

# High School Students' Foreign Language Vocabulary Acquisition in the Era of Artificial Intelligence

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## ABSTRACT

The development of artificial intelligence technology has a profound impact on foreign language teachers, learners, teaching mode and methods, the ways of evaluation, etc. In order to explore how much the artificial intelligence technology has influenced on foreign language vocabulary acquisition in classroom setting, the researcher implemented an experimental study between two classes in a high school. The results showed that the class using the artificial intelligence technology had outperformed the one using traditional word-formation vocabulary teaching in reading comprehension, gap filling and matching items. The study also proved that the application of artificial intelligence devices in classroom setting can make full use of learners' existing knowledge structure and promote their cognitive growth and information processing ability. The research simultaneously implicates that the existing application of artificial intelligence technology in foreign language teaching is far from satisfaction. The improvement of current situation needs the efforts from whom it may concern.

**Keywords:** *Classroom Setting, Vocabulary Acquisition, Artificial Intelligence Technology.*

## 1. INTRODUCTION

Human society is marching towards a brand new artificial intelligence (AI for short) era. The rapid development of 5G technology and AI industry will utterly change the traditional education ecology and bring new opportunities as well as challenges to the education<sup>[1]</sup>.

It is a common sense to every foreign language learner that vocabulary is the basic building material of an individual's language edifice. In recent years, researchers show great interest in the study of foreign language learners' vocabulary acquisition from cognition and psychology perspectives. The scholars at home and abroad focused their main attention on the strategies, techniques and methods applied in foreign language vocabulary teaching and the memorization, and partly or utterly ignored the application of artificial intelligence technology (AIT for short) in vocabulary teaching and acquisition in classroom setting.

In many schools, students are still prohibited from bringing AI devices, such as cellphones, ipad, etc. into their classrooms. In fact, the application of AI devices in foreign language teaching, especially the autonomous use of AI devices in classroom setting, can improve

teaching efficiency and enhance students' interest in foreign language learning<sup>[2]</sup>.

## 2. REACHING DESIGN

### 2.1 Hypotheses

The experimental study is to verify the following two hypotheses:

- (1)AIT assistance vocabulary teaching is more efficient than word-formation teaching method in classroom setting.
- (2)AIT assistance vocabulary teaching will produce more efficient long-term effect in vocabulary acquisition than word-formation teaching method.

### 2.2 Subjects

The subjects (the average age is 17.40) in two intact classes were randomly chosen from the 20 classes in Grade Two from a provincial key high school.

**2.3 Instruments**

40 words used in the experiment were deliberately chosen from *A Vocabulary Builder for TEM Band-8*. The subjects can identify the word-formation features of the words under the teacher’s guidance.

**2.4 Method**

A pretest was carried out before the experiment to reconfirm that the subjects knew none the 40 words. After this, the control group was treated with word-formation approach and the experimental group

with AIT assistance teaching. 40 words were taught in different sequence to guarantee that the subjects have no opportunities to exchange the teaching information.

**2.5 Post-test**

After a four-week treatment, all the subjects in two classes took part in the post-test. Then all the test papers were marked twice to ensure the same criteria implemented in post-test marking. After the data were collected, the statistics were analyzed with SPSS.

The results of the experiment indicate that the experiment buttresses the hypotheses.

**Table 1.** Results of post-test

	Results of gap-fillings		Results of matching items		Results of reading comprehension	
	Control class	Experimental class	Control class	Experimental class	Control class	Experimental class
Mean	2.90	4.39	6.74	7.32	9.83	15.47
Std. Deviation	1.43	1.75	2.91	3.54	7.43	7.96
t	2.39		.712		3.69	
Sig.(2-tailed)	.012		.025		.00	

**3. DISCUSSION**

**3.1 The Subjects’ Knowledge Structure**

The subjects have received 12 years’ school education, which provides them with well-structured knowledge basis of thinking and problem solving. Additionally, more than 17 years’ lifetime endows them with some basic social experience. Both school and social life provide the subjects with opulent knowledge context, which satisfies the basic requirement of the application of AIT.

**3.2 The Subjects’ Cognitive Growth**

High school students have distinctive characteristics in cognitive and learning patterns and information treatment technology. Technology, image reading, innovation and aspiration have become their symbols.

In adolescence, an individual’s meta-memory knowledge become much richer, especially the knowledge concerning memory strategies grows rapidly. Meta-memory monitor overall develops with the age growth. They had possessed the competence to monitor their thinking mode, even can evaluate and modify their thinking ways when they use the AI devices to memorize the lexical items.

The velocity and the capacity of information processing have greatly improved in the digital native generation<sup>[3]</sup>, who are inclined to access digital resources through AI devices. They can conduct psychological operations in a very brief time, even several different types psychological operations can be

implemented simultaneously. The information processing velocity and capacity of the subjects meet the demand of the employment of AI devices.

Additionally, the subjects have learned English as a foreign language for more that seven years, most of them have formed their learning habits in learning new words. Comparing with the adult foreign language learners, their learning routines have not been stereotyped. In the development of learning strategies, they have greater plasticity in cognitive growth perspective than that of the adult learners.

**3.3 The Subjects’ Information Processing**

Under the assistance of AIT, the information as well as the linear sequence of the target words can be assimilated with the learners’ existing knowledge context at the very beginning, which accelerates the entry of the lexical item into the learners’ cognitive scope.

Both word-formation and AI assistance teaching involve acoustic coding and visual coding, whereas the semantic coding and strategic coding are absent in word-formation approach. and the semantic coding is superior to phonetic coding in learning process.

In AI assistance approach, the learners’ existing knowledge and experience will be activated and exert great function in the learning process. Nonetheless, in the word-formation approach, only the existing knowledge about word-formation can work in the target word learning while learners’ other existing knowledge and experience were utterly confined.

AI assistance teaching approach has distinctive advantage in long-term memory over word-formation approach.

In Spreading Activation Model, words are represented in the internal lexicon in a network, and the organization is closer to a web of interconnecting nodes, with the distance between the nodes determined by both structural characteristics such as taxonomic relations and the considerations such as typicality and degree of association between related concepts<sup>[4]</sup>. The researcher argues that the semantic net should be three-dimensional or more dimensions, which is more convenient for the learners to store and retrieve the existing information. An ideal model for information store should be a well-organized net and can be retrieved in a very brief time, all of which can be carried out in a distance as short as possible.

#### 4. CONCLUSION

The experimental study chiefly focused on the verification of the hypotheses that AIT assistance teaching is, to a large extent, superior to word-formation in foreign language learning in classroom settings and its long-term memory effect is obvious, and the final results back up the hypotheses. In addition, the advantages of AIT assistance teaching over word-formation are respectively probed from the perspectives of adolescents' knowledge structure, cognitive growth and information processing.

The transition of the second language vocabulary acquisition (SLVA for short) study from the peripheral to the central lasted more than one hundred years and this era saw the zigzag path the SLVA had groped in the dust of structuralism and the dawn of the Chomskyan school of linguistics<sup>[5]</sup>. With the introduction of the top-down, naturalistic, and communicative approaches in the 1970s and 1980s, the researcher reoriented their focus on the SLVA study<sup>[6]</sup>.

In foreign language (FL for short) vocabulary instruction, western scholars principally focus on the key-word method, which is more appropriate for the Indo-European languages speaker, whereas the Sino-Tibetan speakers cannot benefit much from this technique, especially the Chinese FL learners.

After reviewing a wealth of documents on language learning, memory and the psychological characteristics appeared in adolescents' cognitive growth, the researcher aimed to conduct a comparison between the AI assistance teaching approach and the traditional word-formation vocabulary instruction in the classroom setting and hoped to propose a more helpful approach to facilitate learners to cope with the numerous lexical items in their FL learning.

An experimental study was conducted, which chiefly

focused on the testification of the hypotheses that AI assistance teaching approach is, to a large extent, superior to word-formation in SLVA in classroom settings and its long-term memory effect is obvious. The final results of this experiment back up the hypotheses. In addition, from the perspectives of adolescents' cognitive growth, personal knowledge context, information processing, and the performance of the subjects, the advantages of the AI assistance teaching approach over word-formation are presented and investigated. Furthermore, the relationship between the word-formation and AI assistance teaching approach is pointed out. At last, the limitations of the AI assistance teaching approach and the experiment are pointed out.

#### 5. IMPLICATIONS

##### 5.1 Implications for FLT

The Chinese FL learners are facing many concrete difficulties diverging from Western learners<sup>[7]</sup>. Above all, most of them do not always immerse in a natural English environment. Besides, as they are not accustomed to the alphabetical language, they will tend to memorize the new words by rote at the very beginning. In reality, Chinese FL learners' cognition has been rather mature. In facilitating the learners to acquire FL vocabulary with a high efficiency, the language teachers should integrate the concrete circumstances in China with the learners' cognitive growth to design potent methods for memorizing new words.

Additionally, the language teachers should have reoriented the prejudice against AIT assistance, which is of great importance for the pedagogical and theoretical research. AIT assistance has great academic research potentialities, but mainly of the investigation was made in academic circles but in the language classroom setting. The researchers should not merely introspect the underlying reasons, but should conduct more detailed investigations, which will benefit the pedagogical research, especially the millions of Chinese foreign language FL learners.

Furthermore, we could tentatively introduce the AIT assistance into the edition of the textbooks for intermediate and advanced learners. The knowledge about word-formation comes into view in textbooks as early as the first year in senior middle school. In fact, the junior middle school students have been imparted some basic affixes and roots. All of these demonstrate that word-formation is significant in the FL pedagogical position. Whereas AIT assistance does not come into sight in the textbooks from senior middle school to university all along, such situation essentially hold back the further development of the devices. It is hoped that the position of AIT assistance teaching can be ameliorated in future.

In fact, the theoretical research in English language teaching (ELT for short) in China has chronically followed the footprint of the western scholars<sup>[8]</sup>. However, as the situation in China is diverse from that of the west, we should combine introduction and innovation in the establishment of EFL theories. The explicit conduction should be the following pattern: study the specific circumstances that the Chinese learners are confronting in EFL at home attentively. Then put forward the initial or innovational theories on the basis of the empirical researches to solve the problems that have occurred in the pedagogical process.

In short, the ELT must integrate the actual situation in China with the learners' actual requirements. We should apply it appropriately and scientifically in foreign language teaching in our social environment so as to develop ELT theories and improve the outcome of ELT in China.

### **5.2 Implications for SLVA**

SLVA has been in the peripheral zone over a long period, and the vocabulary was ignored in the middle schools in China<sup>[9]</sup>. With the enhancement of the researchers' awareness to the significance of L2 vocabulary, the position of SLVA has been improved and the study of SLVA quickly approaches to the central from the peripheral, which brings a diversity of the research methods to the SLVA. As a major FL learning strategy, AIT assistance teaching will widen the research scope of the SLVA and eventually will become an effective method for the L2 learners.

It is suggested that the language teachers today need to rejuvenate their traditional teaching ideas and be aware that learning and teaching are concerned with a series of complex psychological alterations. They are about changing learners' conceptions rather than simply about dumping more facts to learners. Accordingly, teachers need to carry out a comprehensive study on the internal and external factors influencing the outcome of the SLA, especially the learners' cognitive capacity, cognitive psychology and memory etc., and bring forth some new learning strategies appropriate for the learners' cognitive growth and memorial psychological characters. Only in this way, can we know fairly well how to teach the students according to their authentic level and develop them to be independent, high efficient and competent thinkers and learners. Each researcher should bear such a notion on his mind: pedagogy is a systematic work and any ignorance to a link will cast negative influence to the expected outcome.

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