

An Experimental Study of the Effects of Production-oriented Approach and Task-based Language Teaching on Senior High School Students' English Writing

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Abstract

Based on theoretical foundation of Production-oriented Approach (POA) and Task-based Language Teaching (TBLT), a nine-week quasi-experimental study was conducted to explore the effects of POA and TBLT on senior high school students' English writing. Two parallel classes of grade two in a senior high school in Hohhot, Inner Mongolia Autonomous Region were chosen as experimental classes, which were randomly assigned to either POA group or TBLT group. Combining standardized writing tests, validated questionnaires with semi-structured interviews, it aims at addressing the following two research questions: (1) What are the effects of POA and TBLT on complexity, accuracy and fluency of senior high school students' English writing? (2) What are the effects of POA and TBLT on the senior high school students' critical thinking skills? The research results showed that: (1) There existed significant difference of writing scores between POA group and TBLT group. Compared with TBLT, the application of POA was more contributed to improving complexity and accuracy of English writing of senior high school students. (2) There was no significant difference between two groups in the mean scores of overall critical thinking skills. But it existed significant difference in the dimension of analysis between POA group and TBLT group. Finally, according to the findings of the research, some suggestions for improving efficiency of English writing teaching are put forward for high school English teachers and the limitations of the study and suggestions for the future research are discussed.

Keywords: production-oriented approach, task-based language teaching, English writing, critical thinking skills, senior high school students

1. Introduction

Within the domain of secondary education, written composition occupies a central position in English language pedagogy. Newly revised National English Curriculum Standards for Common High School (2017 edition, revised 2020) emphasizes the pedagogical significance of writing proficiency within the framework of communicative competence. The curriculum mandates educators to implement evidence-based instructional strategies that incorporate authentic English materials to enhance learners' cultural awareness and linguistic repertoire. Furthermore, it advocates for a learner-centered approach that accommodates individual differences while adhering to the established principles of second language acquisition theory. This dual focus aims to cultivate students' writing competence across three critical dimensions: fluency, accuracy, complexity, thereby fostering comprehensive communicative competence in English as a foreign language (EFL) contexts.

Furthermore, English writing is not only an external output test for language items, but also an intrinsic overall activity for thinking. Among all different thinking qualities, critical thinking skills are core competences, which have been especially emphasized in the new round of curriculum reform by the National Department of Education. In January 2018, China's Ministry of Education issued the first "national standard" of teaching quality in China's higher education field, which made clearer requirements for the cultivation of students' critical thinking skills. However, the English writing proficiency and critical thinking skills of senior high school students have not reached an ideal level.

In order to solve this problem, it is necessary to explore effective teaching methods to improve students'

language skills and cultivate their critical thinking skills. Recent developments in second language acquisition theory, particularly the emergence of POA and TBLT, have established a robust theoretical framework for advancing English writing instruction. While these approaches share certain pedagogical principles, they differ in their theoretical foundations and implementation strategies, promoting preliminary comparative analyses at the conceptual level by domestic researchers. However, experimental research has rarely been conducted to compare the effect of POA with that of TBLT. The current research is going to carry out teaching experiment to examine the differential effects of POA and TBLT on English writing performance among senior high school students within the Chinese English as a Foreign Language (EFL) context.

2. Literature Review

The emergence of POA and TBLT has provided a strong theoretical foundation for improving English writing instruction. Scholars globally and domestically have systematically investigated the pedagogical effectiveness of POA and TBLT in English writing.

2.1 Relevant Researches on the Effects of POA on English Writing Abroad and at Home

POA is a new foreign language teaching theory with Chinese characteristics proposed by Wen (2008, 2013, 2014, 2015, 2017, 2018), which is based on Input Hypothesis and Output Hypothesis. Its aim is to change the current teaching situation that is inefficient and separation of learning and use in English learning in China (Wen, 2017).

Hyland (2016) employed POA in English writing to discuss the problems in writing and presented a teaching mode under the guidance of POA. Kern (2017) carried out a teaching experiment to explore the effects of POA on English writing in the senior high school through designing a teaching mode of English reading and writing class under the guidance of POA. Alister Cumming (2017) affirmed the optimal impact of POA on educational practices and theories of language learning.

Zhang (2017) conducted a two-week experimental study to examine the effects of the POA on college students' English writing quality in which she discussed whether POA could better improve students' writing quality and whether it could help students master the newly-taught linguistic items. Zhang & Tao (2018) carried out classroom instruction on sophomores under the guidance of POA to make an analysis of the change path of English writing ability from the points of micro-change. The results showed that the students' writing ability had been improved in lexical, grammatical, cohesive, content and logic aspects. Fan (2019) applied POA to business English letter writing course and showed the detailed teaching design and procedures of the practice with instances under the guidance of POA. Chen & Wen (2020) conducted one semester-long instruction of nominalization to 90 non-English majors under the guidance of the POA. This research examined how POA, especially its enabling procedure, can be applied to the teaching of nominalization. The result indicated that the accurate application of the three criteria of effective enabling can improve the quantity and quality of nominalization in academic writing.

2.2 Relevant Researches on the Effects of TBLT on English Writing Abroad and at Home

TBLT has originated from 80s in the last century, and was first proposed by Nunan. Some representative frameworks of TBLT were proposed by researchers (Skehan, 1998; Willis, 1996; Ellis, 2000 & Nunan, 2004). Cheng (2004) considered that TBLT refers to a language teaching method based on task, which aims to improve students' communicative competence by organizing them to participate in meaningful communication activities during the implementation of tasks. Most of the empirical studies of domestic and foreign scholars used the mode of TBLT to classroom activities designed by Willis.

Nunan (1989) probed into the main meaning of TBLT when studying the design mode of communicative task. Afterwards, the effects of task-based language writing teaching were also testified by other scholars. In terms of writing teaching, regarding how to use task-based language teaching in English writing, Cai (2001) applied a task-based writing instruction method in college English writing, drawing on Willis' task-based teaching framework. The research of Cai (2001) provided us with a reference. Tian (2011) analyzed the theoretical foundation and main idea of TBLT and proposed pedagogical implications to college English writing teaching and specific teaching strategies. Liu (2016) did sixteen weeks of experiment to explore the effect of TBLT on English writing teaching in senior high school. The results of this study indicated that the accurate application of TBLT contributed to the improvement of the writing test scores and interest in writing significantly compared with traditional teaching method. Even in 2001, China put forward task-based writing teaching in the "interpretation of English curriculum standards" (experimental draft), explaining the significance of strengthening task-based language writing teaching, thus promoting the development of task-based writing teaching and accelerating the progress of foreign language writing teaching reform.

2.3 Comparative Researches on the Effects of POA and TBLT on English Writing

It has been confirmed that the effectiveness of POA and TBLT in English writing in the above literature review. There are only a few researches making a comparison between POA and TBLT at the theoretical level (Deng, 2018; Bi, 2019; Tang, 2020; Wen & Bi, 2020). Deng (2018) compared the pedagogical principles, hypotheses and procedures of TBLT with those of POA. The similarities and differences of POA and TBLT from pedagogical principles, hypotheses and procedures were illustrated and three advantages of POA for Chinese learners were stated in this study. Based on the research of Deng (2018), Bi (2019) examined the similarities and differences between POA and TBLT in terms of the design and use of teaching materials. Tang (2020) systematically compared teaching design of one unit from an intensive reading textbook for English majors under the guidance of POA and TBLT respectively to find out the similarities and differences between two teaching methods in the teaching procedures. Wen & Bi (2020) analyzed the fundamental distinctions between POA and TBLT, particularly in their target learners and teaching objectives, and provided a systematic comparison of their similarities and differences from three perspectives.

As for experimental research, the effects of POA and TBLT on English writing teaching are very seldom. Zhou (2021) has taken experimental research to compare the effects of POA and TBLT on English writing proficiency in terms of complexity, accuracy and fluency in real English writing teaching classroom. The result of this study found out that POA was a little superior to TBLT on improving English writing, which can also enhance student's fluency and complexity. Xu & Yao (2022) compared and analyzed the differences of POA and TBLT in guiding the teaching process design of business English professional courses. By comparative analysis, they concluded that POA was more in line with the teaching practice of business English majors in China, which helps to awaken students' learning autonomy, promote the output of high-quality tasks, and enhance their learning confidence. Wu (2022) applied the POA and TBLT theories to the teaching design of senior high school English reading class to explore the difference between POA and TBLT in English reading teaching. It has been concluded that the POA emphasized teacher-leading and student-oriented in teaching design, advocated the combination of learning and using, attached importance to multi-subject evaluation. Therefore, POA can stimulate student's learning initiative in the teaching process and help teachers achieve good teaching result in senior high school English reading teaching.

In conclusion, a comprehensive review of the extant literature reveals that the majority of domestic research investigating the comparative efficacy of POA and TBLT has predominantly focused on theoretical conceptualizations, with a paucity of empirical studies examining their practical applications in English writing instruction. Furthermore, there exists a significant research gap in the comparative analysis of these pedagogical approaches across multiple dimensions of writing proficiency, particularly in relation to complexity, accuracy, fluency, and the development of critical thinking skills. To address these research gaps, the present study implemented a quasi-experimental research design in an authentic EFL context, conducting a systematic investigation of POA and TBLT's differential effects on the writing competencies among senior high school students in China.

3. Research Methodology

3.1 Research Questions

The current study endeavors to investigate the effects of POA and TBLT on English writing competencies of senior high school students, answering the following two questions:

- (1) What are the effects of POA and TBLT on complexity, accuracy and fluency of senior high school students' English writing?
- (2) What are the effects of POA and TBLT on the senior high school students' critical thinking skills?

3.2 Research Subjects

The participants involved in this experimental research were 60 second-grade students from two parallel classes at a middle school in Hohhot. These participants were randomly allocated into two groups with their agreement: the POA group, consisting of 30 students, and the TBLT group, also consisting of 30 students. They were informed that the data were used for the research only.

All participants are senior high school students who had a minimum of seven years of English language education and had successfully passed the secondary school entrance examination who have learned English at least for seven years and have passed entrance examination for secondary school, so the participants' English level catered the demands of adopting POA and TBLT in English writing. Consequently, the English proficiency of the participants met the requisite standards for the implementation of the production-oriented approach (POA)

and task-based language teaching (TBLT) in the context of English writing instruction.

3.3 Research Instruments

The writing tests, questionnaire and interview were employed to collect the data. The data collected from writing composition, the questionnaire of critical thinking skills and interview were analyzed by the software SPSS 22.0, L2SCA and LCA.

3.3.1 Writing Tests

In the context of this experimental investigation, a series of five writing assessments were administered, encompassing an initial pre-test, three subsequent immediate post-tests, and a concluding delayed post-test. The pre-test, executed at the inception of the study, was designed to ascertain the presence of any statistically significant disparities in English writing proficiency between POA group and TBLT group. The immediate post-tests, along with the delayed post-test, were strategically implemented to evaluate the short-term and long-term efficacy of POA and TBLT on the students' English writing, with a particular focus on the dimensions of complexity, accuracy, and fluency.

To ensure the reliability and validity of this experimental study, the five writing assessments were administered concurrently in both classes, with a strict completion time of 35 minutes allotted for each test. The writing tasks for the three immediate post-tests were meticulously crafted by the researcher in alignment with the stipulations of the College Entrance Examination. All the writing assessments which have been finished by the students during the experiment, including pre-test, immediate post-test and post-test, were meticulously evaluated and annotated by two English teachers from Grade one. These evaluations were conducted in accordance with the English Composition Scoring Standards established for the College Entrance Examination, ensuring the integrity and academic rigor of the assessment process.

3.3.2 Questionnaire

The Critical Thinking Skills Questionnaire developed by Wen Qiufang (2011) was adopted in the experimental research. It is displayed in the form of six-point Likert scale in Chinese, with the option of "completely disagree" with a score of 1, "disagree" with a score of 2, "slightly disagree" with a score of 3, "slightly agree" with a score of 4, "agree" with a score of 5, "completely agree" with a score of 6. It consists of 52 questions, which is to measure different effects of POA and TBLT on critical thinking skills of senior high school students in English writing. The questionnaire is consisted of eight dimensions, which are analysis, curiosity, tenacity, self-confidence, truth-seeking, cognitive maturity, openness and justice. Each dimension contains 5 to 8 items, a total of 52 items. The same questionnaire was disseminated to students within both the POA group and the TBLT group on two separate occasions. The main aim of pre-questionnaire was to ascertain whether the students from two groups possessed comparable levels of critical thinking skills prior to the intervention. Subsequently, the post-questionnaire was utilized to verify whether there was a significant enhancement in the critical thinking skills of students in the POA group compared to their counterparts in the TBLT group following the pedagogical intervention. The Cronbach's alpha coefficient of this study is 0.987, which shows that the questionnaire has considerable reliability, and it can be used as a research instrument to collect the data of critical thinking skills. The KMO value and P value of Bartlett's spherical test is 0.863 and 0.000 separately, which manifests that the questionnaire is suitable for factor analysis and there is sufficient validity in critical thinking skills questionnaire.

3.3.3 Interview

The aim of interviews was to further verify the effectiveness of English writing teaching based on POA and TBLT on the critical thinking skills of senior high school students and give supplementary information. The questions of interviews are displayed as follows:

- (1) Do you like the English writing course based on POA or TBLT? If yes, which teaching phase of POA or TBLT do you like best?
- (2) Do you think POA and TBLT can promote your critical thinking skills?
- (3) Which aspects of critical thinking skills do you think are promoted during writing lesson?

3.4 Research Procedures

The experimental investigation spanned a duration of nine weeks, commencing in November 2022 and concluding in January 2023. The instructional material employed in this research was the "High School Curriculum Standards of English" (New Senior English for China, NSEFC), a publication of the People's Education Press. The experimental protocol was segmented into three distinct phases. During the pre-experimental phase, both the POA and TBLT groups were administered a pre-test writing task and a

pre-questionnaire designed to assess critical thinking skills. The interim experimental phase involved the execution of three cycles of writing instruction within the POA and TBLT groups, each adhering to their respective pedagogical frameworks. In the post-experimental phase, a post-questionnaire evaluating critical thinking skills was distributed to both groups. Conclusively, semi-structured interviews were conducted with participants from both the POA and TBLT groups to delve into the influences of these teaching methodologies on the development of critical thinking skills. The instructional designs for English writing pedagogy, grounded in the principles of POA and TBLT, are delineated as follows:

3.4.1 Teaching Procedures of POA

Step1: Motivating

- (1) The teacher presents some pictures of people who have made contribution during epidemic times and elicits the topic of great people.
- (2) The teacher presents real communicative scenarios and the students try out the required output task.
- (3) The teacher introduces output target and assigns the productive activities for the students.

Step 2: Enabling

- (1) Watch the video about introducing Qian Xuesen and find out the basic information of him.
- (2) Read the sample text about introducing Tu youyou and underline all the words and sentences related to basic information, experience and evaluation.
- (3) Do the language exercises.
- (4) Read the sample text about introducing Langping and find out the structure of descriptive discourse.

Step 3: Assessing

- (1) The teacher determines evaluation focus according to typical common problems found in students' compositions. According to evaluation focus, the teacher designs the evaluation criteria. The teacher prepares to select 2~3 typical samples before the class.
- (2) The teacher explains the evaluation criteria, requirements and steps of evaluation to the students. After getting the typical samples, the students evaluate it by themselves. Then the students work in pairs to evaluate the samples. Finally, the teacher summarizes the students' evaluation and proposes the modification plan. The teacher and students discuss the reasons for the modification.
- (3) After TSCA in the class, the students conduct self-evaluation and peer-evaluation. The teacher selects two students' evaluation form to learn about the students' evaluation. Then the teacher recommends 2~3 excellent works for the student next class.

3.4.2 Teaching Procedures of TBLT

Step1: Pre-task

- (1) Mission demonstration: Watch a short video about introducing a great men named Lin Qiaozhi and answer the following questions. Can you tell me her personal information? What does she do? What contribution did she make? What kinds of adjective words do you describe Lin Qiaozhi?
- (2) Pre-task language teaching: The teacher introduces some words and phrases by doing some exercises.
- (3) Schema construction: The teacher stimulates and expands basic knowledge about great men.
- (4) Strategic planning: Arrange time for the students to discuss the structure and content of descriptive discourse.

Step 2: While-task

- (1) Time limit: Ask the students to introduce the great men briefly within the specified time.
- (2) Situational support: Provide the students with relevant materials during task implementation.
- (3) Unexpected element: Provide additional information when students perform tasks.
- (4) Explicit instruction: The teacher reserves time for language teaching in task implementation

Step 3: Post-task

- (1) Repeat task: Students repeat the task in front of the whole class.
- (2) Report task results: Students report the results of the activities to the whole as a representative of group.
- (3) Language practice: The teacher conducts practice to help students master language points.

4. Results and Discussions

This section presents the results and discussions of the research. The first part shows the results and discussions of effects of POA and TBLT on English writing, encompassing the facets of complexity, accuracy and fluency. The second part illustrates the results and discussions of effects of POA and TBLT on critical thinking skills.

4.1 Comparison of the Effects of POA and TBLT on English Writing in Pre-test and Post-test

To ascertain English writing proficiency of students prior to the intervention, a pre-test writing assessment was administered on November 1st. Concurrently, to explore whether POA method could really influence students' writing proficiency compared with TBLT, three immediate post-tests and one delayed post-test were conducted with both the POA and TBLT groups throughout the experimental period. The results of pre-test and post-test are displayed as follows.

Table 1. Independent Sample T-test of POA and TBLT in Pre-test and Post-test

	POA (n=30)		TBLT (n=30)		MD	T (58)	Sig.
	M	SD	M	SD			
Pre-test	11.26	6.76	11.30	5.83	-.03	-.02	.984
Post-test	16.07	3.66	12.97	3.87	3.10	3.18	.002

*p<0.05

Based on the results of independent sample t-test of POA and TBLT in pre-test, the mean value and SD of the POA were 11.26 and 6.76 while those of the TBLT were 11.30 and 5.83. What's more, the independent sample t-test ($t(58) = -0.2$, $p > 0.05$) showed that there was not a significant difference in writing scores between POA and TBLT group in pre-test of writing task.

In delayed post-test of writing, the mean score of POA was 16.07 while the mean score of TBLT was 12.97. Obviously, the means of writing scores of POA was significantly higher than TBLT in post-test. The independent sample t-test ($t(58) = 3.18$, $p < 0.05$) showed that there was a significant difference in writing scores between POA and TBLT group in post-test of writing task. It can be deduced that the students in POA group exhibited superior writing performance relative to their counterparts in the TBLT group.

To get the effects of POA and TBLT on English writing respectively, a paired sample t-test was performed on the writing scores of pre-test and post-test in POA and TBLT group respectively. The results are displayed in Table 2 and Table 3.

Table 2. Paired Sample T-test of POA in Pre-test and Post-test

	Pre-test		Post-test		MD	T (29)	Sig.
	M	SD	M	SD			
POA	11.26	6.76	16.07	3.66	-4.80	-3.41	.002

*p<0.05

On the basis of results of the paired sample t-test of POA in pre-test and post-test, it can be seen that before the research, the mean value and SD of the POA were 11.26 and 6.76, while after three rounds of teaching experiment, they were 16.07 and 3.66 points. At the same time, after the comparison, the t value was -3.41 and p value was 0.002, which had obvious statistical significance. It can be concluded that the scores of the POA have obvious difference between pre-test and post-test and the latter was higher than the former. In other words, the implementation of the Production-Oriented Approach (POA) method has led to a significant enhancement in the writing capabilities of the students within the POA group.

Table 3. Paired Sample T-test of TBLT in Pre-test and Post-test

	Pre-test		Post-test		MD	T (29)	Sig.
	M	SD	M	SD			
TBLT	11.30	5.83	12.97	3.87	-1.66	-1.32	.195

*p<0.05

The results of the paired sample t-test of TBLT in pre-test and post-test showed that before the experiment, the mean value and SD of the TBLT were 11.30 and 5.83, while after the experiment, they were 12.97 and 3.87. After the comparison, the t value was -1.32 and p value was 0.195, which had no statistical significance. It can be showed that there was not a significant difference between pre-test and post-test of TBLT group.

It can be inferred that the pedagogical application of POA exerts a positive influence on the enhancement of students' writing performance, surpassing the efficacy of TBLT. Furthermore, POA demonstrates a superior effectiveness in the domain of writing instruction. This investigation aligns with the findings of prior research conducted by scholars such as Deng (2018), Bi (2019), Tang (2020), and Wen & Zheng (2020). The outcomes of this study corroborate the results of earlier studies that have acknowledged the beneficial impact of POA on students' writing proficiency.

4.1.1 Comparison of the Effects of the POA and TBLT on Complexity of English Writing in Post-test

In the context of complexity, the present study encompasses both syntactic complexity and lexical complexity. The syntactic complexity of written compositions was evaluated using the L2 Syntactic Complexity Analyzer (L2SCA), which encompasses five dimensions and fourteen metrics. For the purposes of this investigation, four specific indices were selected. The syntactic complexity was quantified by the following measures: clauses per T-unit (C/T), dependent clauses per clause (DC/C), dependent clauses per T-unit (DC/T), and clauses per sentence (C/S).

Table 4. Independent Sample T-test of POA and TBLT on Syntactic Complexity in the Post-test

Round	Index	Group	N	M	SD	T (58)	Sig.
First	C/T	POA	30	1.44	0.23	4.19	.000
		TBLT		1.22	0.18		
	DC/C	POA	30	0.24	0.10	3.04	.004
		TBLT		0.15	0.12		
	DC/T	POA	30	0.36	0.22	3.17	.002
		TBLT		0.20	0.16		
C/S	POA	30	1.47	0.31	3.06	.003	
	TBLT		1.26	0.22			
Second	C/T	POA	30	1.34	0.22	3.26	.002
		TBLT		1.08	0.36		
	DC/C	POA	30	0.25	0.12	3.52	.001
		TBLT		0.14	0.11		
	DC/T	POA	30	0.36	0.23	3.42	.001
		TBLT		0.18	0.15		
C/S	POA	30	1.39	0.27	2.287	.006	
	TBLT		1.12	0.40			
Third	C/T	POA	30	1.37	0.24	3.43	.001
		TBLT		1.18	0.19		
	DC/C	POA	30	0.26	0.12	3.16	.002
		TBLT		0.17	0.11		
	DC/T	POA	30	0.37	0.21	3.31	.002
		TBLT		0.21	0.15		
C/S	POA	30	1.41	0.24	4.00	.000	
	TBLT		1.19	0.16			
Delayed Post-test	C/T	POA	30	1.38	0.24	3.47	.001
		TBLT		1.18	0.16		
	DC/C	POA	30	0.26	0.11	3.30	.002
		TBLT		0.17	0.11		
	DC/T	POA	30	0.37	0.21	3.34	.001
		TBLT		0.21	0.15		
C/S	POA	30	1.41	0.23	4.03	.000	
	TBLT		1.21	0.16			

*p<0.05

Note: C/T= the total number of clauses per T-units; DC/C= the total number of dependent clauses per clauses; DC/T=the total number of dependent clauses per-T-unit; C/S=the total number of clauses per sentences

Table 4 demonstrated that the mean values of C/T, DC/C, DC/T, C/S of syntactic complexity in POA were higher than that of the TBLT. Besides sample t-test of POA and TBLT in post-test showed that p value of four indexes was lower than 0.05. There was obviously statistical difference in syntactic complexity of writing between two groups. It can be concluded that syntactic complexity of POA was higher than TBLT.

As for lexical complexity, it includes three dimensions, namely lexical variation, lexical sophistication and lexical density (Wolfe-Quintero, 1998). The current study focused on the measurement of lexical variation, which refers to the diversity of a learner's vocabulary. Lexical Complexity Analyzer (LCA) was applied to calculate lexical complexity of compositions, designed by Lu (2010) in this study, which can calculate totally 25 measures of lexical variation, lexical sophistication and lexical density proposed in SLA literature. Among the 25 measures, one index was selected in this current study, which was measured by TTR.

Table 5. Independent Sample T-test of POA and TBLT on Lexical Complexity in the Post-test

Round	Index	Group	N	M	SD	T (58)	Sig.
First	TTR	POA	30	0.61	0.08	2.58	.012
		TBLT		0.52	0.19		
Second	TTR	POA	30	0.61	0.06	3.44	.001
		TBLT		0.56	0.05		
Third	TTR	POA	30	0.61	0.04	5.57	.000
		TBLT		0.56	0.03		
Delayed Post-test	TTR	POA	30	0.62	0.04	5.76	.000
		TBLT		0.56	0.03		

*p<0.05

Note: TTR= the ratio of the number of word types to the number of words

From Table5, it can be seen that the scores of TTR in POA was higher than that of TBLT. Moreover, p value was lower than 0.05, indicating that significant difference of lexical complexity of English writing existed between POA and TBLT after the three rounds of experimental research.

From the interviews conducted with students, it is evident that those in the POA cohort exhibit a propensity to employ complex sentence structures and idiomatic expressions in their writing. Concurrently, Wen (2015) has highlighted that the POA facilitates students in discerning valuable concepts, linguistic elements, and discourse frameworks from input materials, thereby facilitating deeper processing, practice, and retention of the knowledge they aim to apply in productive tasks. Consequently, the enhancement in writing complexity observed among students may be attributed to the enabling process inherent in POA. The findings of this experiment are congruent with the purported benefits of the POA theoretical framework.

4.1.2 Comparison of the Effects of POA and TBLT on Accuracy of English Writing in Post-test

The most commonly used accuracy measures included the error rate per T-unit and the percentage of error-free T-units. Accuracy in this study was calculated based on EFT/T by L2SCA automatically. With the help of L2SCA, the number of error-free T-unit and the number of T-units in every writing composition were calculated. Then, with the help of these two numbers, EFT/T was calculated in this research.

Table 6. Independent Sample T-test of POA and TBLT on Accuracy in the Post-test

Round	Index	Group	N	M	SD	T (58)	Sig.
First	EFT/T	POA	30	0.63	0.21	2.41	.019
		TBLT		0.50	0.21		
Second	EFT/T	POA	30	0.77	0.16	3.39	.001
		TBLT		0.64	0.14		
Third	EFT/T	POA	30	0.78	0.09	3.28	.002
		TBLT		0.65	0.18		
Delayed Post-test	EFT/T	POA	30	0.78	0.08	3.25	.002
		TBLT		0.66	0.18		

*p<0.05

Note: EFT/T= the number of error-free T-unit divided by the number of T-unit

From Table 6 presented above, it can be indicated that the scores of EFT/T in POA was higher than that of TBLT obviously. Moreover, p value was less than 0.05, showing that significant difference of means of writing accuracy existed between two groups after the three rounds of experimental research.

From the student interviews, it is evident that the components focusing on reading for structure during the enabling phase and the mutual evaluation of compositions in the assessment phase were highly favored by all participants. A majority of the students acknowledged that they have acquired the ability to revise their compositions based on peer feedback.

Wen (2016) also emphasized that TSCA facilitates more targeted evaluations in the classroom, guided by the collaborative assessment of both the teacher and students, thereby yielding superior evaluation outcomes. The beneficial impact of TSCA on the accuracy of written language was corroborated in the study by Fan (2018). Consequently, it can be inferred that TSCA plays a significant role in enhancing writing accuracy.

4.1.3 Comparison of the Effects of POA and TBLT on Fluency of English Writing in Post-test

The most frequently accepted measures of fluency were acquired based on the ratio of the number of words of the whole passage to the number of T-units and clauses. If the ratio number of words to the number of T-units or clauses is higher, the fluency of the composition is proficient. As for the testing of language fluency, L2SCA mentioned before was adopted again. Fluency in this current study was calculated based on W/T and W/C.

Table 7. Independent Sample T-test of POA and TBLT on Fluency in the Post-test

Round	Index	Group	N	M	SD	T (58)	Sig.
First	W/T	POA	30	10.31	4.08	.737	.464
		TBLT	30	9.73	1.34		
	W/C	POA	30	8.40	2.54	-.494	.623
		TBLT	30	8.74	2.68		
Second	W/T	POA	30	12.02	2.06	.306	.761
		TBLT	30	11.80	3.31		
	W/C	POA	30	9.28	1.87	-.214	.832
		TBLT	30	9.39	2.21		
Third	W/T	POA	30	11.94	2.08	.768	.446
		TBLT	30	11.47	2.60		
	W/C	POA	30	9.66	1.96	.415	.680
		TBLT	30	9.43	2.19		
Delayed Post-test	W/T	POA	30	12.01	2.07	.721	.474
		TBLT	30	11.57	2.59		
	W/C	POA	30	9.73	1.93	.483	.631
		TBLT	30	9.47	2.17		

*p<0.05

Note: W/T= total number of words per T-unit; W/C= total number of words per clause

Table 7 indicated that the W/T, W/C of POA group was close to that of TBLT. Meanwhile, the p value of W/T and WC were higher than 0.05, which meant that there was not a significant difference in fluency of English writing between POA and TBLT after three rounds of experimental research.

It can be deduced that the fluency of writing is not significantly influenced by either POA or TBLT. In other words, while POA and TBLT may exert some influence on the fluency of English writing among senior high school students, a notable difference is not distinctly evident. The underlying reason for this may be that students utilizing POA tend to focus more on the complexity of structures and the length of their compositions, which may detract from their attention to the fluency of the text.

4.2 The Effects of POA and TBLT on Critical Thinking Skills in English Writing

The effects of POA and TBLT on senior high school students' critical thinking skills are presented and discussed in this section.

4.2.1 The Effects of POA and TBLT on Critical Thinking Skills in Pre-test

Table 8. Independent Sample T-test of POA and TBLT on Overall Critical Thinking Skills Score in the Pre-test

	POA (n=30)		TBLT (n=30)		MD	T (58)	Sig.
	M	SD	M	SD			
Score	186.97	19.45	189.80	16.79	-2.83	-.604	.548

*p<0.05

The results indicated that levels of critical thinking skills were not significantly varied among students of POA and TBLT (t (58) = -.604, p >0.05), which indicated that there was no significant difference in overall critical thinking skills in pre-test between two groups.

Table 9. Independent Sample T-Test of POA and TBLT on Sub Dimensions of Critical Thinking Skills in Pre-test

Dimension	Group	N	M	SD	T(58)	Sig.
Analysis	POA	30	11.12	2.68	.685	.496
	TBLT		11.67	3.44		
Curiosity	POA	30	14.32	4.11	.483	.631
	TBLT		14.82	3.81		
Self-confidence	POA	30	23.54	4.94	-.574	.568
	TBLT		22.88	3.94		
Truth- seeking	POA	30	24.40	3.31	-1.52	.133
	TBLT		17.14	30.29		
Cognitive maturity	POA	30	22.33	43.67	-.441	.661
	TBLT		23.11	46.11		
Open-mindedness	POA	30	8.17	26.50	-.240	.811
	TBLT		11.33	23.00		
Justice	POA	30	7.00	16.80	-.202	.840
	TBLT		5.00	16.60		
Tenacity	POA	30	12.33	22.50	-.465	.643
	TBLT		10.17	23.17		

*p<0.05

As shown in Table 9, there was not a significant difference (p>0.05) in each sub dimensions of critical thinking skills between POA and TBLT groups in pre-test questionnaire. Therefore, the current level of critical thinking skills of two groups were equal before the experiment.

4.2.2 The Effects of POA and TBLT on Critical Thinking Skills in Post-test

After three rounds of teaching experiment, post-questionnaire was conducted with the students in POA and TBLT group respectively so as to know if there was a significant difference in POA and TBLT before and after the experiment, a paired sample t-test was performed on the scores of pre-test and post-test in POA and TBLT respectively. The results are presented in following tables.

Table 10. Paired Sample T-test of POA on Critical Thinking Skills in Pre-test and Post-test

	Pre-test		Post-test		MD	T (29)	Sig.
	M	SD	M	SD			
Score	186.2	18.74	202.36	31.42	-16.16	-2.26	.031

*p<0.05

Based on the result of the paired t-test of POA on critical thinking skills of pre-test and post-test, before the research, the mean value and SD of the experimental class were 186.2 and 18.74 points, while after three rounds of the research, they were 202.36 and 31.42 points. At the same time, after the comparison, the T value was -2.26 and P value was 0.031, which showed that there was a significance difference between pre-test and post-test of critical thinking skills of POA. It can be concluded that the English writing teaching based on the POA exerts a positive impact on the students' critical thinking skills of POA group.

The implementation of POA ignites students' enthusiasm for learning and their impetus for output by crafting authentic communicative activities. A variety of enabling activities and the evaluation of peers' compositions serve to cultivate students' critical thinking skills. The outcomes of this study affirm the theoretical exposition of POA in fostering learners' critical thinking skills, as articulated by Li (2021). These findings are congruent with the research conducted by Wei & Deng (2020), who explored the development of critical thinking skills from the students' perspective through English writing instruction in a senior high school setting. The results of this investigation revealed that English writing pedagogy grounded in POA can, to a certain degree, cultivate students' critical thinking skills. Additionally, the results align with the study by Fan (2022), who executed experimental research on first-year "5+3" clinical medicine students and discovered that college English instructional design based on POA was conducive to enhancing students' critical thinking skills and fostering the development of a positive critical thinking disposition.

Table 11. Paired Sample T-test of TBLT on Critical Thinking Skills in Pre-test and Post-test

	Pre-test		Post-test		MD	T (29)	Sig.
	M	SD	M	SD			
Score	189.8	16.79	199.3	13.09	-9.5	-2.493	.019

*p<0.05

Based on the result of the paired t-test, before the research the mean value and std. deviation of the controlled class were 189.8 and 16.79 points, while after three rounds of the research, they were 199.3 and 13.09 points. After the comparison, the t value was -2.493 and p value was 0.019, less than 0.05, which had obvious statistical significance. We can conclude that the scores of critical thinking skills of TBLT have obvious difference between pre-test and post-test and the latter is higher than the former.

The implementation of TBLT provides students with a clearer purpose in specific learning tasks, thus improving their critical thinking skills. By participating in targeted tasks, students develop a stronger sense of agency and become more proactively engaged in their learning.

The findings of this study corroborate the theoretical assertions regarding TBLT's efficacy in fostering learners' critical thinking skills, as posited by Zhang (2016) and Feng (2020). These results also resonate with the research conducted by Huang (2017), who explored the impact of TBLT on critical thinking skills in the context of English writing at a private college.

The adoption of TBLT not only facilitates the acquisition of knowledge and skills but also nurtures students' critical thinking abilities in English writing through a methodology that is both goal-oriented and task-oriented. By delineating specific task requirements, TBLT encourages students to participate more actively in English teaching activities and deepens their comprehension and cognitive engagement with the subject matter at hand. Since TBLT clarifies the teaching objectives within the pedagogical process, students approach their learning tasks with greater intentionality, which in turn fosters critical thinking.

For the sake of exploring whether the effects of POA have great significance to improve the level of critical thinking skills in writing compared with TBLT, an independent sample t-test of POA and TBLT on overall critical thinking skills are made to discuss. Furthermore, in order to further test if there were differences in eight dimensions of critical thinking skills between POA and TBLT group after three rounds of experimental research, the detailed results are presented as follows:

Table 12. Independent Sample T-test of POA and TBLT on Overall Critical Thinking Score in the Post-test

	POA (n=30)		TBLT (n=30)		MD	T (58)	Sig.
	M	SD	M	SD			
Score	202.37	31.43	199.3	13.094	3.06	.493	.624

*p<0.05

The data stated that the mean score of POA was close to that of TBLT (the mean score of POA was 202.37, and TBLT was 199.3), Meanwhile, $t = 0.493$, and $P = 0.624 > 0.05$, which indicated there existed no significant difference in overall critical thinking skills of the students between POA and TBLT after three rounds of experimental research.

Table 13. Independent Sample T-Test of POA and TBLT on Dimensions of Critical Thinking Skills in Post-test

Dimension	Group	N	M	SD	T (58)	Sig.
Analysis	POA	30	13.04	2.14	1.281	.003
	TBLT		11.01	2.95		
Curiosity	POA	30	14.25	3.29	2.49	.070
	TBLT		15.93	3.76		
Self-confidence	POA	30	23.39	3.99	1.43	.215
	TBLT		22.07	4.14		
Truth- seeking	POA	30	22.07	4.14	.604	.926
	TBLT		22.73	3.99		
Cognitive maturity	POA	30	29.51	7.55	-.422	.675
	TBLT		28.86	3.93		
Open-mindedness	POA	30	18.18	1.53	.503	.134
	TBLT		16.95	4.14		
Justice	POA	30	11.20	3.40	.169	.866
	TBLT		11.33	2.66		
Tenacity	POA	30	17.19	2.34	1.44	.155
	TBLT		16.05	3.63		

* $p < 0.05$

The conclusion could be drawn that the scores of analysis of critical thinking skills was higher that of TBLT obviously. Moreover, p value was less than 0.05, showing that significant differences of means of critical thinking skills existed between two groups after the three rounds of experimental research. From the interview, it can be known that the questions put forward by the teacher in motivating link and activities designed in enabling link are novel, so the students are more serious and struggling to find the answer, even search more information after the class. It can help students open the mind and think about questions more comprehensively. As a result, the students' reasoning and analytical ability can be enhanced greatly.

After the post-questionnaire, three students with different proficiency levels from each of two groups were interviewed. The aim of interview is to further verify the effects of English writing teaching based on POA or TBLT on cultivating the critical thinking skills of senior high school students. The six respondents held positive attitudes towards the effects of POA or TBLT English writing teaching in cultivating their critical thinking skills.

For the first question, in POA group, motivating part not only help the students develop their minds, increase their curiosity, but also stimulate the tendency to find the truth and thirst for knowledge.

I am interested in some extracurricular knowledge mentioned by the teacher and I want to know more about it. (S1)

The questions that put forward by the teacher in motivating stage are novel and difficult to answer. In order to find out the answer, I become more serious in the following activities and would like to search more information after the class. (S2)

I really like the topic of writing task, which is related to our daily life and open my mind. I know what I will do in the writing lesson and I can use some words what I have learned in the reading lesson. (S3)

The application of TBLT method enables students to acquire knowledge and skills through the goal-oriented way, and makes students more active in English teaching activities. It can strengthen their understanding and thinking about relevant knowledge in the specific task orientation. The students in TBLT group have more purposes in specific learning task because of clear teaching goals.

I really like the language exercises that the teacher provides. It can help me summarize what I learned. (S1)

I am so familiar with the writing task that I have more confidence to finish the task. At the same time, I am clear about what I should in the writing class. (S2)

I am interested in group discussion during the while-task. Because of lacking vocabulary, I need help from teacher and classmates during the while-task. (S3)

For the second question, all the students in POA group affirmed that their critical thinking skills has been improved after having a writing lesson based on POA. Majority of the students said that they will consider the problems comprehensively from different aspects.

In assessment part, I am more confident to find errors from others' essay than before and would like to offer my suggestions for the classmates no matter accept or not. (S1)

The teacher showed us different points of view and asked us speak our voice openly. (S2)

After taking several writing lessons based on POA, I would like to communicate with my classmates even I can't express idea in English. (S3)

While acquiring foreign language ability, the students in TBLT group have developed critical thinking skills, such as reasoning ability, including forming conclusions and interpreting ability. At the same time, these teaching tasks also cultivate students' speculative and emotional characteristics, such as curiosity about the unknown, and an open attitude towards disputes.

I would like to represent our group to report our task in front of the class and can explain the results of the discussion. (S1)

I am more curious about the parts of content that our group didn't reach an agreement in the discussion. (S2)

In while-task stage, I would like to express my own idea and consider the suggestions that other classmates provide. (S3)

In summation, the implementation of the production-oriented approach (POA) and task-based language teaching (TBLT) in English writing instruction has markedly enhanced the overall critical thinking competencies of students. Nonetheless, a comparative analysis of the data reveals no substantial disparity in the overall critical thinking skills between the POA and TBLT methodologies. It is noteworthy, however, that a significant divergence is observed in the analytical dimension of critical thinking skills when contrasting the two pedagogical approaches.

5. Conclusion

5.1 Major Findings

The present investigation scrutinized the effects of POA and TBLT on English writing proficiency of senior high school students, with a focus on the dimensions of complexity, accuracy, fluency and critical thinking skills. Firstly, analysis of the writing assessments revealed a statistically significant disparity in the composition scores between POA group and TBLT group, with the former outperforming the latter. Moreover, pedagogical practices underpinned by POA were found to be more efficacious in enhancing the complexity and accuracy of senior high school students' English writing compared with TBLT. Secondly, combined with quantitative and qualitative data, the research result indicated that the total scores of critical thinking skills of two groups in post-test were significantly higher than that of pre-test. However, upon comparative analysis, no significant variance was observed in the mean scores of overall critical thinking skills between the two groups. Notwithstanding, a significant divergence was detected in the analytical component of critical thinking skills when comparing the POA group with the TBLT group.

5.2 Implications for Improving English Writing Teaching in Senior High School

On the basis of the major findings of the study and related literature of POA and TBLT, several recommendations are posited to augment the efficacy of English writing instruction in senior high schools. Primarily, during the process of English writing teaching under the guidance of POA, in motivating phase, it is imperative that educators employ authentic cases as communicative scenarios during the motivational phase to ensure that output activities are imbued with communicative authenticity, thereby mitigating the dichotomy between learning and application. In enabling phase, it is incumbent upon the teacher to discern students' impediments and comprehensively apprehend their exigencies prior to instruction. According to the potential difficulties of completing tasks, the teacher should design the tasks that are more detailed and targeted. For different levels of students, the teacher can adopt different contents and use more challenging tasks to cater for the demands of the

students with different levels. During the assessment phase, examples of common mistakes and excellent work should be used as teaching tools to provide feedback, helping students identify weaknesses, improve their work, and leverage the formative potential of assessment to enhance learning. Secondly, the teacher should articulate explicit pedagogical objectives concerning the cultivation of critical thinking skills when integrating POA into writing instruction. In the motivating stage of POA, the teacher should have a responsibility to make the students fully realize the importance of improving their critical thinking skills. Additionally, teachers are encouraged to design writing topics that are intellectually stimulating and replete with opportunities for critical engagement, grounded in the curriculum, and to implement argumentative writing exercises to facilitate the development of critical thinking skills among high school English learners. Thirdly, the present research elucidates that both POA and TBLT has its probability and positive effects on students' academic performance. Considering that writing is the importance and difficulty of senior high school English teaching, this study advocates that teachers should combine POA with TBLT in writing teaching to accomplish teaching objectives effectively.

5.3 Limitations of the Study and Suggestions for the Future Research

This study acknowledges several methodological limitations that should be addressed in future research. Firstly, the study's findings may have been influenced by the researcher's limited understanding of POA theoretical constructs and practical implementation experience, which may have restricted the effective use of the framework's pedagogical benefits. Secondly, the lack of specialized instructional materials designed for POA application in senior secondary writing curricula may lead to inconsistencies in implementation, which need to be addressed systematically. The cultivation of writing ability and critical thinking skills is a long-term process. The nine-week intervention period proved insufficient for comprehensively assessing the progression of writing proficiency and critical thinking capacities, which inherently require extended periods of cultivation. Furthermore, the study's sample size, comprising merely sixty participants, may compromise the generalizability of the findings. To enhance methodological rigor in subsequent investigations, researchers should implement multi-site longitudinal designs incorporating stratified sampling across various grade levels and institutional types. Future research should adopt longitudinal study designs to better capture the developmental trajectories of the variables under investigation.

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