Research on English Teaching Practice in High School Based on Independent Learning Theory

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Abstract

The ultimate goal of high school English teaching is to enable learners to master language skills and therefore improve their ability in language use comprehensively. Language application ability can be gained by self-learning rather than being taught by teachers. And the mastery degree of English learning largely depends on students' subjectivity and participation. The traditional English teaching mainly focuses on teachers, and the teaching mode often overlooks students' subjectivity and independence. Under such a context, stimulating and cultivating students' self-learning awareness and ability to learn English independently has become one of the important goals of high school English teaching. The aim of this study is to explore effective teaching design solutions for cultivating and developing students' independent learning abilities in high school when learning English, and seek to find concrete steps for teachers to conduct design framework and further apply into practice when giving lessons for high school English independent learning, and statistical testing methods will be used to verify the effectiveness and feasibility of this solution. This study mainly adopts two methods including literature review and experimental research. The study shows that implementing teaching plan based on independent learning theory in high school English teaching can stimulate students' motivation for independent learning, develop students' independent learning ability, and improve their comprehensive language proficiency.

Keywords

High School, English Teaching, Independent Learning, Learning Motivation

1. Introduction

1.1. English Learning Is an Important Part of Talent Cultivation in the Digital World

As a widely-used international language in today's world, English is an essential

communication tool for international communication and cooperation. In different fields, English plays an important role as a communication tool. For example, in the field of scientific research, English is one of the main academic languages as a communication tool. Mastering English can help us deepen our communication and understanding with other cultures around the world. Learning and using English are of great significance in drawing on sparkling achievements of human civilization, taking advantage of advanced foreign science and technology, disseminating traditional Chinese culture, and thus enhancing mutual understanding and exchange between China and other countries (Ministry of Education, 2020).

However, due to the shortage of English context, students fail to communicate with others smoothly in English and despite of many years of English learning. Traditionally, English learning mode is built on teachers and students. Students acquire knowledge and skills through teachers' lectures, and such modes put more emphasis on the mastery of grammar knowledge and not paying much attention to cultivating students' ability to apply language. As a result, many students spend a lot of time reciting words and memorizing grammar structures. Due to the shortage of English context, students fail to communicate with others smoothly in English and despite of many years of English learning.

1.2. Research Status and Existing Problems in English Teaching

With the development of information technology and cognitive science, many scholars have begun to delve into the rules of foreign language learning.

A prominent representative figure in this aspect is Professor He Kekang, a famous monograph "Language Perception Theory" (He, 2004). He believes that language learning has a critical period, and it is necessary for children to create a favorable language environment so as to effectively cultivate children's foreign language ability such as listening and speaking during this critical period (the lack of language environment is the fundamental reason to make second language learning difficulty).

American educator Goodman (1986) proposed the whole language approach, which encourages learners to express their thoughts and achieve communication with others in real social environment (Goodman, 1986).

Gu Lifen (2003) pointed out that the whole language approach is "centered on the teaching targets, with learners participating in the teaching, and teachers collaborating with learners, which can help students use language in real natural environment." (Gu, 2003) In addition, with the development of psychology and the deeper understanding of peoples for language communication, many new learning methods and strategy applications have emerged in foreign language learning, such as project-based Learning (Jiang & Li, 2022), situational teaching method (Wang, 2015), cooperative learning method (Zhou, 2009), scaffolding instruction, etc. (Ye, 2010).

The above educational concepts all believe that foreign language should be a

communication tool, and the learning of a foreign language should be based on situations and developed through communication. Students are not being taught, but self-learning. Therefore, in foreign language learning, attention should be paid to students' initiative and independence and students' independent learning is the key to improve English learning ability.

1.3. Purpose and Significance of the Study

How to design an English teaching plan based on independent learning theory to effectively cultivate students' English independent learning ability is an important goal for current middle school English teaching. Based on the theory of independent learning, it is a must to explore effective teaching design solutions for cultivating and developing students' independent learning ability in high school English teaching, in order to promote the improvement of students' English independent learning ability and level English overall ability including listening, speaking, reading and writing. This study provides specific practical solutions and data support for students' independent learning in high school English teaching. It can serve as a guidance and reference for front-line English teachers in high school, and has practical significance in expanding teaching ideas under the new curriculum concept.

2. Theoretical Basis for English Independent Learning Teaching and Research

With the development of student-centered education theory in the information environment, more and more teachers and researchers have realized that "English learning should be learned by students driven by their initiative, rather than taught by teachers". Therefore, teachers should strive to create context for students' independent learning, become guides and supervisors of students' independent learning, for the purpose of achieving active learning based on an independent learning environment.

2.1. Identification of the Concept of Independent Learning Theory

The definition of independent learning is influenced by theories such as humanism, cognitivism, and constructivism (Huang, 2008). Holec was first scholar to propose Independent learning, who believed that independent learning is the process of "learners taking responsibility for their own learning", which means that learners develop their own learning plans and achieve goals due to internal driving forces (Lombardo, 1990). Littlewood extends the definition of independent learning to "the ability to think, make decisions, and act, critically and independently (Little, 1991). Nunan also acknowledges the importance of such ability and defines "learners who can set their own goals and create learning opportunities as independent learners." (Seaman & Nunan, 2001) Zimmerman, American scholar, starting from the perspective of the learning subject, believes that only when students are active participants in metacognition, motivation, and behavior than their learning can be independent (Sun & Zheng, 2021).

2.2. Application Practice of Independent Learning Theory

Most scholars use Zimmerman's independent learning theory model for instructional design when applying independent learning theory into practical teaching (Zhang & Pan, 2006). This model divides independent learning into three stages: prospective stage, performance stage, and self-reflection stage. In the prospective stage, students analyze learning tasks and make learning plans, using independent learning motivation as the driving force to activate independent learning. During the performance stage, students implement learning plans, and observe the learning process while maintaining learning enthusiasm. In the self-reflection stage, students conduct self-evaluation and attribution of learning outcomes. However, Zimmerman's theoretical model of independent learning only reflects students' independent learning behavior, without teacher intervention and guidance. Therefore, other scholars have also incorporated teacher guidance into specific teaching applications.

Such scholars as Chen Baohong use the theory of self-directed learning as the foundation and take advantage of Internet to cultivate college students' ability to learn English independently. Teachers use the rich learning resources of the Internet to stimulate students' interest in learning, integrate independent learning strategies into the classroom, and guide students to use the Internet for independent learning. In addition, regular questions and answers in reverse classroom are conducted. Research has shown that the use of the Internet is helpful in improving the independent learning ability of college students in English (Chen & Shan, 2021). Scholars such as Wang Zhanquan apply the theory of independent learning in the teaching of computer composition courses. Teachers provide relevant learning materials to students before class, organize the classroom in a way that teachers lead students, and prepare classroom handouts and online resources to help students better engage in independent learning, After class, he also uses specific knowledge quiz to test students mastery of knowledge by independent learning. In addition, the teacher also designs a "practical homework table" to guide students to learn independently and provide appropriate positive encouragement to students who are not best in this aspect (Wang et al., 2023). Scholar Peng Xiaofei proposes a "six step" teaching model for cultivating college students' English independent learning ability: creating situations to improve learning motivation, learners exploring and discussing to determine learning goals, collaborating with students to develop learning plans by groups, reporting on discussion results by groups, guiding students to reflect and evaluate the process of independent learning under the help of teachers, and experience the value of independent learning. This empirical study indicates that the "six step method" teaching model can significantly improve the independent learning ability and English proficiency of college students (Peng, 2020).

2.3. Literature Based Analysis and Discussion

It is a necessary to summarize and analyze literature related to middle school

English teaching and independent learning. And the author believes that in order to strengthen the feasibility and effectiveness of research on English independent learning, experimental samples should be selected from actual teaching to conduct experimental teaching and the theory of independent learning should be combined with English teaching practice. After selection and further design on specific English independent learning units, English teaching based on independent learning theory should be implemented. Finally, the experimental results should be quantitatively and qualitatively analyzed, and the reliable data support and analysis results we gained are useful material for developing students' independent learning in high school English teaching.

3. Research Design for English Independent Learning

This design example is based on the practical process of English teaching mode, and will carry out research from the perspective of developing students' listening, speaking, reading and writing ability.

3.1. Research Design

3.1.1. Guiding Ideology

The effect of English learning depends to a large extent on the subjectivity and participation of learners. The improvement of students' comprehensive English listening, speaking, reading and writing ability must be accomplished through their own practical activities. Therefore, two core contents should be reflected in English teaching design: students' subjectivity and initiative.

In line with the purpose of learning language being for use, this study is not divided according to the textbook and the class hours as the teaching unit, but takes the theme as the basis for students' independent learning. By adopting the method of self-listening, self-speaking, self-reading, group collaborative learning and classroom discussion, students can master the knowledge points of this course in communication, expand relevant subject knowledge, develop and improve the ability to comprehensively use language.

Classroom teaching is limited in time and space, and a large number of processes need to be completed by students outside the classroom. Therefore, the occurrence of extracurricular language practice is also an important role in the cultivation of students' English independent learning ability. In the process of English teaching design, students' subjectivity and initiative are not only reflected in the classroom, but also extended and run through the entire student learning process.

3.1.2. Research Assumptions and Organization

This study takes the teaching design scheme of English independent learning as the independent variable, and the students' motivation and behavior for English independent learning as the dependent variables. And experimental group and controlling group should be conducted to organize teaching practical activity, early and later measurement, respectively.

The research hypothesis: Students can give full play to the learning initiative in English teaching based on the independent learning theory, and their learning motivation is more evident, which is conducive to cultivating and improving students' comprehensive English application ability. Otherwise, students' initiative will not be able to be exerted, which is not helpful to improve students' comprehensive English application ability.

In order to make the research persuasive, this study selects two classes with the same level of pretest as the experimental group and the control group, and the two classes are randomly sampled, taught by the same teacher, with the same textbooks. If the post-test performance of the experimental group that implements the English independent learning teaching design scheme in teaching is significantly higher than that of the control group that implements the traditional teaching design scheme in teaching, the research hypothesis is established.

3.1.3. Key Processes of Research

Based on the above self-directed learning research, this paper reflects the thought of independent learning according to the characteristics of English language acquisition, and proposes the following key processes for independent learning of English in senior high schools (Figure 1).
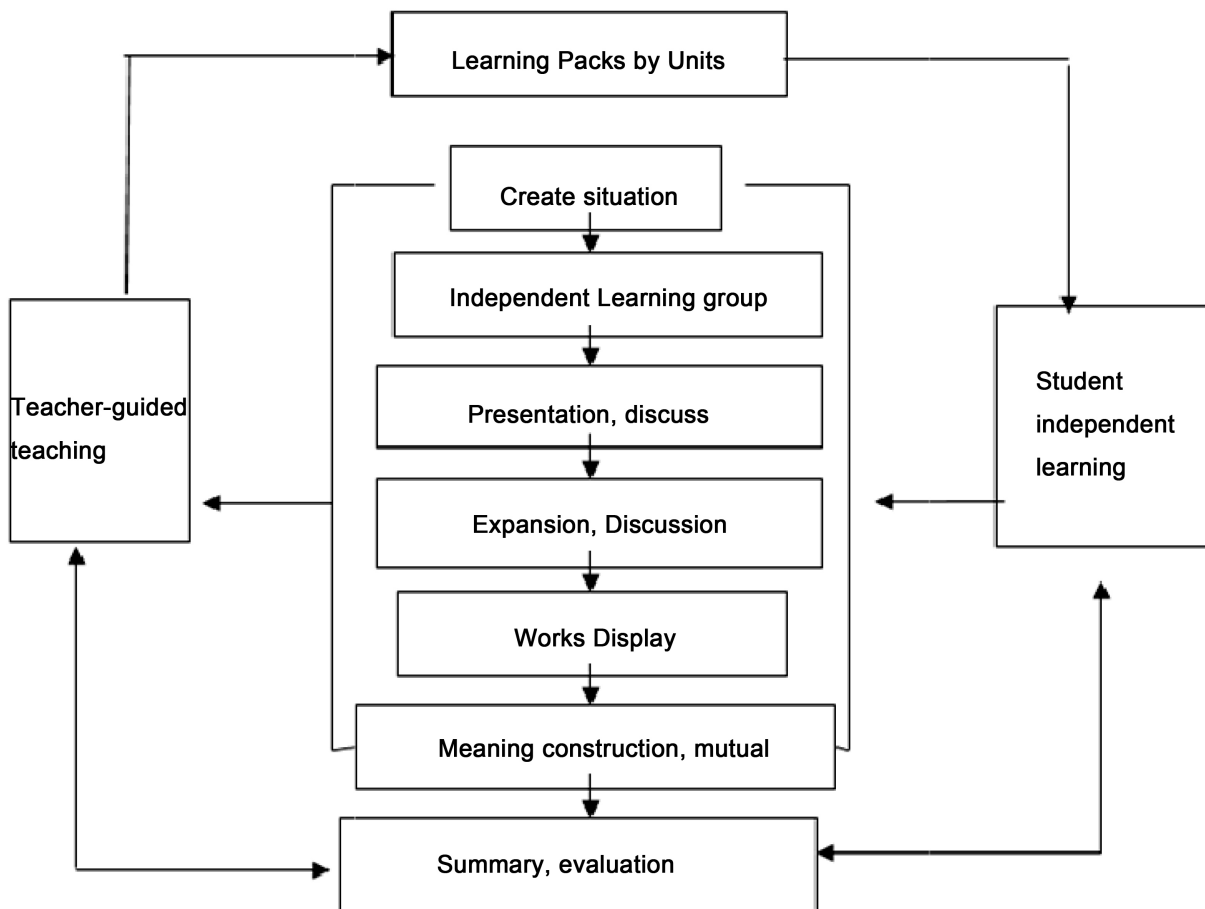

Figure 1. Flow diagram of English teaching mode design based on independent learning theory.

Teachers organize study groups before class and provide students with learning packs by units. In class, the teacher created the situation and guided the group members to learn independently. Then each group presented their views and opinions on the subject of the class and actively participated in the discussion. According to the results of class discussion, each group collected further information, modified and improved the theme works of the group and presented them. The teacher evaluated and scored each group and summarized the evaluation performance of each group member in each stage.

3.2. Design of Teaching Activities

3.2.1. Overall Design Idea
Based on the theory of self-directed learning and the laws of English teaching, this study will organize the teaching situation of independent learning from the four perspectives of "classroom listening and speaking", "classroom reading and writing", "extracurricular listening and speaking" and "extracurricular reading and writing", and encourage the students of the experimental class to learn independently in the context provided by the teacher, and through the comparison of experimental classes and control classes, test the effect of self-directed learning, and finally summarize the rules and find problems, so as to improve the quality of English teaching in theory and practice.

3.2.2. Organizational Model of Teaching
Project learning and group collaboration are the main forms of independent learning, so this study will organize in the form of group collaboration.

1) Grouping mode (Liuhuang & Huang, 2002)

Study groups are constructed in a combination of free combination and teacher designation, following the principle of heterogeneous grouping, and each collaborative group consists of three or four students. Study groups organize learning activities by their own in the form of collaborative task completion, discussion, questioning and sharing.

2) Management of group collaboration activities (Liuhuang & Huang, 2002)

In order to ensure the quality of group collaboration, teachers must formulate task allocation forms, group self-evaluation and mutual evaluation forms, theme work evaluation forms and other forms in advance, and require each study group fill in the forms in time, so as to summarize and reflect on their own learning quality, and students can also provide teachers with evaluation and management data.

a) Task allocation table, the team leader assigns learning tasks according to the independent learning conditions of the students in this group.

b) The group evaluation table, its function is that students use it to monitor and evaluate the status of self-directed learning. The group leader of each group stores and records it in the daily table that reflects self-directed learning evaluation of students.

c) The theme work evaluation table is used to summarize the quality of the

evaluation team's tasks.

3.2.3. Digital Effects Package for Independent Learning

In order to fully support students' self-directed learning activities, it is necessary to provide learners with digital effect packages that conform to their age characteristics and psychological representations based on the theory of self-directed learning and learner characteristics, and distribute materials by study groups. Each effect package should contain at least the following aspects (Liu, 2009).

1) The basic knowledge points of this unit. Its function is to make all students understand the content to be learned in this unit in advance, so as to plan the independent learning of this unit.

2) Unit theme. There is a theme activity in the task pack distributed to each group. According to the requirements of the activity, the group can organize internal discussions and exchanges, find relevant materials, enrich the theme content, and prepare for classroom speeches, interactions and re-revisions.

3) Self-reading materials and their websites. In addition to the necessary knowledge, the package should also include self-reading materials, which are selected by the teacher and provided to the students. The reading materials are divided into compulsory reading materials and related optional materials. Students in the group can choose the optional materials according to their own learning conditions.

3.3. Research Tools

Teaching evaluation is an important basis for measuring the success or failure of teaching research. The design of teaching evaluation in this study mainly starts from three aspects: 1) to reflect students' mastery of knowledge and skills through students' test scores and language application performance; 2) to form students' independent learning ability scale to measure the true level of students learning ability by their own; 3) to collect group collaboration data with the help of collaborative learning control strategies and group collaboration evaluation forms to reflect the quality of group collaboration.

3.3.1. Group Collaborative Learning Status Evaluation Form

In order to comprehensively monitor the dynamic situation of group collaborative learning and discover problems in group collaboration in a timely manner, the author designed a series of tables based on Ma Xiulin's book "Flipped classroom teaching practice and educational value" to collect data on group collaborative learning timely (Ma, 2021). The relevant tables are shown in Figure 2 and Figure 3.

3.3.2. A Survey Scale of Students' Awareness and Ability of English Independent Learning

According to the book "Principles and Strategies of Independent Learning and Teaching" written by Professor Pang Weiguo, the author designed a scale that can reflect students' independent learning awareness and ability (Pang, 2003). As

Projects\Name	Task completion								
	Completion pf basic tasks			Expansion task completion			Mutual aid performance		
	Execellent	General	Not completed	Good	General	Not completed	Good	General	Not completed
student 1									
student 2									
student 3									
student 4									

Figure 2. Panel self-assessment evaluation form for group CL.

Assessment Items	scoring criteria	Group number of the evaluation team						
		Group number 1	Group number 2	Group number 3	...	...	...	...
Learning performance	10 Points							
Importance of the work undertaken	10 Points							
Work 1 and Completion								
Work 2 and Completion								
Work 3 and Completion								
Advantages of the evaluated team:								
Weaknesses of the evaluated team:								
Inspiration from the evaluated group:								
Conclusion								

Figure 3. Group mutual evaluation for group CL.

shown in **Figure 4**.

Scale code: Complete = 10 points, partial = 8 points, uncertain = 6 points, incomplete = 4 points, none = 2 points. The score obtained by students after measurement is between 20 and 100. Since the full positive narrative topic is used, the higher the score, the stronger the students' awareness and ability of English independent learning.

	A Survey Scale on Students' Awareness and Ability of English Autonomous Learning					
Description: Please select the item that best reflects your status in the space below, all of which are single selections.						
Title number	Topic	Complete	Partial	Uncertain	Incomplete	None
1	I always preview before class.					
2	I have clear English learning goals.					
3	I often ask my own questions to the teacher.					
4	I often use reference books, teaching aids, etc.					
5	Every day I take the initiative to arrange time to learn English.					
6	I will exchange learning experiences with my classmates.					
7	A summary of the learning situation will be made after a stage of learning.					
8	I know my learning weaknesses and can find solutions.					
9	I like reading English books and taking notes.					
10	For the choice of questions that can be done or not, I also strive to do it well.					

Figure 4. Survey scale of Students' English independent learning awareness and ability for group CL.

4. High School English Teaching Practice for Independent Learning

This research will focus on students' independent learning activities. It not only pays attention to the cultivation and development of classroom students' learning initiative and mutual assistance, but also regards students' self-directed learning and group collaboration activities outside the classroom as an important part of the teaching process.

4.1. Subject Selection and Control

This study used the experimental group-control group model to organize research activities, and collected pre- and post-test data to test the effectiveness of the study.

4.1.1. Subject Target Selection

In this study, the G106 teaching class and the G107 class were selected as the research objects. The number of students in the two teaching classes was basically equal, and the ratio of males to females was basically the same, roughly 3:7. There was no significant difference.

Taking Class G106 as the experimental class, the teaching design scheme of English independent learning is implemented in the teaching; Taking Class G107

as the control class, teaching activities are organized in line with the teaching scheme combining traditional lecture with practice in the teaching.

The experimental sample consisted of 67 people, including 32 in the experimental class (G106) and 35 in the control class (G107). Both classes are parallel classes, and the average scores of the two classes are comparable in the real situation test for entering high school.

4.1.2. Irrelevant Variable Control

In order to ensure the preciseness and stringency of the research, except that the experimental class adopts the independent learning strategy to organize teaching activities, it is necessary to ensure that there is no significant difference between the experimental class and the control class in terms of personnel characteristics, knowledge base, skill level, and learning ability endowed with learners.

1) Pre-test results and comparison of English independent learning awareness and ability

Based on the "Survey Scale of Students' English independent Learning Awareness and Ability" proposed by the 3.3.2, the students in the experimental class and the control class were measured and coded according to the scale. The results after statistical analysis are shown in Table 1.

It can be seen from Table 1 that the pre-test average scores of the experimental class and the control class are relatively low and basically the same. It shows that the performance of the students in the two classes is not so satisfactory in terms of self-learning awareness and ability.

2) Pre-test results and comparison of language use ability

Students' English application ability is tested. The content of the test is divided into two parts, and calculated as percentages. Listening and speaking are the first part, and reading comprehension and writing are the second part. The average scores of the two classes are shown in Table 2.

It can be seen from Table 2 that the scores of the students in the experimental class and the control class are very close, and the scores of listening and oral speaking are not high. This shows that the students' English communicative competence level is in a low state.

Table 1. Statistical table of pre-test scores of the English independent learning awareness and ability survey.

English independent Learning Awareness and Ability Survey Scale Pre-test Score Statistics			
group	Pre-test average score	Pre-test comparison T value	Pre-measured Sig value
Experimental class (G106)	46.656		
		0.952	0.698
Controlling class (G107)	46.086		

Table 2. Statistical table of pre-test scores of English comprehensive application ability test.

| Group | Pre-test situation | | | | | |
| | Listening and Speaking | | | Reading and Writing | | |
	average	T/value	S/value	average	T/value	S/value
Experimental class (G106)	37.656			63.656		
		1.121	0.631		0.987	0.872
Control Class (G107)	38.143			64.229		

Statistics of Pre-test Scores of English Comprehensive Application Ability Test

4.2. Teaching Case Selection

This course material takes WHEELS, Unit 9, Module 3, New Curriculum of Beijing Normal University as an example to organize teaching practice activities to explore the feasibility of implementing independent learning in high school English teaching. The selected teaching content is based on the background of urban traffic-related issues that attracts world attention.

According to the textbook, this unit mainly discusses the "wheel" in society and the knowledge related to it, and its knowledge system is shown in Figure 5.

4.3. Teaching Situation Design Based on the Concept of Autonomous Learning

This lesson example takes On the Move, Unit 9, English Module 3, Beijing Normal University Edition as an example.

4.3.1. Design of Independent Learning Situations for Listening and Speaking Objectives

1) Explanation of listening and speaking goals

Before starting listening, students should firstly clarify the listening and speaking goals of this lesson:

a) Use the strategy of "occasion focus" to train listening at the airport or train station.

b) Train the ability to listen to the broadcasts of airports and railway stations to find detailed information.

c) Role-play, aims at training the expression of asking for help at the airport or train station.

2) Stimulate students' motivation and interest in listening, and construct listening situations.

First, teachers use multimedia to show pictures or video clips of airports and train stations to inspire students to identify the scene of the picture, and ask students if they have traveled by plane or train. The related questions are shown in Figure 6.

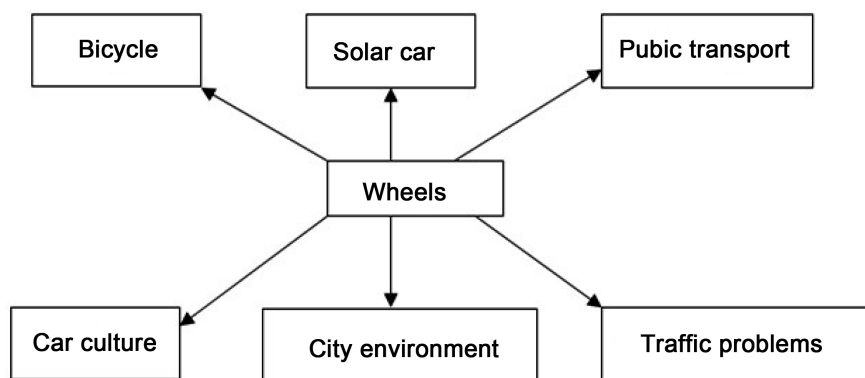Students communicate their experiences and answer questions from teachers

Figure 5. The theme of the WHEELS unit in the ninth unit of the third module of the new curriculum of Beijing Normal University Edition.

Have you ever been on an airplane？
Have you ever been abroad？Where did you go？
Have you ever traveled a long distance on your own？How did you travel？

Figure 6. Questions that stimulate interest.

by groups.

Next, the teacher shows the students the keywords related to listening, and the students work in groups to classify the keywords and fill in the form. In the process of classifying and filling in words, students may not know some words, and the teacher encourages students to look up the dictionary or explain them in English so that students can understand the vocabulary.

Students then talk about what table keywords appear in the figure in a group discussion through pictures or video cuts shown by the teacher, as shown in Figure 7.

Then, the teacher assigns listening tasks to remind students to pay attention to completing exercises 3, 4, and 5 in the book when listening to the material.

3) Use the method of distinguishing primary information and from secondary information, and students can understand both the general idea and the details.

First, let students have 5 minutes to understand the content and requirements in Exercises 3, 4, and 5. Vocabularies and details will appear in the listening. The teacher reminds the students to pay attention to the details in the material when listening. When the students listen to the listening material for the first time, they use the listening details to complete the connection questions in Exercise 3 and the information fill-in-the-blank questions in Exercise 5. Play back the recording material and let the students check the details of what they have heard. The teacher repeats the recording material again, and the students listen to the general information and answer the questions in Exercise 4.

Second, the teacher instructs the students to read the text about the "situation" in the group, and asks the students to expand their minds and guess where the conversation will take place based on the speaker's language and emotions. Then the students will listen to the listening material secondly and answer the

> *I can see a platform at the train station and there are a lot of passengers there. A lot of passengers stay in the airport. They are waiting for their plane!...*

Figure 7. Student speeches.

questions in Exercise 6: Where did the dialogue take place and what the people were talking about?

4) Students use listening materials to perform role-playing and exercise oral communication.

The teacher guides the students to review the content of the listening materials. According to the dialogue in Exercise 7, the students conduct dialogue exercises in groups, changing some of the items and conducting new dialogues. Teachers can choose several groups of students to have classroom dialogues, show the group style, and give timely encouragement.

4.3.2. Design of Self-Directed Learning Situations for Reading and Writing Goals

1) Explanation of the reading and writing goals of this lesson

Students should understand that the learning objectives of this lesson are:

a) Take notes on important information by reading the text.

b) Write a report on the pros and cons of cars.

c) Discuss traffic issues.

2) Create situations to stimulate students' motivation and interest in learning

First, teachers use multimedia to show students some pictures and video clips of the current situation of cars and traffic, and ask students questions: Can you name the car? Do you know where the car is made? Does your family have a car? Which car would you like to have? What can you see in the picture? These questions will bring students into the situation, guide students to think about and answer.

Secondly, when encountering words that you don't know, before asking students to look up the dictionary, teachers encourage students to use their vocabulary reserves to guess the meaning of the keyword.

3) Use reading strategies to understand and analyze the article

First, students skim the text and complete the notes for Exercise 3 by familiarizing the outline description of the text in Exercise 3 (see Figure 8).

Students discuss in groups to check that whether their answers are consistent with their peers. The teacher selects several classmates to verify the details.

Second, students read the passage again in groups and discuss comprehension questions about the text in Exercise 4.

Then, with Exercise 5 as the background for the argument, are encouraged to argue and express opinions on "which sentence will be best to reflect the author's attitude towards the car." Students reinforce what they have read while discussing.

4) Write a report based on the article to consolidate reading comprehension

> *Number of cars：*
> *Growth over the past 10 years：*
> *Number of car advertisements：*
> *Excursion：*
> *Vehicle emissions：*

Figure 8. Reading and taking notes.

Students work in groups to discuss the traffic problems involved in this lesson and the corresponding solutions, and organize a traffic report on British cities in their own language. Students use group collaborative exchanges and online forums to exchange and evaluate their reports and present them in class.

4.3.3. Design of Independent Learning Situations for Extracurricular Listening and Speaking

1) Description of the goals of extracurricular independent listening and speaking learning

Share reading experience, Display thematic reports, exchange opinions, and improve report content.

2) Assign learning tasks

Students consolidate their knowledge of the text through discussions and conversations, and expand their understanding of urban traffic conditions and environmental protection (Please refer to Figure 9).

3) Distribution of learning packages and task allocation:

The group leaders assign learning tasks and organize independent learning. For example, the first group consists of four students: Ning Chengjian, Gao Yingying, Yu Yang, and Liu Jingjing. The corresponding tasks are assigned according to the students' own level. The specific assignments are shown in Table 3.

Through the distribution of study packages, students can understand the general content of the lesson and have a general prediction on the theme of the lesson. Preparation can be made for verbal communication, independent reading and presentation of themed works.

4) Role play

In order to make the discussion process interesting, a role-playing method can be used in group activities. For example, group members play the roles of traffic police, ordinary citizens, car drivers, etc., and then discuss the traffic conditions and car development in Beijing in English (Huang & Zeng, 2000).

5) Group Learning Evaluation

The evaluation process is the process of students reviewing the self-directed learning situation, so that students can recognize the state of self-directed learning in the previous stage and adhere to or correct it. Through the self-evaluation and mutual evaluation of the self-directed learning status of group members, students' learning motivation can be stimulated and maintained.

> ① *Discuss in the group on the topics of bicycles, solar cars, car culture, traffic problems and explore how to improve the current situation of urban traffic.*
> ②*Two-sided conversation centered on above topics, chose one, randomly.*
> ③ *You can choose one of the above topics for two dialogues between groups.*

Figure 9. Learning tasks for listening and speaking outside the classroom.

Table 3. Assignment table for the first group of learning tasks.

Team member name	The content of the task to be completed	
	Basic task	Expand the task
Liu Jingjing	1) Preview the vocabularies and articles of the third lesson, and talk about the advantages and disadvantages of solar cars.	Website Information (4) (7)
Yu Yang	2) Think about the traffic situation in your own city and answer questions from reporters.	Website Information (3) (6)
Ning Chengjian	3) Read website articles to understand the usefulness of solar energy.	Website Information (2) (4)
Gao Yingying	4) Co-design themed works about solar cars	Website Information (1) (5)

4.3.4. Design of Independent Learning Situations for Extracurricular Reading and Writing

1) Description of the goals of Independent activities

a) Learn more about solar vehicles by reading the expansion materials independently.

b) Use online forums to communicate and evaluate, and improve the writing of thematic reports.

c) Group collaboration to discuss reading results and organize each group's thematic reports.

2) Assign reading and writing tasks (Figure 10)

3) Independent reading, group collaborative learning

Students begin to study independently according to their own tasks, understand texts, reading materials, consult relevant materials, and obtain information knowledge of urban traffic conditions. Students read relevant materials independently, accumulate information, and provide materials for the expression and communication of the theme. In the process, students cultivate their self-reading awareness and ability.

The group leader organized the group members to summarize the reading materials, encouraged the students to communicate their experience after reading, and prepared for interactive communication in the form of interviews. Students' listening and speaking skills can be promoted through verbal communication, and reorganized the independent reading information.

4) Use the online forum as a platform to form a theme report

The group will publish their own theme report on the learning forum and receive comments from other members. Other members can comment on this report and propose suggestions for modification.

(1) *Basic tasks:*
    ① *Preview the vocabularies and articles of the third lesson, can you talk about the advantages of solar cars? Does it have any shortcomings? (Mark under the vocabularies and sentence patterns you do not understand, and look up the dictionary to understand the vocabulary usage.)*
    ② *Think about it according to your own expanded reading content: If a reporter interviews you, asks you to talk about the traffic situation in your city, and answers some questions from reporters, how should you organize the language? (refer to the form of the text).*
    ③ *Independent reading: the content from the website:*
      http://www.energyquest.ca.gov/story/chapter15.html 14
    ④ *The group communicates and discusses the results of their own reading, and jointly designs a theme work related to solar cars!*

(2) *Expansion tasks:*
    Read the information on the following websites to understand the relevant content of traffic topics. What are the current prominent problems of urban traffic in the world? (Record your own experience in the reading in the table below)
    ① *http://www.nutramed.com/environment/cars.htm*
    ② *http://www.edf.org/page.cfm?tagID=40*

Figure 10. The task assignment of extra-curriculum.

Not only can they further improve their works, improve their writing ability, but also cultivate their independent reading ability. In addition, students in each group can also record feedback information, so as to gradually improve the theme report of this group and improve their learning quality (Liang & Zhong, 2005).

For example: Student comments on the first group of thematic reports are mainly shown in Table 4.

5) Improvement of thematic reports

According to the feedback information, each group once again organized group members to conduct thematic discussions, find materials, improve their works, and exercise their writing skills. Through the improvement of the theme report, students are prompted to embark on deep thinking. In addition, with the support and help of teachers, the theme reports of the students in each group have become more and more perfect, which also reflects the improvement of the students' independent learning ability.

6) Summarize and present the thematic reports of each group

Each group of students displayed the final theme report and expressed it through verbal communication, reflecting the importance of verbal communication and the teaching mode of students' independent learning. The themes and keywords of each group's theme report are shown in Table 5.

5. Results and Discussion

This study adopts the real teaching situation of "experimental group-control group" and pre- and post-test. The consistency of the experimental group and the control group on the pretest data ensures the initial conditions of the study. During the research process, the author paid full attention to the control variables in the research, thus ensuring the reliability of the research.

Table 4. Record of comments on the first group of thematic reports.

Theme work name	Comments on the work supplement
How does A Solar Car move?	1) Rewrite some difficult words and sentences to make the whole article easy to understand. 2) Note the Chinese of the new words in the text to facilitate students' learning. 3) When displaying the theme works, pictures and texts should be added, which is helpful for understanding.

Table 5. Thematic reports by groups.

Group 1	Group 2	Group 3	Group 4
How does A Solar Car move?	Solar Cars Are Good for the Earth	Ordinary Cars V.S Solar Cars	Solar Car Racing
Group 5	Group 6	Group 7	Group 8
The History of Solar Cars	Different Kinds of Solar Cars	Our Solar Car Design	The Use of Solar Energy

5.1. The Effectiveness of Organizing English Teaching Based on the Theory of Independent Learning

Regarding the effect of English independent learning under the independent learning theory, the author believes that it should be carried out from three dimensions: students' achievement (knowledge goal), practical application level (ability goal) and core literacy.

5.1.1. Analysis of the Effectiveness of English Autonomous Learning from the Perspective of Students' Grades and Language Application Ability

Grades are an important indicator of students' achievement of knowledge and skills goals in English learning. The final exam scores of students in the experimental class and the control class are shown in Table 6.

It can be seen from Table 6 that the grades of the experimental class are higher than those of the control class in both "listening and speaking" and "reading and writing", especially in listening and speaking, and the scores are significantly higher than the pre-test scores. This result shows that: after the implementation of the English teaching experiment based on the independent learning theory, the students' comprehensive English use ability have been significantly enhanced; while the control class under the traditional teaching mode is less than ideal, especially in the "listening and speaking" dimension, and its average score is actually unsatisfactory (only 39.286 points), which shows that the traditional "teacher-based" teaching mode has serious defects in English listening and speaking.

In order to better illustrate this phenomenon, the author made an "independent sample t-test" on the final grades of the students in the two teaching classes, and the results are shown in Table 7.

Table 6. Statistical table of post-test scores of English comprehensive use ability test.

	Statistics of post-test scores of English comprehensive application ability test	
	Post-test average score	
group	Listening and speaking	Reading and writing
Experimental class (G106)	71.25	68.5
Control Class (G107)	39.286	64.114

Table 7. T test table for students' English listening and speaking ability.

	T-test analysis of students' English listening, speaking and using ability			
	N	$\overline{X}$	Sig	T
Experimental class (G106)	32	71.25	0.000**	5.213
Control Class (G107)	35	39.286		

It can be seen from Table 7 that its Sig = 0.000, its value is much less than the confidence level of 95%, so the difference between the experimental class and the control class in English listening and speaking ability is very significant; in addition, T = 5.213 > 1.96, it also shows that the difference between the two is significant.

Similarly, an "independent sample t-test" was performed on the "listening and speaking" scores of students in the experimental and control classes, and the results were shown in Table 8.

It can be seen from Table 8 that the Sig = 0.048 < 0.05 of the two, and this data shows that the difference between the two is also significant. That is to say, the effect of implementing English teaching based on the theory of independent learning in improving students' comprehensive English ability is significantly better than that of traditional English teaching featured with speaking and practice.

In addition, comparing the data (T value and Sig value) in Table 7 and Table 8, the author believes that the implementation of English teaching based on the theory of independent learning has a more obvious effect on students' English listening and speaking ability.

5.1.2. Analyze the Effect of English Independent Learning from the Perspective of Students' Self-Directed Learning Ability and Consciousness

Self-learning ability and self-learning awareness are important contents of the cultivation of innovative talents in today's society, and serves as an important part of the development of students' core literacy. After a school year of teaching reform research, the results of the experimental class and the control class in the measurement of self-learning awareness and self-learning ability are shown in

Table 8. T test table for students' English reading and writing ability.

T-test analysis of students' comprehensive English use ability post-test score				
	N	$\bar{X}$	Sig	T
Experimental class (G106)	32	71.25		
			0.000**	5.213
Control Class (G107)	35	39.286		

Table 9.

It can be seen from Table 9 that the scores of self-directed learning awareness and self-directed learning ability of the experimental class are significantly higher than those of the control class, which shows that after the implementation of the English teaching experiment based on the independent learning theory, the students in the experimental class have significantly improved their English learning ability, thereby promoting the improvement of students' independent learning awareness. The control class has not undergone the professional training of this teaching reform experiment, and its self-directed learning awareness and ability level have not been significantly improved, and its scores are basically the same as those in the pre-test.

In order to better illustrate this phenomenon, the author made an "independent sample t-test" on the self-directed learning measurement data of students in two teaching classes, and the results are shown in Table 10.

It can be seen from Table 10 that the Sig = 0.012 < 0.05, and this data evidently shows that the difference. That is to say, the implementation of English teaching classes based on the independent learning theory has a significant effect on improving students' learning ability and awareness on their own. Students who have participated in learning activities based on such self-directed learning theory have significantly improved their learning ability and awareness independently.

5.2. Discussion and Analysis

Under the guidance of the independent learning theory, this study proposes an instructional design model for English independent learning, and verifies the feasibility and effectiveness of this instructional design scheme in high school English teaching through real experiments of experimental group and control group and by pre-and-post tests.

5.2.1. Organizing English Teaching Based on Independent Learning Theory Can Significantly Improve Performance and Learning Initiative

Through the implementation of the self-directed learning scheme, it can be seen that students' English learning process have been changed from receptor to active learner. Students consolidate knowledge, expand knowledge, form ability and demonstrate ability in group by learning, discussion and exchange.

Table 9. Statistical table of post-test scores of the English Independent Learning Awareness and Ability Survey Scale.

English Independent Learning Awareness and Ability Survey Scale Post-test Score Statistics	
Group	Post-test average score
Experimental class (G106)	75.563
Control Class (G107)	45.629

Table 10. T-test table of students' English independent learning awareness and ability post-test scores.

T-Test Analysis of Students' English Independent Learning Awareness and Ability Post-test Score				
	N	$\bar{X}$	Sig	T
Experimental class (G106)	32	75.563	0.012	2.389
Control Class (G107)	35	45.629		

Self-directed learning provides students with multiple channels to acquire knowledge, thus becoming the owner and freeman.

Through the statistical analysis of the experimental results, it can be seen that the positive impact of the English teaching design scheme based on the independent learning theory on English teaching and students' learning mainly includes the following three points:

First of all, the teaching method that takes teachers as the center and teacher have absolute control of students' knowledge acquisition method is changed to a learning method that focuses on students' active learning and expands knowledge around the theme. Teachers play the role of helping, supporting, observing and organizing in the process of students' independent learning. This makes students' willing will be strengthened in initiative, awareness and motivation.

Secondly, exercise the formation of students' self-learning awareness, and develop students' self-learning ability, cooperative problem-solving skill and communication ability.

Finally, the improvement of English independent learning ability enables students to develop and improve their comprehensive English use ability. This is also the ultimate goal of this study.

At the same time, independent learning reduces the teaching burden of teachers, and students can handle some learning tasks by themselves. Teachers have more time and energy to focus on more complex teaching tasks and individual guidance, and by understanding students' progress in independent learning, teachers can provide more targeted advice and support to help them solve specific learning challenges. Teachers can explore new teaching methods and tools to support students' independent learning, which can spark innovation and improve teaching practices.

5.2.2. Research Limitations and Reflections

First of all, this experimental research has only done preliminary research, and the research scope is small, with only nearly 70 students, and the research period is short, only one semester. In order to improve the timeliness of experimental research on teaching, it should continue to be studied in a relatively large range, and should be carried out in schools at different levels to verify the universality of the English independent learning model.

Secondly, in the teaching process of implementing English independent learning, on the surface, the classroom workload of teachers seems to be reduced, but in fact the author has carried out a lot of data collection and selection work after class, analyzing and screening the content of teaching materials, and designing students' learning activities. These tasks all take up a lot of the author's time and energy, and increase the workload a lot. Students also make more efforts due to the increasement in the amount of learning task in the process of independent learning whether in classroom or outside.

Third, in the process of organizing the teaching of the experimental class, the author also heard the voices of doubts from some parents. They feel that teachers should talk more about knowledge and do more practice questions in English class, which will promote children's English learning. It is a waste of time for students to practice communication during class time. Obviously, some parents still respect the traditional view of English teaching in their minds, holding the viewpoints that a class without grammar cannot be regarded as a complete class. Therefore, the author believes that social support and understanding are also necessary conditions for the smooth progress of research.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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