

Practical English Curriculum Development to Improve the Writing Ability of Deaf and Hard-of-Hearing College Students Based on Autonomous Learning Theory: A Case Study of Chongqing Normal University

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Abstract

The article aimed to develop a practical English writing curriculum based on autonomous learning theory and evaluate its effectiveness in improving the writing ability of deaf and hard-of-hearing college students (DHH). The target group comprised 18 deaf freshmen. The curriculum development process includes four stages: (i) research on basic information about curriculum development; (ii) development of a practical English writing curriculum; (iii) implementation of the curriculum; and (iv) evaluation of the curriculum with a focus on improvement. After three months of implementation, the researchers made a statistical analysis of the students' writing scores in the pre-test, mid-test, and post-test and analyzed the demographic variables. The validity of the evaluation results of the Practical English Curriculum and the analysis of research data showed as follows: 1. An enhancement was made to students' writing skills throughout the curriculum, and 2. practical English writing curricula are effective in improving the English writing ability of DHH college students.

Further analysis of the data indicates that the schools attended by DHH college students, their communication methods, and their learning psychology all have an impact on their curriculum learning results. Consequently, curriculum designers, implementers, and managers should all pay attention to the above issues. Useful suggestions are given according to the results and conclusions of this research.

Keywords: Practical English Writing Curriculum; Writing Skills; Case Studies of Deaf and Hard of Hearing College Students

Introduction

With the development of China's social economy and the increasing frequency of international exchanges, there is an increasing need for a large number of senior talents with expertise in foreign languages. As English solidifies its status as an international lingua franca, an increasing number of learners, including DHH college students, are joining the ranks of English learning. According to statistics from the China Disabled Persons' Federation (2021), more than 70 colleges and universities in China admit DHH students, with about 2,000 students enrolled every year. English is a compulsory curriculum for Chinese college students, and DHH college students in every university are required to study college-level English. Xia (2018) found a lack of suitable teaching materials and curriculum syllabi for DHH students.

In China, school-based teaching materials and curriculum syllabi for college English are still in the experimental stage. Wang (2020) pointed out that most high schools for the deaf and universities that admit deaf college students offer English curriculums, but the materials and tests are designed based on standards for non-deaf students. English textbooks for ordinary college students mainly focus on students' English listening, speaking, reading and writing abilities. However, due to the hearing impairment of DHH college students, their English learning does not involve listening and speaking. The "Twelfth Five-Year Plan" Development Outline for Disabled Persons in China (2013) further clarified that deaf people are exempt from the listening test of various foreign language examinations. Therefore, the main learning content for deaf college English-learning students centers around reading and writing.

The "College English Curriculum Standards for Higher Vocational Education (2021)" issued by the Ministry of Education of the People's Republic of China clearly proposes the cultivation of students' English learning and application abilities to establish a strong English foundation for their future continued learning and lifelong development. Additionally, one of the purposes of the teaching model reform, as stipulated in the 2007 Order No. 3 Notice of the General Office of the Ministry of Education on Issuing the "Teaching Requirements for College English Curriculum", is to promote the development of students' personalized learning methods and independent learning abilities. The new teaching model should enable students to choose materials and methods that suit their learning needs, receive guidance on learning strategies, and gradually improve their

ability to learn independently. Furthermore, the “Experimental Plan for Compulsory Education Curriculum in Deaf Schools” (2007) of the Ministry of Education of the People’s Republic of China indicates that foreign languages are optional curricula that each school can choose to offer based on the actual situation of different regions and deaf students.

Due to varying degrees of hearing loss, DHH students exhibit great differences in English proficiency, learning needs and methods. The initiative of DHH college students in English learning, as well as the importance placed on English learning, also result in differences in English language acquisition among DHH college students. There is a significant difference in the basic English proficiency between DHH college students who graduated from high schools for the deaf and that of DHH college students who graduated from ordinary high schools. Therefore, the English proficiency level of DHH college students taking college entrance examinations varies significantly, which is detrimental to the development of college English class teaching.

Writing serves as an important foundational skill critical to academic success. Students are expected to use writing to express understanding and document their learning in various subjects. English writing serves as a language output activity that cultivates students’ comprehensive ability to systematically use the English language, including tasks such as reviewing questions, collecting materials, constructing article structures, and outputting language in specific situations. It helps DHH students assess the English syntax they have acquired. The use of structures and words can effectively consolidate and internalize their English language knowledge, thereby facilitating language acquisition. This study takes a three-month practical English curriculum. English writing ability is that deaf and hard of hearing students can write about 100 words of practical article, including notices, advertisements, and emails.

Research Objectives

1. To develop the practical English curriculum based on autonomous learning theory for the D/HH college students.
2. To evaluate the effectiveness of practical English curriculum for deaf college students’ writing abilities based on autonomous learning theory for deaf college students.

Literature Review

Paul (1998, 2009) pointed out that the writing level of the deaf lags behind those of their hearing peers of the same age. Deaf high school students exhibit writing skills comparable to 9 to 10-year-old hearing students, equivalent to the fourth-grade level in ordinary elementary school, because of several factors, including the delayed introduction of English curriculum in schools for the deaf and inadequate class hours for English learning. As a result, deaf students do not have a sufficient understanding of the importance of the English curriculum and are less enthusiastic about English learning, which hinders their English learning. DHH students struggle with low-level morphology and syntactic skills, as well as high-level semantic and rhetoric skills (Wolbers et al., 2010). Their writing style is characterized by shorter and simpler sentences, a higher frequency of nouns and verbs, less adverbs, auxiliaries, and conjunctions than their hearing counterparts (Marks & Stuckless, 1966). When it comes to spelling, DHH students make spelling errors uncommon in other populations due to their reliance on visual rather than auditory cues for spelling (Bowers et al., 2014). Gu (2023) conducted a literature review and semi-structured interviews with deaf college students to investigate their current situation in English learning: Deaf college students have great internal differences; Deaf college students suffer obvious psychological problems in learning English. English teachers lack sufficient knowledge in special education; Teaching materials do not match the English level of deaf students.

There are several methods to summarize research on deaf writing both at home and abroad. He (2016) proposed the Scaffolding Instruction, where the teacher addresses the problems that DHH students encounter at each stage of writing – before, during and after writing. Various teaching scaffolds, such as review, situational, language, structural, and evaluation scaffolds, are employed for deaf students to complete writing tasks and develop independent writing skills, etc. The Wolbers Interactive Writing method is responsive to the diverse language experiences of deaf students through embedded metalinguistic/linguistic components (Strategic and Interactive Writing Instruction, SIWI). Yu (2018) and Wang (2018) introduced the Error Analysis method, which involves an analysis of common errors in deaf writing, teaching deaf students how to avoid these mistakes. Ding (2019) found through data collection and error analysis that deaf college students will be different from ordinary students in English learning processes. Based on this, the errors in English expression among hearing-impaired college students are summarized as omissions, formal errors and sequence errors. Gu (2023) proposed a processed writing method that guided the deaf through the sequence of writing activities at Renmin University.

The above-mentioned studies all used teachers to deliver effective writing instruction and intervention to DHH college students with specific writing strategies and methods. Foreign studies on the writing strategies of DHH college students mostly focus on those with English as a second language. (Haider, 2016). In China, DHH college students have sign language as their first language, Chinese as their second language, and English as their third language. DHH college students in China usually use Chinese as their second language to acquire English as their third language, making the process more difficult. Consequently, foreign research results cannot be directly applied to English teaching in China for deaf students in China. Teaching English to DHH college students in China requires the development of a curriculum that meets the learning characteristics and needs of DHH students in China.

This study strives to develop a set of practical English writing curriculum suitable for DHH college students. It adopts the independent learning method preferred by these students, actively explores and constructs English writing methods through a large amount of English accumulation and conducts functional English writing learning to directly solve the problem of deaf college students regarding basic English writing skills needed for life and work. The goal of this curriculum is to enhance the comprehensive English writing application ability of deaf college students and cultivate their independent learning ability.

Conceptual Framework

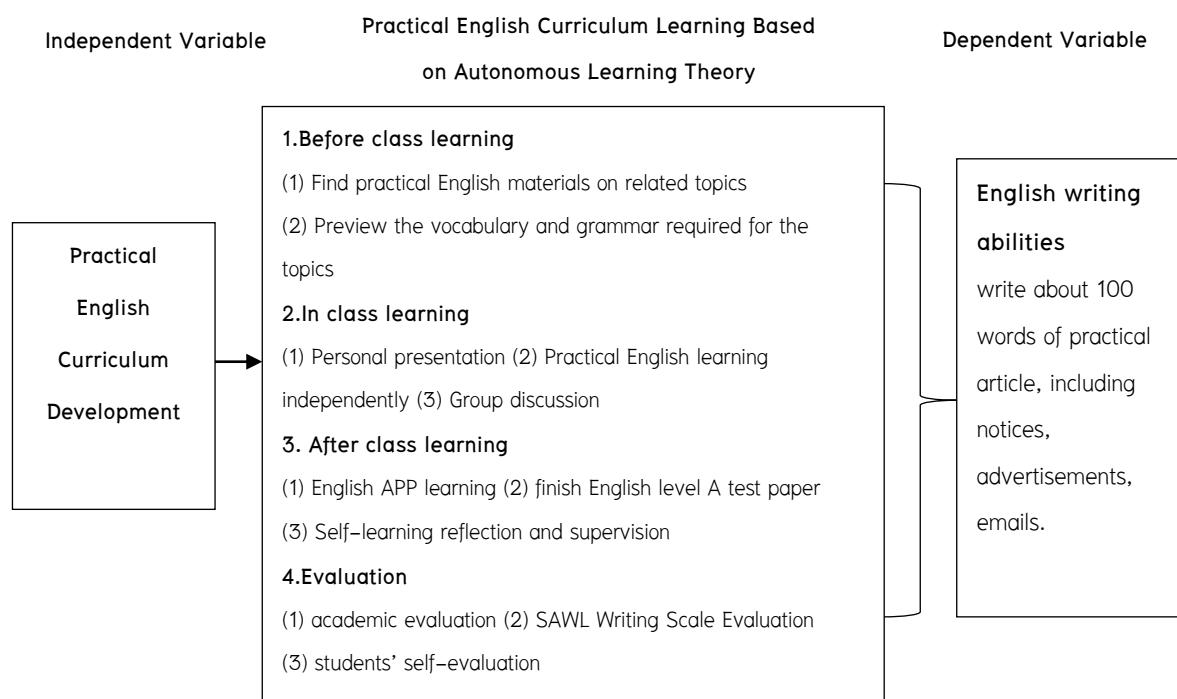


Figure 1 Conceptual Framework

Research Methodology

Participants

Population

DHH college students at Chongqing Normal University in China

Sample

This study selected first-year DHH college students from Chongqing Normal University (average age = 20). Demographic data for DHH student participants are presented in Table 1.

Table 1 Demographic statistics for sample participants (n =18)

Demographic variables	category	counting _	percentage (%)
gender	male	6	3 3.33
	female	1 2	6 6.67
level of hearing loss	level 1	9	5 0.00
	level 2	4	2 2.22
Graduated from high school	level 3	2	1 1.11
	level 4	3	1 6.67
communication method	school for the deaf	11	6 1.11
	Ordinary school	7	3 9.89
hometown	oral	6	3 3.33
	sign language	4	2 2.22
hometown	oral + sign language	8	4 4.45
	rural area	4	2 2.22
hometown	City	1 4	7 7.78

Practical College English Curriculum Development Process

The research on practical English writing curriculum development process mainly includes four main stages: stage 1: basic information survey; stage 2: curriculum development; stage 3: curriculum implementation; and stage 4: curriculum evaluation.

Stage 1: Is basic information investigation

This stage mainly includes:

1. Research on relevant literature and analysis of Chinese practical English teaching materials, including a review of current college English curriculum teaching materials and the college English curriculum standards issued by the country. This curriculum is informed by Chinese high school, vocational school and university English curriculum standards. Specifically, the Ministry

of Education released the National High School English Curriculum Standards (Experimental Draft) in 2020. In accordance with the overall goal of grading English courses at the basic education stage, this curriculum standard proposes corresponding specific content standards for five aspects: language skills, language knowledge, emotional attitude, learning strategies and cultural awareness, including listening, speaking, and reading,

2. Informal interview: Interview peers, experts, and deaf college students for their suggestions on the preparation of a practical English curriculum.

3. An analysis of curriculum needs: Assess the needs of DHH students and society for college English learning. By investigating the English learning status of DHH college students, we can understand their independent English learning status, including their English learning foundation, self-efficacy, goals, motivation, autonomous learning strategies, and English learning needs. DHH college students have different hearing loss, different communication methods, and different educational backgrounds. Consequently, each student has different English learning needs and starting levels. Moreover, individual students approach English learning in distinct ways.

Stage 2: The curriculum development

After questionnaire and demand surveys, with reference to China's existing university practical English curriculum, a particular English learning was developed for DHH college students. This curriculum accounts for DHH college students, and a draft curriculum was formulated. This curriculum is rich in content, covering literature, film and television, cultural etiquette, and domestic English examinations in English-speaking countries. The diverse content is closely aligned with both the current and future lives of college students and addresses their needs for future work and life. Teachers analyze the learning needs and characteristics of DHH college students, flexibly select curriculum content, and guide DHH college students to choose learning content that matches them. The curriculum content layout not only meets the general requirements for DHH college students to learn college English but also meets their unique cognitive and learning characteristics: computer English, artistic English and other professional English learning. The curriculum goes from loose to comprehensive, from easy to difficult: words – phrases – sentence patterns – texts – comprehensive application.

Expert evaluation

After the curriculum development and before its implementation, opinions and suggestions from experts and peers in the field are sought to evaluate the suitability and consistency of the

curriculum and to make suggestions for modifications. The first draft of the course will be revised and completed. Experts and peers will be invited to supervise the implementation process.

A pilot study

The pilot study aims to check the quality of the draft curriculum, such as student study guides and lesson plans, and to familiarize teachers with teaching strategies for the course implementation phase. Since there is only one class of DHH college students in each grade at Chongqing Normal University, the pilot study will be conducted with the DHH sophomore. The pilot study will take place over four sessions, two sessions per week. Researchers will conduct on-site observations to understand the performance of students and teachers in self-directed learning classrooms. At the same time, they will interview classroom teachers and DHH sophomores to understand their attitudes and opinions about practical English curriculum.

Curriculum draft revision

The draft curriculum was revised again based on the results of the pilot study, experts' opinions and suggestions, and the results of questionnaire analysis. Subsequently, a formal curriculum was developed and entered the implementation phase.

Stage 3: The curriculum implementation

In the curriculum implementation stage, DHH students in the experimental class will take a 3-month practical English writing their needs based on independent learning under the guidance of their teachers. In the first, second and third months, students in the experimental class will undergo writing pre-test, mid-test and post-test.

In the first class of the curriculum, teachers and students discuss the curriculum, formulate a three-month English learning framework, and jointly modify the curriculum content and timetable. After the establishment of the curriculum framework, teachers inform students about the framework and content of the next class in advance. Students prepare materials of appropriate difficulty based on their own learning foundation. Teachers guide students to find and plan practical learning content to address their own learning difficulties and strengthen learning content in real life.

Each academic month consists of four units, each with a theme. In class, teachers require students or groups to demonstrate their autonomous learning content based on the predetermined knowledge framework. Teachers and other students can ask questions about the learning content presented. Finally, the teacher makes comments and summaries. Teachers help students establish English learning records to document daily learning content, self-evaluation and reflection. They

support students in transitioning from dependent learning to self-regulated learning. Teachers provide personalized guidance on learning strategies to facilitate individual progress. In each class, students take turns sharing a short English current affairs news and summarizing the phrases and knowledge points from the news. After class, DHH students will study autonomously and complete an autonomous study manual to structure the knowledge they have acquired by themselves.

Stage 4: The curriculum evaluation and revision

The researcher evaluated the effectiveness of the curriculum by assessing the academic writing performance of DHH students. Based on the comprehensive evaluation results, the curriculum will undergo revisions to produce the final version.

Academic evaluation of learning outcomes in the practical English writing curriculum for DHH college students utilized the National College English A-level Examination, which is a national standardized English proficiency test with stable question types and difficulty levels. A writing test question bank was established using ten sets of real questions from the National College English A-level Writing Test in the past five years. A set of writing tests are randomly selected, with topics and genres related to daily life and work. Two English teachers scored the tests according to the A-level exam scoring standards. The students' comprehensive average scores from the pre-test, mid-test, and post-test were calculated, with a maximum score of 30 points for each test.

SAWL Writing Scale Evaluation

In addition, two teachers scored the students' pre-test and post-test writing tests on the SAWL scale, and the consistency of the two teachers' scores will be calculated.

After the implementation of the curriculum, DHH college students ($N = 18$) will be evaluated according to Pan Mingwei (2020) writing level self-evaluation criteria to test their English writing level before and after the practical English writing curriculum. During the curriculum implementation process, DHH college students ($N = 18$) rated their satisfaction with independent learning on a scale of 1 to 5 after a three-month teaching period and the implementation of the practical English writing curriculum. One point means very dissatisfied, 2 points means dissatisfied, 3 points means average, 4 points means satisfied, and 5 points means very satisfied.

Results

Results of stage1: research basic information survey

In stage 1, the researchers analyzed the content framework of existing college English practical self-study textbooks in China. They referenced practical English teaching materials in

higher education in China to analyze the curriculum structure and parts not suitable for deaf people (such as listening and speaking). Considering that the majors of DHH students at Chongqing Normal University are related to computer use, computer English is included in the curriculum. The existing practical English curriculum in higher education mainly consists of the following topics: (1) English movies, (2) Travel English, (3) English vocabulary and expressions, (4) British culture, (5) Computer English (6) English tests.

Results of stage 2: curriculum development

After the first stage of preparation, the practical English writing curriculum is mainly divided into three parts: basic learning, basic application and comprehensive application. Each section contains four-unit topics, with one unit topic covered per week, four lessons per week, and 12 weeks in total. This curriculum has a total of 48 hours. See Table2.

Table 2 practical English writing curriculum content arrangement

Month	The first week	The second week	The third week	The fourth week	Supplementary learning content
09/2023 first month (basic learning)	Common parts of speech and phrases Summarize pre-test	Basic English sentence patterns and grammar	Practical English Basic writing(1)	Practical English Basic Writing(2) mid-test	Classroom routine personal statement 1. English word learning sharing 2. English news sharing 3. Chinese and foreign traditional festivals
10/2023 Second month (basic application)	Movie appreciation	Travel English	Computer English	Practical English Writing (1)	After class study 1. Preparation before class 2. Practical English autonomous learning Manual
11/2023 third month (Comprehensive application)	Cultural knowledge of English-speaking countries	British and American Classic Literature	English expressions of Chinese cultural elements	Practical English Writing (2) Post-test	

Results of stage 3: practical English writing curriculum implementation

Average scores of the two teachers on the pre-test, mid-test and post-test

Two teachers with ten years of experience teaching English to the deaf comprehensively scored the three compositions of the pre-test, mid-test and post-test according to the scoring

standards of the College English A-level exam. A consistency test was then conducted on the raters to test the results. See Table 3.

Table 3 Consistency test of two teachers' ratings

	Pre-test-B	Mid-Test B	Post-test B
Pre-test A	0.795 ***		
Mid-test A		0.883 ***	
Post-test A			0.908 ***

Note: “*” means $p < .05$, “**” means $p < .01$, “***” means $p < .001$

According to the table above, the consistency coefficient of the two teachers' pre-test scores is 0.795, for the mid-test scores is 0.883, and for the post-test scores is 0.908. For the three writing tests, the correlation between the two teachers' scores was significant and highly correlated, indicating that the average of the two teachers' scores can be used as the subsequent pre-test, mid-test, and post-test scores.

Table 4 Difference test and post-test in writing scores between pre-test and mid-test ($M \pm SD$)

	(1) Pre-test	(2) Mid-test	(3) Post-test	F	p	LSD
Writing score	12.56 ± 4.43	14.67 ± 4.83	17.78 ± 4.50	6 4.591***	0.000 _	(3) > (2) > (1)

From Table 4, there is a significant difference in the writing scores of the pre-test, mid-test, and post-test ($p < .000$), reflected in the fact that the mean post-test score, $M = 17.78$ ($SD = 4.50$), is much higher than the mean mid-test score ($M = 14.67$, $SD = 4.83$), which is also much higher than the mean pre-test score ($M = 12.56$, $SD = 4.43$). The average writing score after the exam is greater than the average writing score in the high school entrance exam, which, in turn, is higher than the average writing score before the exam. It shows an improvement in students' writing scores with the implementation of the curriculum. It suggests that this practical English writing curriculum can improve students' English writing ability.

SAWL Writing Scale Test

The researcher conducted a standardized SAWL writing scale test to evaluate students' writing three times: pre-test, mid-test, and post-test. The evaluation included the number of corpus (number of words and number of valid morphemes) and the number of measurement units

(sentences). A repeated measures analysis of variance was employed to assess the results and analyze changes in the length of students' writing and the effective use of words so as to examine the changes in students' writing ability. See table 5

Table 5 Difference test of writing scores between pre-test, mid-test and post-test

Comparative items	writing tests	M	SD	F	p	LSD
Sample Size (TLC)	① Pre-test	82.83	5.41			
	② Mid-test	93.22	5.82	23.664***	0.000	③ > ① ②
	③ Posttest	125.72	6.78			
Samples Taken	Pre-test	9.67	0.68			
	Mid-test	10.28	0.52	5.196*	0.011	③ > ① ②
	Posttest	11.72	0.65			
Level-1 Word Efficiency	Pre-test	0.25	0.05			
	Mid-test	0.26	0.06	1.666	0.204	
	Posttest	0.19	0.05			
Level-2 Word Efficiency	Pre-test	0.76	0.07			
	Mid-test	0.72	0.07	0.460	0.635	
	Posttest	0.77	0.07			
Level-3 Word Efficiency	Pre-test	0.80	0.06			
	Mid-test	0.83	0.06	0.579	0.566	
	Posttest	0.85	0.05			

From Table 5, there is a significant difference in Sample Size (TLC) between the pretest, mid-test and post-test ($p<.000$), which is shown as Sample Size (TLC) in the post-test 125.72 ($SD=6.78$) > Sample Size in the mid-test (TLC) 93.22 ($SD=5.82$) > Pre-test Sample Size (TLC) 82.83 ($SD=5.41$). This indicates a significant increase in the total number of words written by students; there is a significant difference in Samples Taken between the pre-test and post-test ($p<.05$), showing that Samples Taken in the post-test ($M=11.72$, $SD=0.65$)>Samples Taken in the mid-test ($M= 10.28$, $SD=0.52$)>Samples Taken in the pre-test ($M=9.67$, $SD=0.68$), indicating a significant increase in the number of practical sentences written by students. There were no significant differences in the remaining items between the pre-test and post-test.

Overall, the data from Table 5 indicates that the sample size of the post-test (TLC) is 125.72 ($SD=6.78$)>the sample size of the mid-test (TLC) is 93.22 ($SD=5.82$)>the sample size of the pre-test (TLC) is 82.83 ($SD=5.41$), and these differences are statistically significant. This indicates a consistent growth in the average Sample Size (TLC) of deaf college students in the

three tests. However, the standard deviation also increases, indicating a widening gap in word volume among students and an increasing polarization.

In terms of Samples Taken (Total number of measured sentences), the data shows that Samples Taken in the post-test ($M=11.72$, $SD=0.65$)>Samples Taken in the mid-test ($M= 10.28$, $SD=0.52$)>Samples Taken in the pre-test ($M=9.67$, $SD=0.68$), indicating a significant increase in the number of practical sentences written by students.

Table 6 SAWL tool measurement indicators and elements (Gu Yunqiao, 2023)

Writing level	Measurement standard	Writing skills elements
word level	Sample Size (TLC)*	writing fluency
	Mean Morph/T-u	writing fluency
	T-units	writing maturity
	T-unit Word Efficiency	writing maturity
sentence level	Samples Taken*	writing fluency
	T-units/100	writing accuracy
	Complexity Index	writing complexity

Based on the statistics and analysis of the above SAWL scale test data, as well as the information provided in Table 6 regarding SAWL measurement indicators and elements, it can be concluded that there is a significant increase in Sample Size (TLC) and Samples Taken, indicating an improvement in the writing fluency of deaf college students. Through the study of this course, deaf college students will be able to use more English words and sentences in practical English writing, with improved writing skills. However, T-units and T-unit Word Efficiency, which reflect writing maturity, did not show a significant increase. There was no significant increase in the statistical results of T-units/100, which is related to writing accuracy.

Comparing mean scores for demographic variables

The researcher used SPSS 26.0 repeated measurement ANOVA to examine the relationship between the three writing scores of DHH college students in the pre-test, mid-test and post-test across demographic variables such as gender, hearing loss level, high school graduation school, communication method, and hometown. The analysis results are shown in Table 7.

Based on the statistics and analysis of SAWL scale test data and based on the Table 7 regarding SAWL tool measurement indicators and elements, it can be concluded that there is a

significant increase in Sample Size (TLC) and Samples Taken, indicating an improvement in the writing fluency of deaf college students. Through the study of this course, deaf college students will be able to use more English words and English sentences in practical English writing, and their writing skills will be improved.

Table 7 Repeated measures ANOVA results of writing scores

	F	p	Simple effect analysis
Time	53.698***	0.000	(3) > (2) > (1)
Gender	0.161	0.693	
Time×Gender	0.796	0.460	
Time	39.566***	0.000	(3) > (2) > (1)
hearing loss level	0.557	0.652	
Time×hearing loss level	0.820	0.504	
Time	59.262***	0.000	
Graduated high school	9.301**	0.008	(4) < (5)
Time×Graduated high school	0.215	0.808	
Time	54.519***	0.000	(3) > (2) > (1)
Communication way	6.183*	0.011	(6) > (7)
Time×Communication way	0.109	0.978	
Time	38.050***	0.000	(3) > (2) > (1)
Hometown	0.248	0.625	
Time×Hometown	0.632	0.538	

From Table 7, regardless of demographic variables, the main effect of test time is significant ($p<.001$). This is reflected in the mean post-test score of 17.78 ($SD = 4.50$), much higher than the mid-test mean score of 14.67 ($SD = 4.83$) and the mean pre-test score of 12.56 ($SD = 4.43$) (i.e., there is a significant difference in the mid-test scores between pre-test, mid-test, and post-test scores). In addition, a new variable writing score was generated using the average of the pre-test, mid-test, and post-test scores, followed by an independent sample T-test conducted based on gender. The results indicated a significant main effect of high school graduation ($p=0.008$). Post hoc comparisons revealed a significant main effect for deaf school graduates, with an average score of 12.91 ($SD=1.10$), significantly lower than the average score of 18.29 ($SD=1.38$) for graduates from ordinary schools. The main effect of the communication method was also significant ($p=0.011$), reflected in the use of spoken language. The average score

of students who use sign language is 18.39 ($SD=1.43$), much higher than the average score of 10.46 ($SD=1.75$) for students who use sign language.

Students' self-evaluation of their writing level of pre-test and post-test

After the implementation of the curriculum, the subjects ($N =18$) were evaluated according to Pan Mingwei's (2020) writing-level self-evaluation criteria. They self-evaluated their English writing level before and after learning the practical English writing curriculum. The researcher used the related samples t-test to analyze the difference between pre- and post-writing levels.

Table 8 Pre-test level and Post-test level ($M\pm SD$)

	Pre-test	Post-test	t	p
writing level	2.22 ± 0.73	4.11 ± 1.08	9.628***	0.000

As can be seen from Table 8 above, students' self-evaluation of their pre-writing level shows a significant difference ($p <.000$) compared to their post-writing level, which shows that the mean value of students' self-evaluated post-writing level is 4.11 ($SD=1.08$), which is much higher than the mean value of pre-writing level, which is 2.22 ($SD=0.73$). This suggests that students believe the curriculum can improve their English writing level through the practical English writing curriculum. 14 students (77.8%) believe that their English writing level has improved from the original basic stage (Level 1 to Level 3) to the advanced stage (Level 4 to Level 6).

Discussions

Effectiveness of English writing learning for deaf college students

In the three practical English writing tests for DHH college students, the sample size (TLC) and the number of students' compositions increased significantly. During the three-month teaching period, the curriculum content and the implementation process focused on the accumulation of words, phrases and sentence patterns for DHH college students. Additionally, students were allowed to review a large amount of literature. The above reasons can quickly improve the vocabulary, phrases and sentence patterns of DHH college students. Therefore, in the statistical analysis of various indicators of practical English writing among DHH college students, there was a significant increase in the total number of words and the number of measurement units in writing fluency. This conclusion is consistent with the results of the research by Gu (2023). It shows that

the basic writing knowledge of DHH college students can be improved in a short time through vocabulary teaching and sentence pattern learning.

The complexity index results at each level are not significant, indicating that DHH college students mostly use simple sentences without complexity. Gu (2023) also obtained the same research results in his research on writing strategy teaching for DHHH college students. Research shows that DHH college students use fewer non-predicate verbs, various tenses, singular and plural numbers, and clauses in their English writing. The reason why it is of little significance is that the complexity of writing requires learners to use a syntactic processing rule system, and the improvement of the complexity index also requires a long-term process. Due to their weak English foundation, hearing-impaired college students may struggle to master many grammatical rules in a short period of time, making it difficult to accumulate sufficient language input in just two months. Therefore, the results for the complexity index are not significant. This result shows that the writing complexity of DHH college students still needs to be improved. Grammar content revision related to sentence structure and writing should be added in subsequent courses. Grammar teaching for DHH college students should also be emphasized, with a focus on strategies to improve the complexity and accuracy of written sentences.

The psychological process of English learning among deaf college students

This study found that the learning psychology of deaf college students also plays an important role in curriculum implementation. During the curriculum implementation, the subjects (N=18) rated their autonomous learning satisfaction at the end of the first teaching month and again at the end of the third teaching month after the implementation of the practical English writing course. The researcher conducted statistical analysis on the students' self-learning satisfaction at these two-time points using the related sample t-test. See Table 9.

Table 9 Difference test of students' satisfaction level to Mid-test and Post-test ($M \pm SD$)

	Mid	Post	<i>t</i>
satisfaction level to self-study	3.47 ± 1.10	2.17 ± 0.79	3.338 **

From Table 9 above, there is a significant difference in students' satisfaction level regarding self-study scores between the mid-test and post-test, which is reflected in the fact that the mean value of students' satisfaction level to self-study-Mid, which stands at 3.47 ($SD=1.10$), much higher than the satisfaction level mean value during post-test, recorded at 2.17 ($SD=0.79$).

This indicates a decrease in students' satisfaction levels with self-study scores after the implementation of the curriculum.

From Table 9, during the three-month autonomous learning process of practical English writing, DHH college students exhibited higher satisfaction levels with their learning at the end of the first month. However, by the end of the third month, their satisfaction levels decreased, indicating a reduction in learning satisfaction. However, various standardized scales and tests show a significant improvement in the academic performance of DHH college students by the third month. This suggests a negative correlation between self-academic satisfaction and academic performance among DHH college students. This shows that DHH college students lack a strong sense of self-efficacy for their own learning, confidence in their own learning, sustained motivation to learn, and the ability to learn independently. Consequently, they may easily give up and experience self-denial. Zhao and Xie (2021) also believed that DHH students have poor self-learning and independent thinking abilities. Difficulty in communicating with the outside world leads to negative emotions, low self-esteem, and anxiety among these students. As a result, self-denial and fear of difficulties may lead to boredom, resistance, and potential dropout tendencies.

DHH college students are still in the novelty and curiosity stage in the first month of learning the practical English writing curriculum. However, as the difficulty and depth of learning increase, the learning requirements of DHH college students are escalating, and they may also encounter learning difficulties. DHH college students are prone to fearing difficulties and giving up easily. This requires teachers to not only focus on the subject knowledge of English writing but also continue to address the English learning psychology of DHH college students and enhance their learning motivation as well as confidence. Students' self-efficacy can better promote their academic development levels and outcomes.

The influence of communication style on the English writing ability of deaf and hard of hearing college students

The degree of hearing and oral language impairment will affect the English writing ability of DHH college students. This study compared the post-test writing scores of students who used spoken language and sign language. Specifically, the post-test writing scores of students who used spoken language ($M=21.00$, $SD=3.31$) were much higher than those of students using sign language ($M=13.50$, $SD=5.20$) ($p<.05$), indicating a significant difference. Furthermore, the average post-test score of students graduating from schools for the deaf, $M = 15.68$ ($SD = 4.06$),

was much lower than that of students graduating from ordinary schools ($M = 21.07$, $SD = 3.03$) ($p < .05$). There are significant differences and distinctions.

These findings suggest that oral communication can promote the writing of DHH college students. The main reason could be the similarity in word order and vocabulary between spoken and written language. Deaf college students who use oral communication have accumulated written language materials, laying the foundation for writing. In contrast, different word order and vocabulary expression of sign language may affect the understanding and use of written language among deaf college students using sign language, resulting in negative transfer effects. The English input of deaf college students is mainly visual learning, with information output mainly through reading and writing. Therefore, they may exhibit language deprivation due to inadequate exposure to comprehensible input necessary for the full development of expressive language.

The English writing scores between graduation from different high schools

With the same study time and curriculum, the English post-test writing scores of DHH college students from ordinary high schools were significantly higher than those of students from high schools for the deaf. It shows that deaf college students from ordinary high schools possess stronger English foundations and learning abilities. Teachers should pay attention to them and guide their learning. Teachers should also focus on high school graduates from schools for the deaf, who have a weaker English foundation and insufficient learning ability. It is crucial for teachers to offer different teaching support for students with varying learning needs and conduct hierarchical teaching.

Conclusion

This study has proven that developing curriculum suitable for DHH college students is beneficial to academic learning. Curriculum learning for this group is no longer just about lowering the difficulty in ordinary schools. Instead, it requires a comprehensive analysis of unit themes and the selection of learning content suitable for their needs to fully reflect autonomy and individualized learning, thereby improving the literacy skills of deaf college students.

The English curriculum for deaf college students is to cultivate their international vision, professional knowledge, and ability to adapt to social development to broaden their employment prospects. The government and schools should attach great importance to it by allocating more resources and funding. It is important to pay attention to the development of higher education

teaching and scientific research for deaf college students to truly promote the development of higher education for disabled people.

Suggestions

Negative transfer of sign language for deaf and hard of hearing college students learning practical English writing

The sentence structure and word order in sign language are completely different from those of written language, so sign language has a negative transfer effect on written English. Therefore, in curriculum design and actual English writing teaching, teachers must be particularly mindful when using sign language to convey the English reading accumulation of DHH college students. This approach aims to enhance their information input and add visual cues. This visual input can increase the English reading accumulation of deaf college students and reduce the negative transfer of sign language to writing. Furthermore, when guiding writing strategies, they can also consciously compare the different requirements of sign language, Chinese and English, in terms of sentence structure, word order and other grammatical requirements. Yan (2016) pointed out that conscious learners are good at receiving visual images, which aids comprehension through books and textual and visual materials on the blackboards or screens.

Focus on the English learning psychology of deaf college students

There is no significant difference between the independent learning ability and English learning ability between DHH college students and their hearing counterparts. However, due to hearing impairment, attention should be paid to the metacognitive aspects of English writing learning for deaf college students, as well as the impact of their self-efficacy on English learning performance.

Lei (2020) pointed out that college students learning English independently can use metacognitive strategies to formulate long-term goals and short-term plans. Students can develop relevant English learning plans under the guidance of teachers. Cao (2020) suggested that teachers continue to use meta-strategies to cultivate students' abilities in all aspects while fostering an understanding of metacognitive strategies through multiple channels. This approach aims to enhance students' autonomous learning abilities and awareness, ultimately achieving English learning objectives and allowing students to grasp metacognitive strategies through multiple channels.

DHH college students must first gain a comprehensive understanding of their learning interests, methods, abilities, and difficulties. They must understand that independent learning of college-level English involves many difficulties that require initiative to master problem-solving abilities. When faced with difficulties, they should actively seek solutions. Independent learning of college English for hearing-impaired students requires several key elements. Firstly, hearing-impaired students can consciously determine learning goals under the guidance of teachers. Secondly, they should independently choose appropriate learning methods. Thirdly, they need to self-monitor their learning process and self-evaluate learning results. They should actively carry out learning activities, including self-monitoring, self-adjustment, self-evaluation and self-reinforcing. Teachers encourage and guide deaf college students to take English proficiency tests to promote learning, obtain certificates at all levels, set an example in class, and help deaf college students continue their English language learning.

Establishing an English learning resource library for deaf and hard of hearing college students

No learning resource library was established before the development of this course. However, during the course implementation process, deaf college students and teachers spent a lot of time and energy to sourcing suitable learning materials. At the same time, they also found a scarcity of resources suitable for DHH students to learn English. The English writing learning resource library can provide learning materials for deaf college students to learn English, which is particularly important for their English learning. Therefore, it is crucial to conduct follow-up research to establish a learning resource library suitable for their learning characteristics and special needs, such as various writing samples, graded English literature readings, classic film library, etc.

An attempt to apply modern online teaching technology

It is feasible to develop online courses, online and offline hybrid courses, and visual course resources suitable for DHH college students to learn English. Course learning tools can be mobile apps, online lectures, short videos, AI learning, etc., to diversify learning methods. Teachers guide students to objectively understand their individual learning needs and characteristics and use information technology to achieve personalized learning. They will assist students in making a realistic online learning plan for their needs. Teachers can also assign personalized learning homework packages, etc., to students. Cooperative learning is also one of the expected effects.

The online learning platform can establish class learning groups and enable students to conduct discussions and group cooperation, etc., to promote cooperation and communication. Daily check-ins within these groups will help establish a good atmosphere of mutual learning and exploration. Furthermore, a class learning resource library can be established for both teachers and classmates to upload learning materials related to offline classroom learning or topics of student interest. Learning resources from websites such as VIP and Chaoxing, as well as micro-classes and micro-video learning methods, should be fully utilized to make up for the lack of auditory learning among DHH college students with more investment in visual learning.

Outside the classroom, online media, electronic resources, corpora, online feedback, automatic writing scoring systems, etc., can all serve college English writing teaching and provide a resource-rich, intelligent writing environment.

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