



# Fusion of AI-powered Tools and MALL Apps for Teaching Academic Listening Vocabulary in Chinese EAP Classrooms: An Action Research Approach

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## Abstract

*With the rise of AI-powered tools, it has been proved that the application of AI could enhance L2 learners' writing skills[1, 2]. Additionally, previous studies have revealed that Mobile-Assisted Language Learning (MALL) could improve L2 learners' language skills[3, 4]. However, very few studies have examined students' academic listening skills in both rapidly evolving fields. Academic listening skill is essential for English for academic purposes (EAP) students[5]. The lack of listening vocabulary is one of the main barriers that EAP students in China encounter in academic listening[6]. Therefore, in order to assist students in building academic listening vocabulary and mobile learning of listening vocabulary outside of class, a study of integrating AI-powered tools and MALL apps to academic listening vocabulary teaching for Chinese non-English major postgraduates was conducted. The study adopted an action research approach to examine the effect of the new teaching mode. A total of 165 non-English major postgraduates were involved in the teaching practice in a Chinese public university. By applying AI-powered tools and MALL apps, a teaching plan with diverse activities was designed to enrich EAP students' linguistic knowledge and listening strategies. The data collected from questionnaires, interviews, classroom observations, listening quizzes, vocabulary journals, and vocabulary quizzes leads us to a conclusion that the new teaching mode can enlarge non-English major postgraduates' academic listening vocabulary and improve their academic listening skills to some extent. Not only does this study bring in students' perceptions, but it also sheds light into how AI-powered tools and MALL apps can be effectively incorporated into EAP classrooms in the AI Era.*

**Keywords:** Academic listening, AI, Listening vocabulary, MALL

## 1. Introduction

Recent years have witnessed the advancement of AI-powered tools and platforms, and the application of artificial intelligence in language teaching has opened up new paths for innovative teaching methods and language proficiency enhancement in different educational settings. Similarly, with the rapid development of mobile technologies and the widespread use of smartphones and tablet computers, mobile devices have become an indispensable necessity for both life and education, and Mobile-assisted Language Learning (MALL) has gained importance as a popular research topic among researchers[7]. In the current era of mobile technologies and globalization, academic listening skills significantly contribute to English for academic purposes (EAP) students' future success since they need to possess a comprehension of academic lectures[5]. Although academic listening plays an important role in the training of students to be internationally professional in their disciplines, the research on academic English listening teaching, especially with the assistance of educational technology, is still a field to be developed in China[8].

Therefore, the present study tries to look at the application and the efficiency of a new teaching mode of applying AI-powered tools and Mobile-assisted Language Learning (MALL) apps in the teaching of academic listening vocabulary at a Chinese public university through action research. The following sections will present a literature review of the studies related to the topics addressed in this paper. Next, the action research plan will be introduced, which will detail the participants, instruments, procedures, and data analysis. Finally, it will be a conclusion of the main findings and their application in EAP teaching practice, followed by the limitations of the study and suggestions for future research in this field.

## 2. Literature Review

### 2.1 Academic Listening



According to Lynch[9], academic listening mainly refers to one-way academic lecture listening and two-way academic listening. Academic listening used in this paper belongs to Lynch's narrow scope of academic lecture listening. A wealth of studies about academic listening have focused on EAP listening materials such as podcasts[10, 11] and TED talks[12, 13], testing and assessment[14], metacognitive knowledge[15], and vocabulary acquisition[16]. Most of the research into academic listening in China has been conducted with a focus on discourse analysis, cognitive factors, and note-taking skills[8].

## **2.2 Academic Listening Vocabulary**

It has long been acknowledged that vocabulary plays a significant role in determining listening comprehension skills[17]. Specifically, academic vocabulary plays a major role in predicting L2 learners' listening comprehension skills[18]. Ha[19] examines the importance of academic vocabulary knowledge in academic listening comprehension and concludes that L2 learners' academic vocabulary knowledge is highly connected and also influences their academic listening skills. The lack of listening vocabulary is one of the main barriers that EAP students in China encounter in academic listening[6]. Song and Zhou's[20] study on an EAP needs analysis of Chinese postgraduates reveals that understanding the main ideas and the key vocabulary in academic lectures was rated by Chinese postgraduates as the top most important academic skills.

## **2.3 AI-powered Tools and Mobile-assisted Language Learning (MALL)**

Artificial intelligence (AI) refers to the ability of the computer systems to perform tasks that are commonly associated with the intellectual characteristics of humans[21]. Previous research on the application of AI supported language learning and teaching has focused on automated writing evaluation[22, 23], chatbots[24, 25], and automatic speech recognition (ASR)[26-28]. The majority of the studies about ASR pertain to the teaching of speaking, listening[26], and vocabulary[28].

Mobile-assisted Language Learning (MALL) refers to language learning that is aided by the use of portable mobile devices[29]. Similarly, McCarty et al.[30] define MALL as using mobile devices to learn a second or foreign language. It had been found that MALL benefits students' language learning in Chinese universities[31]. Previous studies have focused on applying MALL to teach vocabulary[32-34], listening[4], speaking[35], and writing[3]. In China, very little research has been carried out into the implications of MALL in academic listening[8]. To be more precise, the integration of AI and MALL apps to assist the teaching of listening, in particular to teach academic listening, remains the least researched skill.

Therefore, this study aims to find out how AI-powered tools and MALL apps are applicable for assisting EAP students' academic vocabulary learning and, as a consequence, enhancing their academic listening skills. Moreover, it is found that hardly any studies have been conducted on applying the fusion of AI-powered tools and MALL apps into an EAP listening and speaking course. Thus, the result of this study will be fruitful for teachers to adapt their pedagogical approaches to effectively integrate AI and MALL apps into their teaching practices.

## **3. Action Research**

### **3.1 Description of the Target Classes**

According to Hyland[36], to teach English for Academic Purposes (EAP) is to teach English with the intention of supporting students' research or study in that language. This study was carried out in a Chinese public university. Four postgraduate EAP classes of 7 different non-English majors were chosen as the subjects of this action research, and the author of this paper is their EAP listening and speaking course teacher. All students have to take this compulsory EAP course for one academic year. The primary textbook for this course is *Academic Encounters: Life in Society, Watching, Listening, and Speaking* by Kim Sanabria, published by Shanghai Foreign Language Education Press. Students are encouraged to use the WE Learn app, which is an interactive autonomous learning platform built by the textbook publisher. Among the course objectives, the first and foremost language goal is to help students develop the listening skills needed in academic lecture settings.

### **3.2 Research Instruments**



In order to collect students' views about applying AI-powered tools and MALL apps to the teaching and learning of academic vocabulary, four questionnaires are utilized to help the teacher reflect on the planned action and make adjustments and improvements throughout the study. The questionnaires are anonymous, which, according to Cohen et al.[37], encourages honesty and greater reliability. Apart from the pre-questionnaires, an interview is conducted after stage 3 to test the hypotheses and gather students' opinions, feedback, and suggestions in this action research. Students tend to fill out the questionnaires in a hurry, as it has been pointed out as one of the disadvantages of the questionnaire[37]. Interview, by contrast, is an ideal way to gather data when participants' views, experiences, and attitudes should be taken into further examination in action research[38].

### **3.3 The Problems in Academic Listening**

A common problem many students in this EAP class face is that they can't recognize the vocabulary when they hear it in academic lectures, in spite of the fact that the vocabulary was already taught in class. The vocabulary was not retained in the memory after one week. This phenomenon has successfully driven the teacher's attention to find a valid way to solve the problems in the process of teaching and learning academic vocabulary.

### **3.4 The Identification of Problems**

The problems are just the teachers' personal hypotheses based on class observations and class practice. After searching for the related literature, a questionnaire was launched to the students to find out the possible reasons why they can't make any sense of the words they learned in class. In addition, a listening test, which was adapted from the textbook, was also conducted in Week 1. The listening quiz includes 10 target words taught in class with the topic of culture shock, which is familiar to the students and suitable for their proficiency level. The question types are blanking fillings and true or false items. This full score is 20 points.

#### **3.4.1 Analysis of the Pre-questionnaire and Pre-listening Quiz**

As for the main reasons for no satisfactory vocabulary retention and understanding during academic listening, more than 69% of the students said that they can't recognize the words (taught in class) in academic listening. 70% of the students said that they reviewed the words after class. Most of the students found lecture listening boring. About 48% of the students reported that listening is about listening to a lecture, answering the questions, and checking the answers. 86% of them regarded the lack of vocabulary as the biggest barrier they encounter when it comes to academic listening. The highest score of the listening quiz was 18, while the lowest was 3.5. The average score was only 12.5. Therefore, academic listening vocabulary was chosen to be the focus of this action research.

### **3.5 Action Research Plan**

In order to assist students in building academic listening vocabulary and mobile learning of listening vocabulary outside of class by using AI-powered tools and MALL apps, an action plan (table 1) was created based on Lewin's[39] model of action research, which includes four stages of planning, acting, observing, and reflecting. Table 1 is the sheet of this action research plan, which was designed to examine the effect of the new teaching mode. Table 2-4 shows the implementation of the action plan.

**Table 1. The Action Plan**

Weeks	Procedures	Data collections
Week 1	Problem discovery & identification	Questionnaire, listening quiz, class observation, interview, and sketch an action plan
Week 2	Promote the hypothesis and confirm the problems	
Stage 1: Week 3-5	Put the plan into action	Listening vocabulary journal, vocabulary quiz, listening quiz, questionnaire, and discussion with teachers who teach the same course
	Reflection & finding new problems	
Stage 2: Week 6-8	Put the new plan into action	Listening vocabulary journal, vocabulary quiz, listening quiz, questionnaire, and discussion with



	Reflection & finding new problems	the teachers who observed my class
Stage 3: Week 9-12	Put the new plan into action	Listening vocabulary journal, AI-generated vocabulary quiz, questionnaire, interview, and class observation
	Reflection & finding new problems	
Week 13-14	Summary	

**Table 2. Stage one teaching plan**

Stage one: week 3-5	
In-class tasks	Listening vocabulary quiz (AI quiz generator: Mentimeter & Kahoot or survey app: Questionnaire Star)
After class tasks	Review the listening vocabulary from the lectures in the textbook by listening to the words on the WE Learn app. Keep a vocabulary journal and upload it to the class Moodle platform. Complete the listening exercises on the WeLearn app. Take a screen shot of the total score and share the results within the class WeChat group.
Evaluation	Vocabulary quiz & listening quiz

**Table 3. Stage two teaching plan**

Stage two: week 6-8	
In-class tasks	Peer dictation of the new words from the vocabulary notebook in the MALL apps
After class tasks	Listen to TED Talks (transcripts provided by the teacher) and complete the listening exercises. Learn 10 new words from the talk. Keep a listening vocabulary journal and upload it to the class Moodle platform. Use diverse MALL apps (e.g. YouDao Dictionary, Shanbay Word, and Oulu Dictionary) to keep a vocabulary notebook.
Evaluation	Vocabulary quiz & listening quiz

**Table 4. Stage three teaching plan**

Stage three: week 9-12	
In-class tasks	Do the AI-generated vocabulary quiz. Peer review of the AI-generated vocabulary quiz.
After class tasks	Choose a lecture (the topic of the lecture is closely relevant to one's major) online. Listen to the lecture (transcripts provided by Live captions). Use Live captions to learn 10 new words. Exchange the new words with partners. Use ERNIE Bot to create a vocabulary quiz for each other (e.g., matching the words with their definitions). Use diverse MALL apps (e.g. YouDao Dictionary, Shanbay Word, and Oulu Dictionary) to keep a vocabulary notebook.
Evaluation	AI-generated vocabulary quiz (ERNIE Bot)

At the end of each stage, a revised plan was created with a new objective based on the results of the questionnaires and interviews. Table 5 demonstrates a series of objectives for each stage, which incorporates a cycle of understanding, remembering, and discerning the words in listening. The basic lexical information of a target word, according to Ma[40], includes pronunciation, spelling, part of speech, and definition. In stage 1, the basic lexical information of a word is taught in class, and students are required to understand, remember, and discern the words in listening by using the WE Learn app. In stage 2, knowing the pronunciation and spelling, students are trained to predict the POS and definition of a new word and to understand, remember, and discern it in listening by using MALL apps. In stage 3, students are trained to predict the spelling of the new word before viewing the captions on Live captions, to learn the POS and definitions by using MALL apps, and eventually to understand, remember, and discern the words in listening.

**Table 5. Objectives of 3 stages of the action plan**

Duration	Lexical information				Objectives
	P	S	POS	D	
Stage 1	√	√	√	√	To understand, remember, and discern the words in listening
Stage 2	√	√	?	?	To predict the POS and definitions, understand, remember, and discern the words in listening



Stage 3	√	?	?	?	To predict the spelling, the POS, and definitions, understand, remember, and discern the words in listening
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(P=pronunciation, S=spelling, POS=part of speech, D=definition)

### 3.6 Data Analysis

#### 3.6.1 Stage 1-3 Questionnaires

A questionnaire was conducted before the end of each stage. At the end of stage 1, among 165 students, most of the students reported that they can read more vocabulary than they can recognize when listening to academic lectures. 78% of the subjects said that they review the vocabulary by reading it or writing it down rather than listening to it. About 75% of the students said that they reviewed the new words after class since there would be an in-class vocabulary quiz (the number increased from 70% to 75%). 54% of them stated that they wanted to know how to deal with a word in listening when they only knew the pronunciation and spelling. Thus, stage 2 was designed to meet the participants' needs. About 61% of the students reported that listening is no longer about answering the questions and checking the answers. Instead, it is a source of learning vocabulary. The number of students who reviewed the vocabulary by listening rather than reading it increased from 22% to 45%. 85% of them had a positive view about using MALL apps on their smartphones to review the new words. Most students confirmed the teacher's hypothesis of their needs to understand a new word from academic lectures. In stage 3, students could use Live captions to assist their vocabulary learning. More and more students became skilled at guessing the meaning of the new words within the context of the lectures (the number increased by 16%).

#### 3.6.2 Interview

According to the interview, about 84% of the subjects said that they benefited from keeping a vocabulary notebook on MALL apps since they could have a more immersive vocabulary learning experience by viewing the pictures/videos and playing games with easy access to example sentences, collocations, synonyms, antonyms, rich information, and helpful context. The students reported an increase in interest in lecture listening online by viewing the captions provided by Live captions, while most of them mentioned that they felt less anxious since Live captions plus MALL apps lower the difficulty level of understanding academic lectures. More than 79% of the students thought they expanded their listening vocabulary.

#### 3.6.3 Analysis of Vocabulary Quizzes and Listening Quizzes

Two vocabulary and listening quizzes were launched to students before the end of stages 1 and 2. The question types for vocabulary quizzes are matching the word with its definition and multiple choice. The question types for listening quizzes are blank filling and true or false items. The full score for each quiz is 20 points.

**Table 6. Comparison of scores**

	Vocab Quiz 1	Vocab Quiz 2	Listening Quiz 1	Listening Quiz 2
Average	17.6	18.2	13.5	14.4
Maximum	20	20	18.5	19
Minimum	7	6.5	3.5	2

## 4. Conclusion

### 4.1 The Results of the Action Research

Firstly, the awareness of learning academic listening vocabulary as much by listening as by reading has been increased and activated among the students. Peer dictation of the new words on MALL apps enables them to remember, recognize, and retain the words by listening. Secondly, their guessing skills and overall listening skills have been improved. What's more, peer reviewing the AI-generated quiz gives the students a sense of accomplishment and motivates them to learn more new words, and thus an interactive and active listening classroom environment was created. For mobile learning the vocabulary after class, in addition to understanding, remembering, and recognizing the basic lexical information of individual words, students learn rich lexical information (common phrases, sentence



patterns, and collocations, etc.) as well. Additionally, they learn how to study academic vocabulary through listening to lectures with the assistance of AI-powered tools and MALL apps and, as a result, expand their listening vocabulary. As a consequence, the findings from the action research have direct application to an innovative teaching mode of teaching academic listening vocabulary by incorporating AI-powered tools and MALL apps.

#### **4.2 The Limitations of the Action Research**

The study has some limitations. Firstly, it was only carried out for one semester, which is so limited that it's challenging for the teacher to access the plan with more systematic measures. A longer time of teaching practice will accomplish the validity and reliability of the research. What's more, the study mainly focused on the teaching of listening vocabulary. However, learners' grammatical competence, discourse competence, and strategic competence, which are not examined in this study, also contribute significantly to one's academic listening skills. Thus, the future study can further investigate the efficacy of the affordances on AI-powered tools and MALL apps of these variables on teaching academic listening.

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