

## An Empirical Study on the Effectiveness of Multimedia Annotation to the News Listening Comprehension

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### Abstract

With the continuous progress of science and technology, computers are more widely used in English teaching. In most English classes, computer aided learning and teaching has become an indispensable part of classroom activities. On the other hand, enhancing language skills through multimedia technologies become one of the scholars' concerns. English tests like College English Test (CET) is very popular among the Chinese mainland English learners, to whom the listening part is always the hardest section. Accordingly, how to improve their listening comprehension in the news section leaves us a hot debate in nowadays. For this purpose, through the investigation of how the news listening comprehension is subject to different modes of multimedia annotations, the paper tries to find out the correlation between the effectiveness of multimedia glossaries and listening comprehension of the Chinese mainland EFL learners and hopefully the study could inspire the language educators and other related professions.

**Key words:** Multimedia annotation; Listening comprehension; EFL teaching and learning

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### INTRODUCTION

Nation (1983) defines glosses as short definitions while Werner Hüllen (1989) refers to them as explanations or notes written in the side or bottom margins when students read foreign language articles in the Middle Ages. With the advent of technology and civilization, the forms or modes of glossaries have been changed from the text only into multimedia ones. The research focus therefore has been shifted from whether the traditional types of annotation had any impact on language learning to whether the multimedia types of glossaries influenced language acquisition. With the development of computer and multimedia technology, the form of annotation is not only limited to the printed textual glossary, it has developed into varied forms, such as audio annotation, image annotation, video annotation and the various combination annotation (Segler, 2001). The effectiveness of multimedia annotation on reading comprehension, listening comprehension and vocabulary acquisition has gradually become the focus of many scholars. The results could be classified as follow: a) the multimedia annotation enhances the reading comprehension (Roby, 1999; Leffa, 1992; Lomicka, 1998; et al.); b) the multimedia glossary brings the negative effects to the reading comprehension (Sakar & Ercetin 2005); c) there is no significance difference between the multimedia annotation and the reading comprehension (e.g. Bowles, 2004); d) the multimedia glossary is helpful to the vocabulary acquisition (Al-Seghayer, 2001; Akbulut, 2007).

Among the abundant studies on the effectiveness of the multimedia glossary to the reading comprehension and vocabulary acquisition, the studies on the effectiveness of the multimedia glossary to the vocabulary acquisition and listening comprehension are relatively few, even rare with the learners at all levels in the empirical study. In other words, enhancing listening and speaking ability is as important as improving the reading and writing ability. Currently, learning with the aid of multimedia on the web

grows in popularity among the Chinese EFL learners, unlike the regular class, it provides a more real and natural English environment from which we could infer that multimedia annotation could be one advantageous way to improve their self-assistant and independent learning abilities. Therefore, it is necessary to study the effectiveness of multimedia annotation on listening comprehension.

College English Test (CET) band 4 and band 6 is a very popular nationwide test in Chinese mainland. It is not only welcomed by students and teachers but also highly recognized in the job markets, thus, to get a good test result would be more competitive after their graduation. Since 2016, the listening part has been altered by adding authentic news to the listening section, making the new listening more challenging. The study tries to use another perspective to find out the ways to improve students' listening comprehension.

## MAYER'S GENERATIVE THEORY OF MULTIMEDIA

Based on the Pavio's dual coding theory, Baddeley's working memory model, Sweller's cognitive load theory and Wittrock's generative learning theory, Mayer advances the cognitive theory of multimedia learning (Mayer, et al., 1998). The multimedia learning theory shows how the multimedia information acquired by both visual and auditory channels can be integrated with students' prior knowledge and existing knowledge models, so as to form long-term memory and achieve meaningful learning process. There are three assumptions which constitute Mayer's cognitive theory of multimedia learning and also provide supporting theoretical framework for the e-learning environment.

Dual-channels assumption---human have separate channels for processing visual/pictorial representation and auditory/verbal representations (Baddeley, 1998; Paivio, 1986).

Limited capacity assumption---humans are limited capacity processors, that is people are able to actively process only a small amount of information in each channel at any one time (Baddeley, 1998; Sweller, 1999).

Active processing assumption---humans are knowledge constructing processors, so meaningful learning occurs when people attend to relevant incoming information, mentally organize the information in coherent structures, and mentally integrate it with other knowledge (Mayer, 2003; Wittrock, 1989).

According to Mayer (2003), the process of meaningful learning form multimedia involves five cognitive processes: selecting words, selecting images, organizing words, organizing images, and integrating. Meaningful learning is more likely to occur when the e-learning environment enables the learner to engage in the five processes.

From the above statements, we can sense that learning with multimedia annotation is also the process which involves the five cognitive processes. And it would be a new learning experience compared with the one with the printed textual annotation. Most scholars consider that processing the multimedia annotation is actually closer to the complex activities in the brain which processes all kinds of information while reading and listening. Thus, the present study takes this theory as the framework to find out the correlation between the effectiveness of different forms of multimedia annotation and comprehension of different types of the listening materials.

## RESEARCH QUESTIONS

In order to address the above issues and see more clearly the situation under different circumstances, the present study intends to conduct a research on the effectiveness of different forms of multimedia annotation to the Chinese EFL learners listening comprehension and incorporate the factors (language proficiency, the types of the listening materials in CET4) into one single study. Therefore, during this research the independent variable would be the mode of multimedia annotation, which means none-annotation, audio-annotation, hypertext only annotation and picture annotation. In the CET band 4 test, there are three sections in listening part, the first section is the news listening. In such case, the ability of listening comprehension (how much can a student understand) is assumed to be the dependent variable. The following research question and corresponding hypothesis is the main focus of this study.

Question: which form of the multimedia glossary is the most effective to enhance the news listening comprehension in the CET4?

Hypothesis: It is common to offer some annotation during the listening section, like TOEFL, from which we can infer that it is helpful to most examinee. However, the annotation is the hypertext annotation, leaving other forms of annotation uncertain.

## RESEARCH DESIGN

### Participants

The participants of the present research will be chosen from the first grade students. About 120 students from A, B & C level will be selected basing on the following considerations. Firstly, According to the level-base teaching policy, students are classified into three English levels according to their English score in the National College Entrance Examine. Secondly, the National College Entrance Examine assures a good reliability and validity of the test. The majority of students fall into B level category, which means an intermediate language proficiency. Participation is entirely voluntary. About

60 individual students from B level join the research, who make up the subjects in this research. Thirdly, the participants are randomly divided into 4 groups, 15 each in a group, forming the controlling group, the audio annotation testing group No.1, the Picture annotation testing group No.2, and hypertext annotation testing group No.3. Before the research, the subjects are invited to Nation (2007) vocabulary size test and one of the listening test from the College Entrance Exam. We compare the results from the two tests aforementioned with one-way ANOVA, which shows that there are no significant difference between each group and the students have the same vocabulary size and the ability of listening comprehension.

### Materials

Since the study focus on investigating the effectiveness of different forms of multimedia annotation, thus determining the right forms of the annotation and the listening materials are critical. The level of the news should be suitable for the freshmen, therefore, the College English Test (CET), band 4, is a considerable option for the following reasons. a) CET4, a nationwide exam administered by the National Ministry of Education, guarantees the validity of this study; b) in the listening part, the test consists of two or three sets of multiple-choice question, each of which is presented in single-choice question form. If the correct choice given, one point will be added; c) there are three listening parts in CET 4, which are the news listening, the long conversation from an interview or a dialogue between a professor and a student and the long passages extracted from lectures or textbooks. Most of the listening materials are real and authentic and the three sections are all in the form of multiple choice which is convenient for statistics; d) most of the freshmen have not taken CET4 in the first semester so it ensures the reliability of the test. Basing on the above consideration, the study uses the CET4 (2017.06) test as the material, which contains three pieces of authentic news. The first passage is about Google's self-driving cars, the second one is about a report of a real life story while the rest is about a science news of a new species had been found.

After the materials have been decided, the study invite two level B students from the remained part to read the news scripts and the news related interview of the chosen material. The students are suggested to pick some uncertain vocabularies by themselves as the potential annotated vocabularies later in the research. The numbers of the uncertain words of each news script are 4, 3 and 3, while the number of news related interview are 5, 4, 6. The practice may be controversial for the optimal way to do is to invite every single one of the participant to pick their own unfamiliar words. However, due to the large number of samples, the implementation is difficult and it is the suitable and practical method in this experiment.

## RESEARCH PROCEDURE

Before the research, the students' vocabulary is tested using the Vocabulary Size Test by group. And the specific classification standards are shown in Table 1. From the results in Table 1, it is known that the mean value changes from 2.32551 to 25.3254, the significance  $p = .1341 > 0.05$ , which indicates that the language level of the participants are relevantly fair.

**Table 1**  
Average scores and one-way variance of vocabulary scores in four groups

	N	Mean value	Standard deviation	F	Saliency
Group 1	15	23.2551	2.12546		
Group 2	15	24.8735	4.35665		
Group 3	15	25.3254	2.53546	1.425	1.341
Group 4	15	24.2546	2.45463		
Total	60	24.42715	2.86805		

The study will be carried in one multimedia classroom at school and the test is taken through the WJX.cn web or WJX app through mobile phone (WJX app is an app that could conduct an online survey or a test and process the relevant data. The students need to gather together to take the test at class. Also, they need to bring their own mobile phone and headset. Before the test, the students sit in different rows in the classroom according to different annotation groups. The procedures are as follows: a) the teacher presets the test in the wjx app, and the students need to log in with their names and student campus ID number; b) the students are allowed to look at the annotated words for 3 minutes before the test while the none-annotated group would just start the test after 3 minutes; c) the hypertext annotated group will be provided the words followed by its own L2 explanation, the picture annotated group will be given the words together with its still related pictures, and the audio annotated group will be given the audio L2 explanations; d) after 3 minutes, the teacher plays the tape in the classroom and monitor the whole process according to the instructions from the tape, the students need to finish the test independently; e) the whole procedure takes about 50 minutes.

## RESULTS AND DISCUSSION

Statistical analysis is performed on data of the above test procedure by the software SPSS, for there is only one independent variable in this experiment, One-Way ANOVA test will be used to compare the effectiveness of different forms of multimedia annotation. Set the 'forms of annotation' as the independent variable and the scores of each section will be the dependent variables. Considering there are four modalities as the independent variables, which are none annotated group, hypertext annotated, audio annotated group and picture annotated

group, we need to compare the significance between those different modality we need to compare the significance of the dependent variances by Post Hoc whereas the significances are 0.163 and 0.125, which is more than 0.05, indicating the data is in accordance with homogeneity of variance. After comparing the significance between two sections with Post Hoc, the significant difference is both .000 between sections. The key information is shown in Table 2.

**Table 2**  
**The analysis of the scores of real time test**

	Modality of annotation	Mean value	Audio	Hypertext	Picture
Authentic News Section	None annotated	4.34	.000	.738	.000
	Hypertext annotated	5.12		.006	.041
	Audio annotated	4.02			.000
	Picture annotated	5.85			
Real life report Section	None annotated	3.32	.000	.040	.000
	Hypertext annotated	5.42		.021	.845
	Audio annotated	3.88			.032
	Picture annotated	5.89			

From the data we can infer that the modality of the multimedia annotation have impacts on listening comprehension. However, the effectiveness alters when it's in different section. As is shown in Table 2., in the first section, the none-annotated group get the lowest score compared with the scores of the other three different annotated groups, which proves once again that the multimedia annotation generally enhance listening comprehension. However, the scores of the other three groups are just a little higher than the none annotated group which may be a little bit unexpected compared with the results from former researches on reading comprehension mostly showing that the multimodality of multimedia glossaries is beneficial both to reading comprehension and vocabulary uptake. The situation in the second section also shows that the picture annotation has almost the same effect with that of hypertext. From the data, we know that the effectiveness of multimedia annotation to listening comprehension is not as influential as is to reading comprehension, and its effectiveness alters given the following explanation: 1) according to Frank (2017), in the reading test the multimedia annotation are all listed in the marginal place besides the annotated words at the same page which is very convenient to the readers. It is quite feasible for students to check up the unfamiliar words while they are reading. However, in the study the annotations are presented before the test, which means the students need to memorize the unfamiliar words as many as possible. To some extent, it would become a learning burden for the participants; 2) the second section in the test is a real life report, though it involves some technical terms in news report, it's like a narration of a story, which shares some common sense with the students. In both

sections as we can see that among the three different modes of multimedia glossaries, the picture annotated group gets the highest score. According to Paivio's Dual Coding Theory, it asserts that there are two types of mental representations of concepts: verbal and nonverbal. Abstract concepts are normally coded only verbally, whereas concretes are typically coded nonverbally as well as verbally, with mental imagery being the most common of nonverbal representations (Paivio, 1991). In the test, some of the unfamiliar words from the news scripts are concrete words, which are imageable by our participants and those pictures can easily remind the students of a mental picture of the thing. In the view of this point, the picture annotation will be easier to understand and remember than other types of annotation in other groups. Apart from the high score, we also need to pay attention to the low one. The audio annotated group get the lowest score, one of the reasons accounting for the result is that the explanation of the word is pre-recorded without any given verbal hint except the annotated word, the students need to figure out the exact meaning before they could remember the unfamiliar words (annotated words), which sounds another burden for the participants. Therefore, it becomes a distraction instead of attraction to the test takers.

## CONCLUSION

The role of computer assisted teaching in language has been increasingly highlighted. Therefore, it is essential to investigate the correlation between the effectiveness of different forms of multimedia annotation and listening comprehension. According to the study, we conclude that the modality of multimedia annotation have different impacts on the listening comprehension. And the effectiveness alters basing on different situation. In the former studies, the hypertext annotation was thought to be very influential to listening comprehension like it was to reading comprehension. However, the results show the opposite way in this research. Surprisingly, the picture annotation benefits students the most compared with other groups in both section. As one of the teaching methods, picture annotation could be used to enhance learners' listening comprehension for the nonverbal inputs are more easily processed to language learners. On the contrary, audio annotation is less effective compared with the picture glossary in both section, for the L2 audio explanation of the annotated words require a higher standard of listening skills of students to figure out, to whom it has already seemed to be a burden before the test. Thus, the audio annotated method should be reconsidered in the online or face-to-face listening teaching, especially to the lower language proficiency students. There are still many questions to be answered. This study conducts a small-scale research on the above topic, which needs more

effects and improvement in the future, however, the results hopefully could shed some light on the usage of pictorial annotation to L2 learners' listening comprehension both linguistically and pedagogically.

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