistic accuracy in second language writing can be measured in a variety of ways, including counting error-free units, counting the number of errors, and considering error severity (Polio & Shea, 2014; Wolfe-Quintero et al., 1998), and the most common metric for language accuracy in second language writing is the number of linguistic errors in the text or the proportion of error-free T units (Johnson, 2020). Finally, it has been generally accepted by most previous studies on L2 writing that fluency could be measured by the number of words per text (Polio, 2001; Wolfe- Quintero et al., 1998).

Furthermore, according to information processing model, in the complex process of language production, attention to one of the three dimensions may come at the expense of another (Skehan, 1998). The case may be more evident for second language writers, as the limited human processing capacity makes it even more difficult for second language writers to take into account all dimensions at the same time, and the three domains in charge of complexity, accuracy and fluency have to compete with each other for attentions resources, resulting in trade-off effects.

The effects of planning on CAF were mainly examined under pre-task and online conditions. The two types of condition are distinguished in terms of when the planning takes place, i.e., before the task is performed or during its performance (Ellis, 2005). Pre-task planning provides writers with an opportunity to adequately consider and rehearse the task before the main performance. Online planning in most studies is taken as a type of unpressured writing process during which writers can plan and write at once to achieve goals. Research shows that both planning conditions may affect language performance in L2 writing, but in different ways. Crooks' (1989) study was among the earliest, which reported on an experiment in which two groups of 20 Japanese learners of English performed two monologic production tasks with and without time for planning. It was found that providing learners with time to plan their utterances results in more complex interlanguage productions. Ellis and Yuan (2004) investigated the effects of three types of planning, i.e., no planning, pre-task planning and on-line planning, on the performance of 42 Chinese learners' narrative writing. They found that pre-task planning resulted in greater fluency and syntactic variety. Kawauchi (2005) investigated planning in oral narrative task with Japanese English learners, and the participants were grouped according to different English proficiency levels and assigned to different planning tasks. The results showed that planning had beneficial effects on the fluency, complexity, and accuracy of the participants' oral production, and the high-proficiency group benefited most from planning in fluency and complexity, while the low-proficiency group did so in accuracy. Later studies on L2 learners also obtained different results. Some studies showed that pre-task planning can improve L2 writer's fluency, complexity, and/or accuracy in writing at once (Jung, 2013; Thai & Boers, 2016), while some others indicated pre-task planning mainly promotes L2 writer's fluency, but not complexity or accuracy (Tabari, 2016; Qjima, 2006; Seyyedi et al., 2013). On the other hand, online planning was found to promote mainly accuracy and lexical diversity (Ellis & Yuan, 2004; Ghavamnia et al., 2013; Rostamian et al., 2018).

Research also examines the effect of planning in different tasks and contexts. Wigglesworth (1997) examined the combined effects of planning time and language proficiency on L2 production in different oral tests and found language proficiency made no difference between two groups in easier tasks, but in more complex tasks the proficient participants improved complexity and accuracy on some measures and benefited more from planning than the less proficient. As to task type, Skehan and Foster (1997) examined the effects of various task types on language performance and found some task types tended to promote fluency while others promoted accuracy. Lu's (2011) study based on WECCL (Written English Corpus of Chinese Learners) showed that genre is an important factor affecting L2 syntactic complexity in writing, but Mehrang and Rahimpour's (2010) study indicated no effect of task structure on language accuracy and complexity. Ye and Yan's (2010) study with Chinese undergraduates found genres had no significant effect on EFL learners' language performance.

On the whole, relevant studies have showed that planning has a positive effect on L2 language performance, and the effect might be varied with different types of tasks and learners. However, there lacks consistent results on the effects of pre-task and online planning on writing performance, and very limited research was conducted on the combined effects of planning and genre. Besides, previous studies were mostly conducted at the tertiary level, yet few studies were concerned with high school students' English writing in limited time, and it remains unknown how the combination of planning type and task may affect the performance of high school students in the Chinese EFL context.

In view of this, this study focuses on Chinese high school students' English writing and intends to explore the effect of different types of planning on Chinese high school students' language performance with different tasks. The research questions to be addressed are:

1. How do planning types affect accuracy, complexity, and fluency of Chinese high school students' English writing?

2. Do different genres affect Chinese high school students' planning and language performance in English

writing?

3. Research Methods

3.1. Participants

Eighty tenth-grade students from two classes of an ordinary high school in Shandong province, China attended the study, and one of the researchers was the teacher of the two classes. The students have studied English in school for over seven years, and have writing experiences of narrative, description and practical writings. One class was randomly assigned as pre-task planning group and the other class online planning group. Both classes have similar academic background and similar average English scores in the latest English test.

3.2. The Writing Task

The writing task includes an integral writing (an English writing genre introduced to Chinese college entrance examination since 2016), and a practical writing. The practical writing requires students to write an invitation letter, and the integral writing requires students continuing an unfinished story. Both genres are commonplace and frequently practiced in Chinese high schools when students prepare for Chinese college entrance examination, and the participants have been taught about the two genres in class.

3.3. Data Collection

This study mainly followed Ellis and Yuan (2004) and Rahimpour and Safarie's (2011) research design but put a time limit on the writing task. The writing samples were collected from a writing quiz during the winter semester in 2021. The quiz lasted 30 minutes, the length of time specified by Chinese college entrance examination for English writing. Before the research, the pre-task planning class were trained on how to plan on paper in terms of content, organization and language before writing. When the quiz began, each participant in pre-task planning group was provided with a planning paper and asked to plan on the paper for 10 minutes. The paper was collected as the referential guide in interview when time was up, so that all the language elicited by the writing task was produced within the following 20 minutes. They were reminded of the time limit. In comparison, the online planning group received no training on pre-task planning. They had only the test paper and were instructed to immediately start writing to reduce possible pre-task planning time. They were not reminded of the time limit.

To further explore the effect of planning type on writing, 8 students (4 students in each class) were randomly selected for retrospective text-based interview. The interview questions were mainly centered around the participants' experiences in writing, including the questions such as (1) What do you feel about the difference between the two types of writing (letter application text, reading and writing)? (2) What did you do in the 10-minute pre-task planning? (3) What did you do in online planning?

3.4. Data Analysis

A total of 160 writing samples were collected (80 integral writing copies and 80 letter writing samples). The collected texts were analyzed in language complexity, accuracy and fluency through computational and manual methods. Syntactic complexity is measured along 3 dimensions: (1) General complexity, i.e., mean T unit length (MLT); (2) dependent complexity, i.e., number of dependent clauses per T unit (DC/T); (3) implicit complexity, i.e., number of complex noun phrases in each T unit (CN/T). All indicators of syntactic complexity were analyzed by the Syntactic Complexity Analysis Tool (L2SCA) developed by Lu (2011). Lexical complexity is measured in terms of lexical diversity and sophistication (Bulte & Housen, 2014): Lexical diversity is examined by the measure of textual lexical diversity (MTLD), i.e., the average number of tokens at a given type/token value, and lexical sophistication is measured by the average word frequency of all words (WRDFRQa). Both indicators of lexical complexity are computed by Coh-Metrix. Linguistic accuracy is calculated by proportion of error-free T-units (EFT/T), an indicator frequently used to measure the accuracy of second-language writing, in which all grammar, lexical, vocabulary choices, and spelling errors are taken into account. Fluency is measured by the numbers of syllables per minute (SPM) and dysfunction (DYSF). SPM is the total number of syllables per composition divided by the time taken to complete the composition and DYSF is the total number of word rewrites (such as words deleted, added, or modified) divided by the total number of words per essay. SPM and DYSF are selected instead of the number of words per minute (WPM) to reduce the effect of word length.

The accuracy and fluency of the writing were manually calculated by the researcher. To ensure the reliability of the measurement, five copies from each group were randomly selected and reviewed by two researchers, and the raters' reliability (Pearson correlation coefficient) was 0.881. After sorting the data, JASP statistical software was used to test the complexity, accuracy and fluency of the writings, and a 2×2 ANOVA test was conducted to examine whether there was an interaction between planning type and writing genre. Finally, the interviews were transcribed and qualitatively analyzed to further explore the planning and writing experiences of the participants.

4. Results and Discussion

4.1. The effects of planning type on linguistic complexity, accuracy and fluency

4.1.1. The effects of pre-task and online planning on linguistic complexity

Lexical and syntactic complexity were measured for both groups. The descriptive and *t*-test results were shown in Table 1.

Table1. Statistics of linguistic complexity measures

		Pre-task planning		On-line planning				
Genre	Index	mean	SD	mean	SD	*t*	df	*p*
Letter writing	MLT	9.526	1.627	12.697	5.946	3.253	78	0.001
	DC/T	0.271	0.161	0.487	0.330	3.730	78	0.001
	CN/T	0.649	0.355	1.025	0.456	4.119	78	0.001
	MTLD	65.689	18.460	69.117	17.069	-0.861	78	0.391
	WRDFRQa	3.007	0.098	2.996	0.092	0.557	78	0.579
Integral writing	MLT	9.598	1.125	12.161	3.303	4.644	78	0.001
	DC/T	0.315	0.119	0.651	0.311	6.370	78	0.001
	CN/T	0.816	0.214	1.264	0.565	4.686	78	0.001
	MTLD	71.518	23.606	73.853	18.138	0.496	78	0.621
	WRDFRQa	3.200	0.055	3.172	0.089	-1.663	78	0.100

As is shown, the online planning group produced more syntactically and lexically complex writings. There were significant differences between the two groups in MLT, DC/T, CN/T in both genres ($p<0.05$). There was no significant difference in lexical complexity, which might be due to the fact that the word command of the participants is still small, and the limited vocabulary reduced the lexical difference. It seems that the pre-task 10 minutes have not made any difference in complexity to the pre-task planning group. The result supports the study by Qjima (2006) and the study by Seyyedi et al. (2013) but differs from Kawauchi (2005) and Wigglesworth (1997). The inconsistent results might be explained by the differences in leaners' proficiency level. Generally speaking, Chinese high school students are not proficient and skillful in planning as well as in English, and it might be difficult for them to benefit from pre-task planning in complexity.

4.1.2. The effect of pre-task planning and online planning on linguistic accuracy

The results showed that linguistic accuracy of the online planning group was higher than that of the pre-task planning group, and there was a significant difference between the two groups ($p<0.001$). In integral writing the average proportion of correct clauses in the online planning group was significantly higher than that in the pre-task planning group (Table 2). The results indicated that in both tasks, online planning could improve more accuracy compared with pre-task planning.

It seems that although pre-task planning is conducive to participants' monitoring of the overall text and reducing cognitive load in writing process, the focus of pre-task planning is still on structure and organization of the passage instead of language accuracy. By contrast, the online planning is more concerned with grammar and precision of expressions. The results were consistent with the findings of Ellis and Yuan (2004) and Ghavamnia et al. (2012) suggesting the positive effects of online planning on accuracy but ran counter to Rostamin et al. (2018). The difference might be due to the different research design for planning time. This study had strict time limit for planning and writing while Rostamin et al. (2018) had no time limit for the online planning group. Therefore, given time, the online planning seems to allocate more attention resources to language accuracy.

Table 2. Statistics of linguistic accuracy measures

	Pre-task planning		Online planning				
	M	SD	M	SD	*t*	df	*p*
Letter writing	0.701	0.172	0.827	0.096	4.045	78	0.001
integral writing	0.629	0.180	0.878	0.087	7.863	78	0.001

4.1.3. The effect of planning type on linguistic fluency

Table 3 showed that pre-task planning helped to improve the participants' language fluency more than online planning did, although there was no significant difference. In practical writing, SPM of the pre-task planning group and online planning group were 5.065 and 4.922 respectively, and in integral writing, SPM for pre-task planning and online planning was 7.169 and 6.944 respectively, suggesting that writing after pre-task planning is comparatively faster and more fluent. Besides, the statistics of non-fluency measures also suggested the pre-task planning group seemed to delete, repeat, or rewrite less in writing process. The reason might be that the time and efforts spent in pre-task planning could help reduce the writer's cognitive load or the writing tension, thus improving language fluency and reducing the number of mistakes and revisions in writing.

Table 3. Statistics of linguistic fluency measures

		Pre-task planning		Online planning				
		M	SD	M	SD	*t*	df	*p*
Letter writing	SPM	5.065	1.113	4.922	0.891	-0.632	78	0.529
	DYSF	0.057	0.040	0.071	0.051	1.338	78	0.185
Integral writing	SPM	7.169	1.857	6.944	1.626	-0.576	78	0.566
	DYSF	0.059	0.044	0.078	0.053	1.738	78	0.086

The results lent support to previous studies concerning beneficial effects of pre-task planning on fluency but not on complexity (Ellis and Yuan, 2004; Kawauchi, 2005; Tabri, 2016), and provided more evidence for Zimmerman's (2000) study on revisions, verifying the trade-off effect of information processing model.

The retrospective interviews also revealed that during the 10-minute pre-task planning, the pre-task planning group tended to generate main idea first, and overall structure next, followed by overall meaning of each paragraph, topic sentence and specific expression. Some participants would first produce an outline on the scratch paper for reference all through the writing process. This may partly explain the pre-task planning group's language fluency. The on-line planning group, on the other hand, mainly focuses on generating proper expressions or correct use of grammar in the process and neglects coherence. Some participants talked about their experience of "trying to produce some 'high-level' words and complex grammar or sentence structures" to make the writing more "advanced". This can also in part explain why language complexity of online planning group is higher than that of pre-task planning group in syntactic level.

4.2. The effect of planning and task on linguistic performance

A 2×2 ANOVA test was conducted through JASP online statistical software to explore the interaction effect of planning type and task on language performance, and the results were shown in Table 4. It could be seen that planning type and task did not have any interaction effect in terms of language complexity and fluency but did have significant interaction effect in accuracy ($F = 7.660$, $p = 0.006 < 0.05$).

Table 4. The interaction effect of planning type and genre

		Planning type * Genre		
		F	df	p
Syntactic complexity	MLT	0.295	1	0.588
	DC/T	2.308	1	0.131
	CN/T	0.293	1	0.589
Lexical complexity	MTLD	0.875	1	0.351
	WRDFRQa	2.137	1	0.146
Language accuracy	EFTT	7.660	1	0.006
Language fluency	SPM	0.034	1	0.855
	DYSF	0.121	1	0.729

As the results indicated, in both writing tasks, the two groups showed difference in language accuracy, but the difference was more evident in integral writing, proving that genre is indeed one of the factors affecting L2 writers' language accuracy. From Figure 1 it could be seen that for on-line planning group, language accuracy in integral writing was higher than that in practical writing, yet for pre-task planning group it was the otherwise. A post-hoc test was conducted to examine the interaction effects of planning type and task on language accuracy, which showed planning type had the main effect ($p < 0.001$), and the two groups in language accuracy of integral writing revealed significant difference.

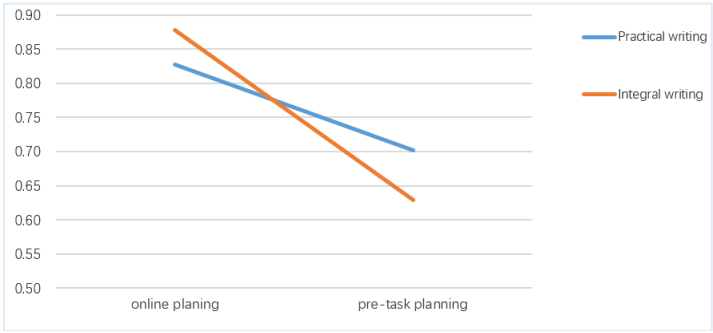

Figure 1. Interaction effect of planning type and task type

The interview suggests that the participants believed practical writing to be comparatively simpler than integral writing, because "you just need to follow a formalized structure and sort out what you say", therefore, to the pre-task planning group, the 10 minutes' planning time provided could be employed for searching the most suitable expressions instead of outlining the whole text, thus improving the pre-task participants' language accuracy in practical writing.

In comparison, the task of integral writing was more complex to the participants. As some participants suggested, the structure of integral writing had no "fixed model" to follow, and they had to make out the outline and search for proper language at once in planning, which might increase their cognitive load; In such a case, the remaining 20 minutes' writing time for pre-task group is more pressing, resulting in lower language accuracy.

The results were in line with information processing theory and were consistent with most of the relevant studies (Beers, 2009; Lu, 2011; Way et al., 2000). As Ellis (2005) pointed out, "Within-task planning can be differentiated according to the extent to which the task performance is pressured or unpressured…When this is unpressured the participants have the opportunity to conceptualize, formulate and articulate their messages with some care". Naturally, L2 learners have to make discourse analysis in writing process, and employing

different planning types for different tasks is a reasonable strategy to improve overall writing quality.

5. Discussion

The study aims to examine the combined effects of planning type and genre on Chinese high school students' writing, and explore the complex relationship among planning type, genre and writing quality of EFL writing. To sum up, in terms of language complexity, the study found that online planning helped produce more complex writings, especially in phrases and clauses. Then, it is found that online planning could promote significantly more language accuracy than pre-task planning. In integral writing the average proportion of correct clauses in the online planning group was significantly higher than that in the pre-task planning group. In terms of fluency, the study showed pre-task planning helped to improve language fluency more than online planning did, but there was no significant difference as the previous studies found (Ellis & Yuan, 2004; Tabari, 2016), and pre-task planning was found to help reduce revisions in writing process. As to the relationship among planning, task and language performance, it is found that planning type and task did not have any interaction effect in complexity or fluency yet did interact in accuracy. Specifically, on-line planning promotes significantly more accuracy in integral writing, while pre-task planning promotes significantly more accuracy in practical writing.

The study indicated pre-task and online planning participants performed differently in language performance. As a whole, participants produced more complex and accurate language under online planning than pre-task planning condition and produced more fluent language under pre-task planning. which is in accordance with many previous studies (Ellis & Yuan, 2004; Ghavamnia et al., 2013; Qjima, 2006; Skehan, 1998). Information processing theory (Skehan & Foster, 2001) believes that the central executive allocates attention capacity to speed and accuracy during task, which could interpret the results of the study. It seems learners in online planning tends to allocate more attention to language form such as phrasing and sentence patterns during task, and learners in pre-task planning allocate attention to fulfillment of task.

Furthermore, the results expanded the application of information processing theory to Chinese high school students' English writing, and shed more light on the arguments between "trade-off effect hypothesis" and "cognition hypothesis". Skehan (1998) argued that the heavy burden imposed on the central executive by the complex task forces the writer to allocate attention among language dimensions, i.e., complexity, accuracy and fluency, and the writer have to trade off one of them for another. Cognition hypothesis (Robinson, 2001, 2005) proposes that the various dimensions of language output are not competitive but connected with each other. When faced up with a challenging task, the writer will recruit most attention resources he could get access to in order to meet the great demands of the task; in this process, meaning and form of language production are given equal attention. This study found that for different tasks and under different planning conditions, the learner prioritizes different language dimensions, giving more evidence to Skehan's (1998) hypothesis. The conclusion was in line with the previous studies (Ellis & Yuan, 2004; Salimi & Dadashpour, 2012). Considering the fact that the participants in this study were Chinese high school students, the application scale of trade-off effect was extended.

This study also suggested the effect of genre on language performance. It is indicated that in tackling with unfamiliar genres, the pre-task planning time hardly helps in language accuracy as the learners tend to focus more attention upon the overall structure and fulfillment instead of language form. In comparison, in writing task of familiar genre, learners in online planning could have sufficient time to formulate, revise and improve language accuracy. The results support some studies (Skehan & Foster, 1997; Tavakoli & Skehan, 2005), which indicated that task with macrostructure under planning condition promotes accuracy. The results differ from the Mehrang and Rahimpour (2010), which found that task has no effect on language accuracy or complexity. The difference might be due to the different task types. The tasks in Mehrang and Rahimpour (2010) include two picture-based oral narratives; as oral task produces more real-time pressure than writing task and is not amenable to revision, it is difficult for learners in oral task to review and revise. In other words, the favorable effect of online planning on language accuracy might be reduced in oral task.

6. Conclusion

This study examined the effect of planning on CLF of high school students in China and enhanced the understanding of planning as a form of task preparation in allocating attentional resources. It was found that pre-task planning tends to prioritize macrostructure and meaning construction, which could lessen the pressure of working memory and reduce revisions, but in more complex writing tasks such effects of pre-task planning seem limited. In comparison, online planning helps promote language complexity and accuracy, especially in written product of unfamiliar genre. The results indicate that pre-task planning, by promoting L2 fluency, could to some extent make up for L2 language deficiencies, and online planning strategies are particularly effective in tackling with complex tasks. The results verified the cognition model of information processing theory (Skehan & Foster, 2001), and expanded the application of cognitive writing model to EFL high school students.

The study also has pedagogical implications for EFL teachers. Explicit instruction on planning, writing models and subprocesses could be integrated into writing instruction to promote students' language performance. Students can be taught to employ pre-task planning in brainstorming and outlining process and employ online planning to search for more specific expressions and in revision to distribute cognitive load to different steps and improve learners' writing ability and confidence. Teachers could help students of different proficiency levels grade

and sequence tasks, weigh up the subprocesses, and promote optimal writing quality of written product. Meanwhile, task type should be taken into account in writing instruction.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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College English teaching based on peer feedback in writing tasks under the perspective of New Liberal Arts

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Abstract

This study aims to explore the teaching model of medical universities' English education based on peer feedback in writing classes under the new liberal arts perspective. Using construstivism as the theoretical framework, the scaffolding theory as the analytical framework, this study employs experimental control methods and utilizes SPSS software for data analysis to evaluate the effectiveness of peer feedback in improving writing abilities. In-depth text analyses of questionnaires and reflection reports are conducted to examine the mediating effects of this strategy on students' text revision, academic discourse knowledge, cultural literacy, and research awareness, and to investigate how peer feedback contributes to the cultivation of autonomous learning, self-assessment, and critical thinking. The findings confirm that peer feedback not only enhances students' writing levels but also fosters their deep learning habits. This study provides an effective teaching model that integrates deep learning and ideological education for medical universities' English instruction based on peer feedback in writing classes under the new liberal arts perspective.

Keywords new liberal arts, peer evaluation, English teaching, medical schools, deep learning

1. Introduction

In 2016, General Secretary Xi emphasized the need to implement a comprehensive development strategy for philosophy and social sciences centered on education and talent cultivation, and to construct an integrated development system that covers students, academics, and disciplines. In February 2019, the Central Committee of the Communist Party of China and the State Council issued the "Modernization of Chinese Education 2035," which clearly put forward a series of suggestions and measures for higher education teaching reform, including promoting the connotative development of higher education, building first-class undergraduate education, further implementing the "Six Excellences and One Top" Plan 2.0, and implementing the "Double Ten Thousand" Plan for first-class professional construction (Wu, 2019). Wu Yan, Director of the Higher Education Department of the Ministry of Education, put forward the overall requirements for the reform of foreign language education in the new era at the Fourth National Forum on the Reform and Development of Foreign Language Education in Higher Education Institutions, focusing on "new mission, grand pattern, new humanities, and grand foreign languages" (Yan, 2019).

On October 14, 2020, Director Wu delivered a keynote report titled "Planning the Overall Situation, Adapting to Changes, and Opening a New Chapter—Comprehensively Promoting the Innovative Development of Medical Education," proposing to accelerate the construction of the new medical discipline. The new medical discipline construction is a strategic layout made by the country for the development of the medical and health system. It is a new concept proposed by the country to adapt to the requirements of a new round of technological revolution and industrial transformation, aiming to promote the interdisciplinary integration of medical, engineering, humanities, and other disciplines, cultivate compound medical talents for the new era, and enhance China's competitiveness on the international stage.

Under the new situation and new requirements, the College Foreign Language Teaching Guidance Committee issued the "College English Teaching Guide (2020 Edition)" (hereinafter referred to as the "New Guide") in 2020. The guide points out that the construction of college English courses in medical institutions must meet the requirements of the new humanities construction while serving the new medical discipline construction. Its interdisciplinary nature is prominent, and the course construction is challenging. The construction background of the "new medical discipline," "new humanities," and "grand foreign languages" requires the following strengthening of medical English courses for undergraduate students in medical institutions: 1) Strengthening the interdisciplinary integration; 2) Strengthening the organic combination of medical knowledge and English language skills; 3) Strengthening the foundation, interdisciplinarity, and frontier nature of the courses, improving the medical students' medical

English application abilities, and enhancing their professional qualities.

This study aims to investigate a model of college English teaching in medical universities based on peer feedback in writing classes from the perspective of new liberal arts. Two classes of students majoring in medical studies were selected and divided into experimental and control groups. A controlled experimental method was applied to quantitatively assess three writing dimensions: "Content," "Organization," and "Language." Using constructivism and scaffolding theory as theoretical and analytical frameworks, a comprehensive text data analysis will be performed on questionnaire data and reflection reports related to the impact and challenges of peer feedback on English teaching and its role in enhancing medical students' language skills and learning abilities. The study hopes to verify the effectiveness of the scaffolding teaching strategy based on peer feedback on the language skills, humanistic literacy, and research awareness of medical students.

2. Literature Review

Theoretical frameworks of scaffolded teaching based on the ZPD theory by Vygotsky (Vygotsky, 1978) and constructivist theory by Piaget (Piaget, 1972), and the New Liberal Arts concept, which focuses on deep cross-disciplinary integration and problem-solving to cultivate students' comprehensive abilities to address national needs and "four services" in higher education have been applied in college English writing teaching in China. Chinese scholars have explored different methods by scaffolded teaching under the constructivist perspective in the context of college English course construction in Chinese medical universities, with a focus on building a proper approach catering for the needs of New Liberal Arts in humanities and social sciences. These theoretical frameworks and research findings provide a foundation for understanding the current state of college English writing teaching, which is fundamental for English language learning and the cultivation of learners' language expression ability and depth of thinking.

2.1. Theoretical Frameworks

Scaffolded teaching, based on the Zone of Proximal Development (ZPD) theory by Vygotsky (Vygotsky, 1978) and constructivist theory by Piaget (Piaget, 1972), emphasizes classroom activities that help students break down complex learning tasks through peer scaffolding and feedback scaffolding, transforming them from passive recipients to active constructors of knowledge (Pan, 2022; Liu, 2021, p. 172). This approach is applied in college English writing teaching and promotes the development of students' actual and potential developmental levels using appropriate methods, steps, and materials.

The New Liberal Arts concept, originating in the United States, focuses on deep cross-disciplinary integration and solving complex problems (Zhao, 2020). In the context of contemporary China's New Liberal Arts, college education emphasizes cultivating students' morality, intelligence, physique, beauty, and labor to address national needs and higher education. This approach fosters the development of students' correct life values, social responsibility, and humanistic spirit.

2.2. Current Research

Chinese scholars' exploration of the New Liberal Arts in the context of college English course construction in Chinese medical universities mainly revolves around the core essence and contemporary requirements of building the New Liberal Arts in China (Fan, 2020). That is, based on the new era, responding to new needs, promoting the integration, contemporaneity, sinicization, and internationalization of liberal arts, leading the development of humanities and social sciences, and serving the new goals of human modernization. Consequently, higher education should have the function and historical mission of updating and renewing the curriculum construction and talent cultivation model. The contemporary requirements of the New Liberal Arts distinguish it from traditional foreign language teaching in terms of educational goals and curriculum construction, focusing on cultivating talents with solid foundations, innovation, extensive knowledge, and expertise in cross-cultural research and communication.

Additionally, the construction of the New Liberal Arts in colleges and universities should focus on the new research objects, paradigms, and social needs of humanities and social sciences (Wang & Zhang, 2019). Currently, English teaching in domestic medical universities mainly focuses on medical English courses, integrating ideological and political content, exploring specific teaching methods, and developing teaching staff and course materials under the background of the "New Medical Science" construction (e.g., Yin, 2020). However, it is argued that the exploration of college English courses in the context of the New Liberal Arts construction, focusing on curriculum construction, curriculum framework, and teaching models, is still relatively scarce. Research on the construction of foreign language major in the context of information technology (Peng et al., 2022) remains at the macro level of curriculum construction suggestions. Most studies revolve around education design and planning layout (e.g., Xu, 2022), curriculum ideological and political exploration under the New Liberal Arts background (e.g., Zhou, 2020), and discussions on important concepts such as "New Ecology" (Yu, 2022) and intelligent teaching (Li, 2022). The author believes that the essential understanding of the important concept of the New Liberal Arts has not yet been highlighted in the existing discussions on college English curriculum construction.

Research on the current state of college English writing teaching is conducted based on the recognition that writing is a fundamental skill in English language learning, an important manifestation of students' English written communication ability, and a pathway for cultivating learners' language expression ability and depth of thinking (Zhao, 2020). It also affirms that the key development goal of higher English education in the new century in China is to cultivate high-quality foreign language learners and achievers with autonomous

learning ability, divergent thinking ability, and innovation capability (Liu, 2021). However, it is regrettable that the English writing ability of college students in China is generally weak, and the teaching mode of college English writing is still relatively traditional. This is manifested in teachers' instructional designs focusing on vocabulary, sentence meaning, grammar, and templates, with less exploration of teaching modes based on students' cognition and thinking.

On the other hand, although studies towards feedback originating from Western educational environments have guiding roles in writing instruction (e.g., Lee, 2011, 2014; Storch, 2010), research on feedback strategies tailored to the Chinese learners' circumstances, teaching realities, and cultural characteristics is scarce. Influential local studies have verified that peer feedback can improve students' writing quality and cultivate their reader awareness (e.g., Cen & Deng, 2010; Cui et al., 2019; Li, 2019; Zhang, 2019; Zhou, 2013), but further research is needed to explore how medical students, under the context of the New Liberal Arts, can enhance their writing proficiency and promote personal development in college English classrooms through effective feedback and assessment. This would lay the foundation for forming habits of deep learning and provide a reference for talent cultivation under the "New Medical Science" background.

The current research on the construction of the New Liberal Arts in Chinese medical universities mainly focuses on exploring its core essence and contemporary requirements. However, there is a shortage of research on the construction of college English courses in the context of the New Liberal Arts, especially in terms of curriculum construction and framework, and teaching models. Furthermore, research on feedback strategies tailored to the Chinese learners' circumstances and cultural characteristics is scarce, and more exploration is needed to enhance writing proficiency and promote personal development in college English classrooms. Scaffolded teaching, which emphasizes the transformation of students from passive recipients to active constructors of knowledge, and hopes address the research gaps upon current research discussions, and is hoped to be realized through peer and feedback scaffolding conducted in this research providing crucial insights into college English teaching.

2.3. Assessment Tool: The Writing Ability Criteria

The English writing scoring criteria (Table 1) used in this study are based on the Second Language Writing Rating Scale (Jacobs et al., 1981), with the addition of a "language" dimension. The criteria for this dimension draw on the "language" component of the College English Test Band 6 (CET-6) writing scoring standards. The scoring criteria cover three dimensions: "content," "organizational structure," and "language." They emphasize the use of rational thinking and information awareness in peer evaluation, and the descriptions of specific indicators serve as a demonstration of scaffolded instruction, which cultivates students' ability to revise texts and their discourse competence. This enables a comprehensive and rational analysis of peers' writing.

On the one hand, the scientific definition of writing indicators in the criteria enables students to analyze the advantages and disadvantages of peer writing more comprehensively and rationally, thus providing objective assessment and cognition of peer writing performance. On the other hand, teachers can observe students' learning status and progress needs from a higher perspective, such as critical thinking and reflection ability, based on the evaluation scores recorded in the criteria. Furthermore, the scoring criteria reflect elements of rational thinking, critical questioning, and information awareness in the ideological and political system, encouraging evaluators to respect facts and evidence, adopt a rigorous attitude, think and judge independently, analyze problems dialectically from multiple dimensions and perspectives, and make appropriate choices and decisions during the assessment process in a peer evaluation environment, thereby consciously providing evaluation information. In this process, the evaluated students obtain ideological and political cultivation that encourages reflection, eagerness to learn, and exploration, independently acquiring the effective connotations of assessment information, objectively examining their learning outcomes, correctly understanding and appreciating the value of learning, forming good learning habits, facing difficulties fearlessly, and persisting in solving problems rationally.

Finally, the teacher's consideration and adoption of individual words on the evaluation form, such as the addition of "only," "basic," and "subjective," the replacement of "diversity" for "traditional" in the original form, and the replacement of "lack of clarity" for "unclear" in the original form, make the criteria more suitable for the specific learning situations of students. As students rarely have the opportunity to engage in peer evaluation, the criteria should be clear, direct, comprehensive, and considering students' pride and strong self-esteem, should weaken negative wording and enhance the conveyance of positive information.

Table 1. The Writing Criteria

Ability Criteria		Description	Score
Content	Relevance	Clear topic understanding, relevant discussion, and a complete, coherent text	3
		Basic topic understanding, mostly relevant discussion, only some off-topic or digressing parts	2
		Unclear topic understanding, most content unrelated to topic requirements	1
	Depth	Article has sub-points, and each sub-point + discussion structure is complete	3
		Article has sub-points, but only some sub-point + discussion structures are complete	2
		Article has sub-points, but discussion is incomplete, no sub-point + discussion structure	1
	Flexibility	Lists diverse viewpoints and provides objective commentary	3
		Article does not mention different or diverse viewpoints, or commentary is subjective when explaining viewpoints	2
		Article's viewpoints and wording are subjective, limited to the expression of subjective emotions	1
Structure & Organization	Clarity	Clear argument, clear expression	3
		Mostly clear argument, some content not clearly expressed	2
		Unclear argument, some content not clearly expressed	1
	Within-paragraph Logic	Reasonable argumentation process, proper use of examples, quotes, or data as evidence	3
		Mostly reasonable argumentation process, basic proper use of examples, quotes, or data as evidence	2
		Unreasonable argumentation process, lack of or improper use of examples, quotes, or data as evidence	1
	Between-paragraph Logic	Complete discussion, clear organization, appropriate elaboration of sub-points and arguments	3
		Mostly complete discussion, basic clear organization, slight inappropriateness in sub-points and argument elaboration	2
		Incomplete discussion, lack of clear organization, inappropriate elaboration of sub-points and arguments	1
Language	Coherence & Accuracy	Smooth, coherent text with essentially no language errors, only a few minor mistakes	3
		Relatively coherent text, but with a small number of language errors	2
		Barely coherent text; a considerable number of language errors, some of which are serious	1
Total Score:			
Other comments:			

2.4. The Significance of this research

As the college English course for medical students is a humanities course in the medical context, the author believes that this course should meet the requirements of both the New Liberal Arts and the New Medical Education. This study uses constructivism as a theoretical framework, adhering to its emphasis that learning is a process in which the subject autonomously constructs knowledge through interaction with the external environment and highlighting students' initiative, innovation, and cooperation to cultivate deep learning. The study also implements scaffolded teaching that aligns with the active knowledge construction philosophy in constructivism, demonstrating the effectiveness of peer feedback on medical students' writing skills, language ability, humanistic literacy, and research awareness, thus "deepening the innovation of training mechanisms and accelerating the cultivation of 'Medicine + X' compound medical talent" as requested by the Higher Education Bureau.

3. The Research

3.1. Research Questions

This mixed-methods study examined the change in students' writing levels based on peer feedback and conducted an open-ended questionnaire survey for teachers, attempting to answer the following questions:

1) Can peer feedback improve the writing level of medical students?

2) Can peer feedback facilitate the coordinated development of ideological and political learning and skill acquisition?

3) What are the roles and challenges of peer feedback in college English classrooms?

3.2. Participants

The subjects participating in the experimental study were 60 students from the Year 2 of Oral and Maxillofacial Surgery class (admitted in 2020) (abbreviated as 20OMS) and 56 students from the Year 2 Psychiatry and Anesthesiology class (admitted in 2020) (abbreviated as 20PA) at Wenzhou Medical University Renji College. The study combined the experimental group and the control group design, as well as the pre-test and post-test design for the same group of research subjects. The 20 MS group serves as the experimental group for teaching exploration, and the 20 PA group serves as the control group for teaching exploration. Implementation began in the second semester of the 2021-2022 academic year.

The subjects participating in the questionnaire survey were 60 teachers from a foreign language college of a medical university who had been teaching college English courses to non-English major students for an average teaching experience of 11 years, with similar teaching backgrounds and experiences. They had consistent understanding regarding the general knowledge, humanistic nature, and instrumental nature of college English courses.

Table 2. Demographic information of the survey participants

Basic Information		N	Percentage
Gender	Male	21	35
	Female	39	65
Title	Teaching Assistant	8	13.3
	Lecturer	48	80
	Associate Professor	4	6.7
Education	Bachelor's Degree	19	31.7
	Master's Degree	34	56.7
	Doctoral Degree	7	11.7

Sixty valid questionnaires were collected. The author numbered them using Arabic numerals, classified the answers (a total of 18,385 words) according to dimensions (1) and (2), and input them into a Word document. The qualitative data was then coded at three levels using NVivo11 software. The two classified texts were read word by word, and key words and phrases were extracted. Further phrase and sentence extraction was conducted to obtain first-level codes based on the preliminary classified data. The relationships between first-level codes were analyzed, and words with similar expressions were merged and classified into more accurate categories to obtain second-level codes. The internal logic expressed between second-level codes was studied, themes were explored, and third-level codes were sorted out as typical textual data, which served as effective answers to research question 3. The results were represented by core category nodes. Coding is the process of associating a part of research data with a node, which is a container used to collect materials about a specific theme or case during the NVivo coding process. The Node Reference refers to the collection of all references coded to a specific node.

3.3. The Experimental Study

The two classes had the same duration of writing instruction and used identical teaching materials. In addition to traditional writing lectures, such as structural analysis, language input, and model essay learning, the curriculum reform emphasized the use of writing assessment rubrics, as shown in Table 1, for peer feedback, discussion, and practice. After the experimental group students used the rubric of criteria to grade their peers' writing, they engaged in interactions and discussions on their grading decisions and areas for improvement. The aim of this exploration was to enhance students' writing awareness, promote independent learning, and foster reflection abilities.

In the teaching experiment, the teacher assigned both groups (classes) an essay titled *The Importance of Mutual Understanding and Respect in Interpersonal Relationships* and required students to produce their work in class. The produced samples served as pre-test samples, and the scores were recorded as pre-test scores. For the experimental group, the teacher instructed students to pair up and evaluate each other's work using Table 1. After the peer evaluation, the teacher organized paired students to discuss and reflect on their grading decisions and areas for improvement in class. Finally, without notifying the students, the teacher assigned another in-class writing task titled *The Impact of Communication among People* and required students to produce their work in class. The control group students also completed both writing tasks in class, with the only difference being the method of feedback. Based on the overall performance of the first assignment, the teacher selected a few model essays and explained their structure, content, and language according to the scoring rubric. To achieve uniform scores, the teacher, who was also the author, graded all four writing tasks (two pre-tests and two post-tests) for both classes.

A total of 232 essay samples were collected before and after the teaching experiment, including 120 pre- and post-test samples from the experimental group and 112 pre- and post-test samples from the control group.

3.4. The Questionnaire

The questionnaire contains 20 questions, including two variable dimensions: (1) What do you think is the role of peer feedback in college English classrooms? (2) Where do you think the difficulty lies in implementing peer feedback in college English classrooms? The second aspect explores the following variables: students (Student), environment (Environment), teachers (Teacher), and evaluation policy (Evaluation Policy) and their close relationship with the inclusion of peer feedback and scaffold-based constructivist teaching in the reform of medical college English classroom teaching. To explore the relationships between these variables, Pearson correlation analysis was conducted on the collected questionnaire data.

A total of 60 valid questionnaires were collected in the survey study. Firstly, the author numbered them using Arabic numerals. Secondly, the answers to the questions were classified into text data (18,385 characters) according to questions (1) and (2), and input into a Word document. Next, this qualitative data was coded into three levels

using NVivo 11. The specific steps were: reading the data word by word, combining the keywords and phrases of questions (1) and (2), extracting phrases and sentences from the basic data, and obtaining the first-level coding through open coding; analyzing the relationships between the first-level codes, merging similar text data into a broader category to obtain the second-level coding; studying the internal logic of the second-level codes, exploring themes, and organizing the third-level coding. Finally, the author selected typical text data for the presentation of the results for research question 3.

3.5. The Reflective Journal Writing

Based on their peer feedback experience, the experimental group wrote reflective journals. The teacher designed questions around three major dimensions: acceptance of peer feedback, improvement of writing skills, and cultivation of deep learning abilities, to answer research questions 1 and 2. The content of these journals included, but was not limited to: Did you gain any writing skills through peer feedback? In what aspects did your initial draft and final draft change? What new insights and thoughts do you have on improving your writing level? After qualitative data was collected, textual analysis was conducted, key concepts and themes were marked, coding was completed, and the meaning of the text data was interpreted, further verifying and deepening the results of the reflective reports.

3.6. Data Analysis

Statistical analysis was performed using SPSS 27.0. Independent sample *t*-tests were used for comparisons between the two groups, paired *t*-tests were used for within-group comparisons before and after the experiment, and single-factor analysis of variance was used to control the variables, i.e., the impact of peer feedback on the two observed variables, i.e., the control group and the experimental group. A P-value less than .05 indicates a statistically significant difference.

For the smooth conduct of the study, an independent sample *t*-test was performed on the pre-test writing scores of the two classes before the implementation of peer feedback. Assuming that the original scores of the two classes were similar and there were no differences, the results of the statistical data analysis reflected that the null hypothesis was valid (t (114) = .593, P > .05).

4. Results and Discussion

4.1. The Results of the Experiment

Through the innovative writing teaching of peer evaluation and feedback in the experimental group, it was found that there was no statistically significant difference in the performance of the experimental group and the control group in the pre-test (t (114) = .593, P > .05), indicating that the baseline levels of the two groups were equivalent before the experiment. The post-test mean score of the control group was 81.08, an increase of .98 points compared to the pre-test. However, the *t*-value was 1.090, and the *P*-value was .280, indicating that the improvement of the control group was not statistically significant. The post-test mean score of the experimental group was 86.02, an increase of 5.47 points compared to the pre-test, and the improvement in the post-test was statistically significant (t (114) = 4.882, P < .05). Through the paired sample t-test of the pre-test and post-test, the difference in the mean values of the post-test between the experimental group and the control group was -4.94, with a *t*-value of -3.432, and a *P*-value of .001. This indicates that the performance difference between the experimental group and the control group in the post-test was statistically significant, suggesting that the peer feedback teaching innovation based on writing practice had a significant effect on the experimental group. After the experimental intervention, the writing level of the experimental group in the post-test was significantly improved, which was statistically significant, highlighting the effectiveness of the experimental intervention, as shown in Table 3.

The purpose of conducting a paired sample *t*-test for the pre-test and post-test of the experimental group and the control group was to compare the differences in the writing levels between the control group and the experimental group under teaching exploration and innovation, namely, the role of peer feedback. As shown in Table 3, the teaching strategies adopted by teachers before the post-test of the control group, such as sharing peer essays in traditional teaching modes, did not play a significant role in improving the post-test scores of this group. In contrast, the experimental group achieved significant progress in their post-test scores after peer feedback. However, the author still believes that the revision process plays an important role in writing teaching. Even if the control group did not achieve good performance in this post-test, it does not mean that traditional feedback modes should be abandoned. Exploring the possibilities and practical value of various revision methods is a long way to go.

Table 3. Independent and paired sample *t*-test results for pre- and post-tests of control and experimental groups

Item	Group	N	Mean	SD	MD	*t*	df	*P*
Pre-test	Control Group	56	80.10	7.95	0.45	0.593	114	0.554
	Experimental Group	60	80.55	7.48				
Post-test	Control Group	56	81.08	8.03	0.98	1.090	55	0.280
	Experimental Group	60	86.02	7.12	5.47	4.882	59	0.000
Post-test comparison	Control Group	56	81.08	8.03	-4.94	-3.432	114	0.001
	Experimental Group	60	86.02	7.12				

Note: P < .05

Notwithstanding, the author still believes that the post-writing evaluation and revision process plays an essential role in writing instruction. Even though the control group did not achieve good performance in this post-test, it does not mean that the traditional feedback mode should be abandoned. Exploring the possibilities and practical value of diverse evaluation and revision methods remains a long-term challenge.

4.2. Reflective Journal Writing Investigation

After the post-test writing exercise, the author asked each student in the experimental group to write a reflection, mainly focusing on the research question, "*Can peer feedback promote the synergy between ideological and political learning and skill learning?*" Based on this question, students can also think about: Have you gained any writing skills through peer feedback? What changes have been made between your initial draft and final draft? What new insights and thoughts do you have on improving your writing skills?

The author collected 60 reflective reports, totaling approximately 15,000 words of qualitative data, and conducted content analysis. The results show that most students in the experimental group highly approve of the peer feedback evaluation model, believing that this method helps to improve writing skills, strengthen self-examination, and enhance research awareness. Communication skills and self-awareness have also been improved (see Table 4).

Table 4. Content Analysis Results of Reflective Journal Writing

Theme	Frequency	Relevant Quotes
Acceptance of Peer Feedback	High	Students generally approve of this evaluation model of peer feedback
Improvement of Writing Skills through Peer Feedback	High	Believed that this method "can help to better review writing standards and check the writing level of peers"
Self-examination and Writing Optimization	High	"Can scrutinize one's own writing deficiencies, optimize writing content through reflection, and focus on writing methods"
Enhancement of Literacy and Awareness	High	"The enhancement of literacy and awareness is being strengthened imperceptibly"
Peer Communication and Self-awareness	Medium	"Discussing with a paired student about the original scoring decision and reasons, and further exploring methods and paths for writing improvement, can promote communication and self-awareness"

The purpose of reflection is to provide a scaffold for students so that they can explore the zone of proximal development (ZPD) of language and skill learning through standards, provide another perspective on students' learning status and needs to teachers, and cultivate students' rational thinking, logical argumentation, and active progress learning habits, integrating the educational goals of ideological and political courses silently into feedback and self-directed learning. Based on understanding the learning objectives, students can critically learn new facts and integrate them into their existing and familiar cognitive structures, making well-founded decisions and solving problems in learning (He & Li, 2005). This process is, in a subtle way, a practice of deep learning.

In recent years, the characteristics of deep learning have become a hot topic in the field of educational research. These characteristics include aspects of the cognitive domain, where learners master core academic content, engage in argumentative thinking, and develop problem-solving skills. Additionally, deep learning encompasses aspects of the self-domain, where learners develop and maintain academic consciousness and learn how to learn. Interpersonal domain aspects are also important, as students experience the positive effects of collaboration and effective communication on learning (Zhu & Peng, 2017).

Undoubtedly, peer feedback during the writing process has provided students with positive learning experiences in cognitive, self, and interpersonal domains. In the context of feedback promoting learning and under the background of New Liberal Arts construction, the deep learning model is suitable for training New Medical talent. This model focuses on communication, self-recognition, and academic exploration, which are not only the core elements of ideological and political education in medical talent training but also the fundamental principles of deep learning. Deep learning emphasizes promoting the development, transfer, and generation of higher-order intelligence (Peng & Zhu, 2020).

4.3. Questionnaire Survey Research Findings

Regarding the first variable shown in question 1, 53 teachers (88.3%) believed that peer feedback had a positive effect on college English classroom learning,

especially in promoting learning enthusiasm, improving language cognitive learning outcomes, enhancing critical thinking and reflection, and recognizing the importance of communication and self. Only four teachers thought the effect was minimal, and three teachers provided irrelevant answers, stating that they never used this strategy in the classroom.

For question 2, the factors that hindered the implementation of peer feedback in college English classrooms are sorted by the frequency of three-level coding from high to low, including "environment," "teacher," and "policy," as shown in Table 4. It is worth noting that 46 teachers (76.7%) pointed out that "there is not enough time for students to understand peer feedback, and they need to understand the meaning of the standards." Some teachers believed that "limited resources," such as "the design of the standard scoring sheet is very complicated," and "directly copying the scoring criteria of standardized tests is unreasonable," making it difficult for peer feedback to be effectively implemented. In addition, 48 teachers (80%) believed that current assessment policies still focus on summative assessments, such as final exams, and "medical students are always under high study pressure and are unwilling to invest too much of their spare time in formative assessments dominated by peer feedback."

The survey results reveal the core framework of research question 3, providing a structured perspective for in-depth analysis of the role and challenges of peer feedback in university English classrooms.

Table 4 provides a summary of the core node categories related to the role and difficulty of peer feedback in university English classrooms (reference point).

Table 4. Nodes of three-level coding results (No. of node reference)

Question	Level 1 Nodes	Level 2 Nodes	Examples of Level 3 Nodes
1. The role of peer feedback	Students (128)	Learning Motivation (36)	Motivation Enhancement (18); Active Participation (18)
		Language Mastery (45)	Language Proficiency Improvement (23); Mastering Language Structures (22)
		Critical Thinking and Reflection (28)	Changing Thought Patterns (14); Critical Thinking (14)
		Communication and Self-awareness (19)	Enhanced Self-awareness (10); Improved Social Skills (9)
2. The difficulty of peer feedback	Environment (103)	Limited Time (67)	Short Teaching Time (34); Insufficient Feedback Time (33)
		Limited Resources (36)	Inadequate Teaching Resources (18); Lack of Feedback Resources (18)
	Teacher (112)	Teachers do not Acknowledge Student Ratings (46)	Inaccurate Student Ratings (28); Low Authority of Student Ratings (18)
		Teachers' Understanding of Feedback (56)	Misunderstandings in Teacher Understanding (28); Improper Application of Feedback (28)
	Assessment Policy (156)	Lack of Side Support for Policies (52)	Incomplete Policies (16); Difficult Implementation of Policies (36)
		Specific Implementation of Policies (45)	Complex Implementation Steps (26); Unsatisfactory Implementation Results (19)
		Feedback Effects of Policies (59)	Inaccurate Evaluation of Effects (26); Insufficient Feedback Improvement (33)

Pearson correlation analysis measures the strength and direction of the linear relationship between two variables by calculating the Pearson correlation coefficient (r) between them. The correlation coefficient ranges from -1 to 1, with 0 indicating no linear relationship. The larger the absolute value of the Pearson correlation coefficient, the stronger the linear relationship between the two variables.

We find a moderately positive correlation between students and the environment ($r_{\text{environment-student}} = .642$, $P<.05$), indicating that students might adapt more easily to scaffolding-based constructivist teaching methods and peer feedback in a high-quality teaching environment. Furthermore, there is a strong positive correlation between students and teachers ($r_{\text{teacher-student}} = .784$, $P<.05$), suggesting that teachers have a significant impact on students during the teaching reform process, especially when employing peer feedback and scaffolding-based constructivist teaching strategies. In addition, the positive correlation between students and assessment policies ($r_{\text{assessment policy-student}} = .494$, $P < .05$) implies that the reform of assessment policies may impact students' adaptation to new teaching methods. Meanwhile, the correlation coefficient between the environment and teachers is .506, showing a moderately positive relationship, indicating that a good teaching environment helps teachers implement new teaching strategies more effectively. Moreover, the strong positive correlation between the environment and assessment policies ($r_{\text{assessment policy-environment}} = .713$, $P < .05$) suggests that the teaching environment and assessment policy reform are closely linked and may impact the success of teaching reform. Finally, the correlation coefficient between teachers and assessment policies is 0.572, demonstrating a moderately positive relationship.

This indicates that teachers play a crucial role in formulating and implementing new assessment policies, affecting the implementation of teaching reforms.

Table 5. Pearson correlation analysis result

Variable	Student	Environment	Teacher	Evaluation Policy
Student	1.000			
Environment	.642**	1.000		
Teacher	.784**	.506**	1.000	
Evaluation Policy	.494**	.713**	.572**	1.000

*Note: ** indicates significant correlation at 0.01 level.*

The Pearson correlations suggest that these variables interacted with each other during the process of incorporating peer feedback and scaffolding-based constructivist teaching methods into the teaching reform of college English classes in medical schools.

4.4. Discussion: Exploring College English Classroom Teaching Models

4.4.1. Effects of Peer Feedback

It can be concluded from the results above that peer feedback in college English classrooms improves students' writing levels and works synergistically with ideological education, cultivating students' habits of deep learning. The construction requirements of the new humanities and new medical disciplines should be considered in college English courses in medical schools, shifting English learning from traditional single-skill learning to ability learning centered on "content," "language," and "literacy" (Long, 2021). Teachers should employ teaching methods that tap into students' Zone of Proximal Development and emphasize the constructive role of "context" and "standards" in learning. English teaching should include content teaching, as well as the cultivation of literacy competency and critical thinking skills, consistent with the requirements of the New Liberal Arts and new medical disciplines. Encouraging students to conduct self-assessment of their peers' learning outcomes enhances active learning abilities and critical thinking skills, providing new evaluation criteria and perspectives for teachers' follow-up teaching. Guiding students in autonomous learning is the requirement of implementing subject education ideas and the premise for cultivating students' lifelong learning abilities (Yu et al., 1999).

4.4.2. Suggestions for the New Model

Combining the basic theory of constructivism, the background of New Liberal Arts construction, and the talent cultivation requirements of New Medical disciplines, as well as the research results, the author believes that college English classrooms in medical schools should achieve the following: 1) student-centered, emphasizing reflection; 2) teacher-assisted, achieving role transformation; 3) embodying the educational function of curriculum-based ideological and political education, enriching teaching materials; 4) using teaching model innovation as the driving force to promote teacher development.

Constructivism emphasizes student-centered learning, which achieves the ZPD through scaffolding and effective teaching strategies. To facilitate this process, students should be given the opportunity to evaluate their peers' learning outcomes, reflect on their own learning, and integrate their knowledge. Meanwhile, teachers should adjust their teaching strategies in real-time based on students' performance and dynamic assessment, aiming to accurately find students' ZPD and build a reasonable scaffolding. This approach requires teachers to provide high-intensity support for students in the classroom, as advocated by Mariani (2005).

Furthermore, the humanistic and instrumental aspects of college English courses should be reflected in the educational function of curriculum-based ideological and political education. English classrooms in medical schools should focus on the integrity, continuity, and systematicity of ideological and political teaching, avoiding the teaching mode of "two separate skins" between teaching and ideological education. The peer assessment explored in this study provides experience and research direction for how to construct an evaluation system and model of college English courses effectively and reasonably under the background of new medical disciplines, to cultivate "medical + English" compound talents with comprehensive English abilities, as noted by Pan (2022).

In addition, the use and construction of classroom assessment methods in medical college English classrooms can promote evaluation tasks and content to serve language teaching goals and emotional goals. Effective evaluation can guide students to gradually appreciate the role of reasonable evaluation and feedback in their future careers during the process of language learning skills. For instance, doctors can promote benign communication between patients through reasonable feedback and comprehensive, professional, and empathetic interaction. A reasonable and scientific evaluation method is also an essential way to innovate the teaching paradigm of medical students' English learning classrooms.

Lastly, under the background of the New Liberal Arts, the main target of college English courses in medical schools is medical and pharmaceutical professional talents. Therefore, the function of general education in college English courses should be based on teachers' mastery of content knowledge (i.e., PCK). Additionally, teachers need to understand some basic medical knowledge inevitably, and appropriately incorporate the learning of basic medical knowledge in teacher training. This will help them set up course content reasonably under the educational function of curriculum-based ideological and political

education, to reflect the ideological and political education goals of multicultural content, objective analysis, rational treatment, and positive life outlook, values, and world outlook. The integration of medicine and language is the key to the embodiment of ideological and political elements in college English courses in medical schools, and when, where, and how to integrate will be a direction worth paying attention to in future teacher development and training.

5. Conclusion

This study focused on second-year medical students in college and adopted peer feedback in college English writing teaching. Through qualitative and quantitative analysis, the study verified the positive effect of peer feedback on English writing learning. The study found that: 1) Learning based on peer assessment and feedback can improve writing proficiency; 2) Peer feedback can help students develop their thinking and reflection abilities, promote cognitive, self, and communication development, cultivate students' habits of deep learning, and promote the coordinated development of language knowledge, skills, and ideological education.

As the sample size of this study is limited to the author's own students, the generalizability of the research results needs to be further enriched and consolidated. However, the effectiveness of peer feedback should be affirmed, especially with the proposal of a new curriculum for medical schools based on the New Liberal Arts framework. This has elevated the research results of this paper and constructed an effective path for achieving the integration of knowledge and skills learning and ideological education, as well as cultivating students' habits of deep learning, based on feedback-based college English teaching in medical schools. This paper provides an effective teaching model that combines deep learning and ideological education for college English teaching in medical schools from the perspective of the New Liberal Arts.

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Conflict of Interest

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