

Original Paper

Effects of Multimodal Listening Instruction on Listening Performance of Rural Middle School Students from East China

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Abstract

To overcome the key factors affecting the instruction of English listening is of vital importance for English teaching in rural middle schools. In this study, we conduct a quasi-experiment following the multimodal instruction model to explore the effectiveness of the multimodal instruction model. Firstly, the research adopts a mixed research method to extract the key factors that have influence on the English listening level of rural middle school students. Then, taking into consideration the influencing factors, a multimodal listening instruction model is designed for instruction experiments. The study, then, collects data via questionnaire survey and conducts statistic analysis to analyze the results of listening tests after instruction experiments. The results show that the multimodal listening instruction model can effectively stimulate students to improve their English listening ability, and its effectiveness on detailed information comprehension is greater than that on inference question. The results of the study can guide rural middle school English teachers to give priority to the use of multimodal listening instruction mode in listening details, and help students effectively improve listening effects.

Keywords

multimodal listening instruction, effectiveness, detailed information, inference information

1. Introduction

In *Compulsory Education Curriculum Standards: English (2022 Edition)* (hereinafter referred to as *The 2022 version of the English Curriculum Standards*), it is proposed that the English curriculum should focus on the fundamental task of building morality and cultivating people, reflecting the nature and concept of the curriculum, and establishing the curriculum objectives aiming at cultivating and developing students' language ability, cultural awareness, thinking quality, learning ability and other core qualities (Ministry of Education of the People's Republic of China, 2022). *he 2022 version of the English Curriculum Standards* indicates that in the implementation stage of English curriculum, we should pay attention to not only the content of learning, but also to students' learning methods, learning satisfaction, and learning instruction. Teachers should encourage students to participate in the learning process with multiple senses according to students' cognitive characteristics, and guide students to adopt multimodal learning methods to enhance learning effects and improve learning efficiency (Ministry of Education, 2022).

But at present, listening has become the bottleneck that restricts many rural middle school student' English learning. There are still some problems in English listening instruction. For example, students lack listening skills, pay too much attention to the words and sentences they hear, can't grasp the general idea of listening materials, and can't find answers from the general idea. Besides, their mother tongue influences their reaction speed to English listening; The differences between Chinese and foreign cultures also affect students' English listening ability and so on. In view of this, this study intends to analyze the factors affecting the listening comprehension of students from rural middle school and try investigate the effectiveness of multimodal listening instruction.

2. Literature Review

2.1 Research on Multimodal Instruction Mode

Multimodal is a term put forward by western scholars at the end of the 20th century. Modality refers to the way in which human senses interact with the external environment. The interaction of a single sense is called a single modal, and the interaction of multiple senses is called multimodal. In recent years, multimodal research has gradually attracted the attention of the linguistic community. Based on Halliday's systemic functional theory, multimodal discourse analysis uses visual, auditory, tactile, olfactory, gustatory, tactile and other models to apply nonverbal modals such as image, audio, video, and body to discourse analysis (Halliday, 1978). Based on some viewpoints of systemic functional theory, multimodal theory pays more attention to the function of discourse. At the same time, the development of science and technology has also affected this theory, which focuses on nonverbal systems, such as motion, sound and image. The development of system function theory and science and technology has injected new vitality into multimodal theory.

Multimodal research pays more attention to the information communication between speakers and society through multiple senses, which reflects a sense of social significance. Multimodal views of language and posture can better describe the interaction between language, psychology and body, and also provide innovative ideas for English instruction models. Multimodal discourse analysis believes that symbols other than language can also express meaning like language. O'Halloran studied text and discourse constructed by two or more symbols (O'Halloran, 2011). Multimodal resources that integrate audio, video and text modes are important data sources, providing great convenience for researchers in retrieval, processing and analysis. The existence of multimodal theory not only breaks the traditional modal theory, but also realizes the combination of multiple sensory modals. It can be seen that multimodal theory can help learners to effectively integrate text, images and other information, so as to help learners obtain effective knowledge input in language instruction.

Multimodal theory has been widely used in foreign instruction field. Educators advocate using music, images, videos, games and other means to mobilize students' hearing, vision and other senses to achieve instruction interaction. As a new instruction concept, multimodal instruction mode is a new term proposed by New London Group in 1996. It advocates making full use of teachers, instruction aids, networks, pictures, classroom activities and other ways to mobilize students' multi senses to work together and participate in language learning. The multimodal instruction mode integrates static resources, including clothing, hair style, face shape, and dynamic resources, including language, voice, expression, action, posture, and vision, into the instruction process through different media, giving students an all-round multi sensory experience and arousing multi-level association (Group TNL, 1996, p. 60).

Baldry comprehensively interpreted the theory of multimodal discourse analysis, studied the different attributes and functions of different technologies (such as telephone, computer, video, etc.) in the multimedia environment, and told students that electronic media is a good tool for English learning (Baldry, 2000). Stein advocated that the instruction curriculum and evaluation should emphasize the characteristics of the learning environment, and created the concept of multimodal instruction in 2000 (Stein, 2000, p. 333). Jewitt pointed out the shortcomings of this instruction model and believed that teachers' attitudes, instruction methods, students' classroom attention and learning effects would be negatively affected by the diversity of symbol resources (Jewitt, 2002, p. 171). Unsworth solved the problem of text and electronic images in modern instruction, making multimedia instruction more acceptable in the information age (Unsworth, 2001). Therefore, in today's information age, applying multimodal theory to instruction can enrich instruction content and diversify educational resources.

In China, Hu Zhuanglin and Dong Jia analyzed the entries of the PPT speech contest with multimodal theory. They believe that PowerPoint demonstration is an important information transmission tool. Their analysis results prove that the use of images, sounds and other modes in PPT can better express the meaning of the theme (Hu Zhuanglin & Dong Jia, 2006, p. 3). Gu Yueguo compared multimodal

learning based on computer multimedia materials with multimedia learning, and built a “multimedia multimodal” foreign language learning model (Gu Yueguo, 2007, p. 3). Zeng Fangben emphasized that the creators of foreign language multimedia should strengthen their cognition of symbols and use symbols to undertake the dynamic context of foreign language multimedia (Zeng Fangben, 2006, p. 59). According to the viewpoint of visual symbols in multimodal discourse theory, Sun Zhinan applied visual symbols to the whole English audio-visual instruction, and applied visual symbols to three core links: corpus selection, curriculum implementation, and ability evaluation (Sun Zhinan, 2011, p. 45). Compared with the research on multimodal instruction abroad, the domestic research in this area started late. Some teachers and researchers have explored the multimodal instruction mode, but most of them have explored the instruction practice at the university stage.

To sum up, experts and scholars at home and abroad have studied multimodality in a wide range of fields, mainly involving images, sounds, word meanings, visual grammar and the role of different symbols in multimodal discourse. They believe that the common use of multimodal resources is conducive to meaning construction, and multimodal instruction mode can effectively promote students’ cognition. The domestic research on multimodal instruction mode is relatively late, mostly focusing on college English instruction, and the research on applying multimodal instruction mode to middle school English instruction is less.

2.2 Research on Listening Instruction

There are two main concerns in the research on English listening instruction at home and abroad: one is college English listening instruction, which mainly involves two aspects: listening instruction mode and listening instruction implementation channels, such as flipped classroom (Xia Xing, 2021: 237), multi-mode flipped classroom (Tian Miao *et al.*, 2019: 152), college listening instruction mode based on cognitive strategies (Wang Xiaojing, 2016: 65), multimodal listening instruction (Yao Wei & Yao Guoqun, 2016: 63; Hu Yongjin & Zhang Delu, 2013: 20), information means in listening instruction (Ou Danyang, 2021: 235; Li & Hui, 2021: 134), and so on; The second is the instruction of English listening in middle schools, which mainly analyzes the specific problems in the implementation of English listening instruction in middle schools and gives suggestions (Zhang Feng, 2018: 61; Xiang Jiazhen, 2017: 228). A small number of studies involve the research of English listening instruction strategies in middle schools, such as the metacognitive strategies of English listening instruction in high schools and middle schools (Zhang Hongsheng *et al.*, 2020: 96; Zhao Xuefeng, 2013: 154).

Therefore, among the current research on English listening instruction, most scholars focus on the research on college English listening instruction. The research on middle school English listening instruction is limited to raising the problems in English listening instruction or improving the methods of English listening instruction, which lacks theoretical basis.

In view of the above, this study tries to apply the multimodal instruction model to rural middle school English listening instruction and explore the effectiveness of the multimodal instruction model in overcoming English listening barriers and improving students' English listening ability. Specifically, there are two research questions in this study:

- (1) What are the key factors influencing rural middle school English listening? Can the multimodal listening instruction model overcome the problems and effectively improve students' English listening ability?
- (2) Is the effectiveness of multimodal listening instruction different on improving the performance of detailed information and inference questions of listening?

3. Research Design

3.1 Experimental Methods and Subjects

This study adopts a mixed research method. First of all, we use qualitative research to sum up the problems in listening instruction and determine the key influencing factors in junior middle school listening instruction; Secondly, based on the key influencing factors of listening instruction in rural middle school, a multimodal listening instruction model is designed, and a double-blind instruction experiment is carried out for the experimental group and the control group; After the instruction experiment, the experimental group and the control group were tested for listening comprehension. And SPSS26.0 statistical software was used for data analysis of the test results. Finally, the study used Likert scale to conduct a questionnaire on the experimental group and the control group, and carried out statistical analysis.

The subjects were 96 eighth grade students from a rural middle school in Jiangsu Province. 96 students were divided into experimental and control groups (51 in experimental group and 45 in control group). The age and gender distribution of students in each group were compared statistically. The results showed that p values were 0.686 and 0.682, respectively.

3.2 Research Tools

The materials and research tools used in this study include: questionnaire on key factors affecting students' listening, listening comprehension test and self-assessment questionnaire.

The questionnaire on the key factors affecting students' listening is used to collect the key factors affecting English listening instruction in rural middle schools. The contents of the questionnaire involve personal factors, teacher factors, listening process and other aspects that affect listening. The questionnaire is simple and can be understood by eighth grade students.

The listening comprehension test consists of the following three types of questions: five multiple choices and two inference questions on sentence listening, five questions multiple choices and two inference questions on dialogue listening, and five multiple choices and two inference questions on passage listening. The number of questions is 21 listening comprehension questions, concerning details

and inference questions. After the implementation of the instruction experiment, the experiment group and the control group are tested with the test papers.

The self-assessment questionnaire is for students. It uses the 5-level Likert scale as a benchmark to quantify the data surveyed and to collect students' satisfaction with listening instruction after the implementation of the instruction experiment. The higher the value, the higher the satisfaction.

The study uses SPSS to analyze results of students' test scores and self-assessment questionnaires, and uses statistical methods to verify the effectiveness of the multimodal listening instruction model, as well as the effectiveness on listening detailed information and inference questions.

3.3 Research Procedure

The research is divided into three parts: determining the key factors affecting listening, building a multimodal listening instruction model and analyzing the effectiveness. First of all, according to *The 2022 version of the English Curriculum Standards*, the research determines the instruction standard of English listening in middle schools, and uses the questionnaire to investigate the key influencing factors in rural middle school English listening.

Secondly, according to the multimodal instruction model, the research builds a multimodal listening instruction model corresponding to the key factors affecting listening instruction, and implements a double-blind listening instruction experiment. The process is as follows: First, according to the multimodal English listening instruction model, we design a multimodal listening instruction scheme. Then, teachers conduct listening instruction for experimental and the control groups according to their listening instruction scheme. The experimental group is instructed according to the designed multimodal listening instruction scheme, and the control group is instructed according to traditional listening instruction scheme. The instruction experiment lasts two months.

Then, the study uses listening comprehension tests to test the listening comprehension of the experimental and the control groups. 96 valid test papers were recovered. According to the test results of the subjects, matched samples T test is conducted to see the differences between experimental and control groups in terms of overall listening performance and performance in getting detailed information and inference information. At the same time, paired samples T test is conducted to see if there is difference before and after the instruction experiment for the experimental group. In order to verify the effectiveness of multimodal listening instruction mode on solving the key influencing factors of listening instruction, and the effectiveness of multimodal listening instruction on getting detailed information and inference information, the study uses the Likert scale to investigate the satisfaction of the experimental and the control groups. The scale has five levels, namely "completely disagree", "agree", "undetermined", "agree" and "completely agree", which are quantized by "1, 2, 3, 4, 5". There are 9 survey questions, with 1-5 concerning detailed questions and 6-9 concerning the description of inference questions of listening test.

Finally, the research conducted a self-assessment questionnaire survey on the experimental and control groups to provide a triangulation support for the effectiveness of the multimodal listening instruction model for rural middle school English listening instruction, as well as the effectiveness of the multimodal listening instruction model for listening performance in detailed questions and inference questions.

4. Results and Discussion

4.1 Key Factors Influencing Listening Instruction

Based on *The 2022 version of the English Curriculum Standards*, the research analyzes the factors that affect English listening instruction in rural middle schools via the questionnaire, which are mainly the following five aspects: lack of listening skills, negative transfer of mother tongue, cultural differences, psychological factors and lack of student subjectivity. Among them, the lack of listening skills means students pay too much attention to words and sentences they listen to, cannot grasp the general idea of the listening materials as a whole, and cannot find answers to the questions on understanding the overall content of listening. The influence of negative transfer of mother tongue is mainly reflected in the students' inability to consciously distinguish the difference between Chinese tone and English tone, and their inaccurate grasp of English rhythm and stress. The influence of negative transfer of mother tongue on listening comprehension is that students can't allocate their attention correctly in the process of listening comprehension. Cultural differences mainly stem from the lack of cultural background knowledge. Due to the lack of understanding of relevant cultural background knowledge and the accumulation of oral expression, students cannot accurately understand the listening content in combination with the context. The influence of students' psychological factors mainly refers to the fact that a single instruction mode is difficult to stimulate students' learning motivation and maintain their interest in learning. Junior middle school students generally lack confidence in English listening and are not interested in it and their anxiety can easily lead to the untimely processing of information processing. The performance of listening comprehension is the untimely understanding of listening content. The lack of students' subjectivity refers to the fact that in the traditional listening instruction process, teachers are in a dominant position, and students passively accept language input and cannot actively participate in classroom interaction.

4.2 Multimodal Listening Instruction Model

According to the requirements and instruction tasks of middle school English listening, and taking into consideration of the key factors affecting rural middle school English listening instruction, the research designs a multimodal English listening instruction model for three stages: pre-listening, while-listening and post-listening, as shown in the following figure.

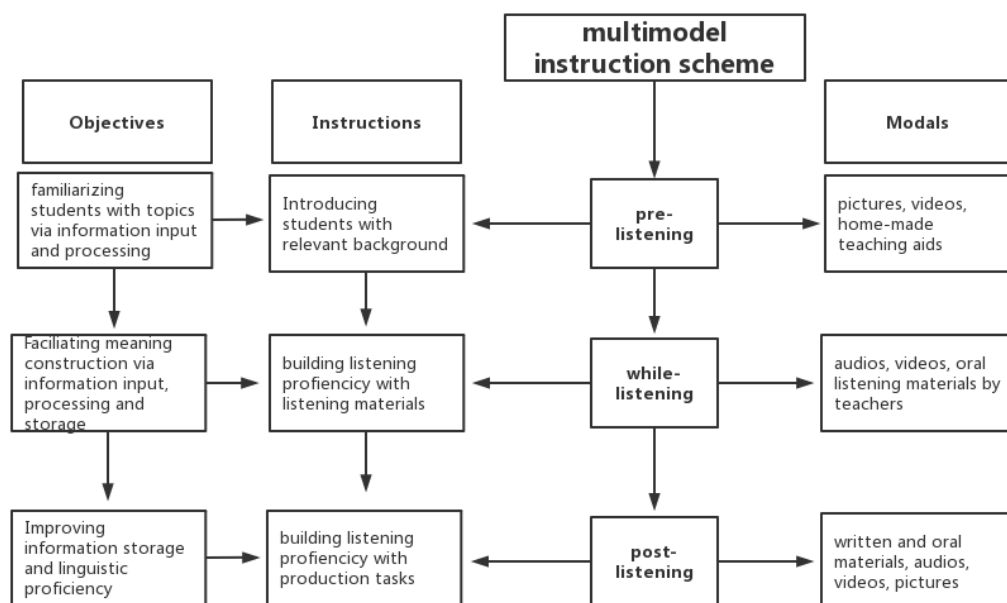


Figure 1. Flow Chart of Multimodal Listening Instruction Scheme

The first step is the pre-listening stage. The teacher shows the students the pictures or teaching aids related to the listening theme, tells the stories related to the theme to introduce the background, stimulate the students' interest and motivation in learning, and supplement the students' long-term memory. Through the display of visual pictures, props and other multimodal materials, teachers can drive students to prepare for the while-listening stage. Teachers input information to students through video, audio and pictures to stimulate students to obtain listening content, process and store listening materials, and construct meaning. The post-listening stage is a cognitive and psychological process of storing, processing and outputting listening information. Teachers design classroom activities such as retelling listening content, role playing, reciting or dictating words, phrases or sentences, and explaining the gists of the listening materials. Through audio, pictures, props, videos and other modes, teachers mobilize students' multiple senses to listen, read and write, construct the meaning of listening information, and construct learning strategies related to cognitive and psychological processes, so as to realize the subjectivity of students in the instruction and learning process.

4.3 An Analysis of the Effectiveness of Multimodal Listening Instruction Model

From Mann-Whitney U test, there is no significant statistical difference of the listening proficiency and learning satisfactory ($p=1$ and 1) between experimental and the control groups, indicating that the main factors affecting the listening learning effect are balanced between the experimental and the control groups before the instruction experiment.

After the implementation of the instruction experiment, the study used listening comprehension test to test the listening comprehension of the experimental and the control groups. The independent samples T test was carried out on the listening comprehension scores of the students in the experimental and the control groups to investigate the impact of multimodal listening instruction mode on listening scores. From the data shown in Table 1, the average score of the experimental group is higher than the average score of the control group, and the standard deviation of the experimental group is less than the standard deviation of the control group. At the same time, the score of the experimental class with multimodal listening instruction (STD=7.02472, SEM=.98366) is significantly higher than that of the control group without multimodal listening instruction (STD=7.53477, SEM=1.12322). It can be seen from Table 2 that whether multimodal listening instruction mode is implemented or not has significant difference on listening performance ($t=3.364$, $p=.001$).

Table 1. Descriptive Data of Listening Test of Experimental and Control Groups

Descriptive results of listening test of experimental and control groups				
Instruction Model	N	M	STD	SEM
Multimodal listening Instruction	51	80.3333	7.02472	0.98366
Traditional Listening Instruction	45	75.3333	7.53477	1.12322

Table 2. Results of Independent-samples T-test of Listening Test Scores of Experimental and Control Groups

Results of independent-samples T test									
	Levene's test for equality of variances				T-test for equality of means				
	F	Sig.	t	df	Sig. (2-tailed)	mean difference	Std. error difference	95% confidence interval of difference	
								lower	upper
Assume Equal Variances	.052	.821	3.364	94	.001	5.00000	1.48646	2.04859	7.95141
Not Assumed Equal Variances			3.349	90.518	.001	5.00000	1.49305	2.03403	7.96597

The research uses paired samples T test to compare and analyze the scores of detailed questions and inference questions before and after the implementation of instruction experiment of the experimental group so as to understand whether the scores of detailed questions and inference questions have changed after the implementation of multimodal listening instruction. In Table 3 and Table 4, A represents the score before the instruction experiment, and B represents the score after the instruction experiment. Table 4 shows that there is a significant difference in the scores of listening details before and after the implementation of the instruction experiment ($t=-5.699$, $p=.000$), and there is a significant difference in the scores of inference questions before and after the implementation of the instruction experiment ($t=-7.047$, $p=.000$). Table 5 shows that after the implementation of the instruction experiment, the average scores of listening detail questions and inference questions have improved ($35.9412 < 38.6863$, $35.5098 < 41.6471$), the standard deviation of details questions has decreased ($4.94939 > 4.09629$), and the standard deviation of inference questions has increased ($5.93421 < 6.15410$).

Table 3. Results of Paired-samples T-test for Students' Scores of Detailed Questions and Inference Questions of Experimental Groups

		Results of paired-samples test								
		Pairing difference					t	df	Sig. (2-tailed)	
		mean	Std. deviation	Std. error mean	95% confidence interval of difference					
					lower	upper				
Detailed Questions	A-B	-2.74510	3.44002	.48170	-3.71262	-1.77758	-5.699	50	.000	
Inference Questions	A-B	-6.13725	6.21939	.87089	-7.88649	-4.38802	-7.047	50	.000	

Table 4. Descriptive Results of Paired-samples T test of Students' Scores of Detailed Questions and Inference Questions in the Experimental Group

Paired sample statistics of students' scores of detailed questions and inference questions in the experimental class					
		mean	N	Std. Deviation	std. error mean
Detailed Questions	A	35.9412	51	4.94939	.69305
	B	38.6863	51	4.09629	.57360
Inference Questions	A	35.5098	51	5.93421	.83096
	B	41.6471	51	6.15410	.86175

Results of questionnaires on learning satisfaction of the experimental group shows that the proportion of choices "2" and "1", which means "agree" and "completely agree" respectively, is basically more than 50%, with the exception of item 6 (the ability to obtain the topic information of the conversation in the process of English listening). This shows that multimodal listening instruction is helpful to solve the key influencing factors in listening instruction. To verify whether the effectiveness of multimodal listening instruction on getting detailed information and inference information is consistent, the research uses SPSS to transform the scale data of the experimental and the control groups. The original value 1 is converted into 100 points, 2 into 80 points, 3 into 60 points, 4 into 40 points, and 5 into 20 points. The higher the score, the better the performance. It can be seen from Table 5 that the average score of each item in the experimental group is higher than that in the control group, which indicates that the students in the experimental group believe that the multimodal listening instruction model is really helpful to improve listening performance. At the same time, the scores of 1-5 questions in the experimental group are significantly higher than those of 6-9 questions, which shows that the effectiveness of the multimodal listening instruction model for getting detailed information is greater

than that for inference information.

Table 5. Data of Listening Instruction Satisfaction of Experimental Group and Control Group

	Experimental	Control group	total	N
	group			
	average value	average value	average value	
1. Be able to obtain information about place and time during English listening	72.94	52.00	63.13	96
2. Be able to obtain information about professional identity during English listening	81.57	51.11	67.29	96
3. Be able to obtain the identity information of the interviewer during English listening	78.43	59.11	69.38	96
4. Be able to understand numerical information in English listening	70.98	47.56	60.00	96
5. Be able to obtain reason information in the process of English listening	74.51	51.56	63.75	96
6. Be able to obtain information about the topic of conversation in the process of English listening	65.10	55.56	60.63	96
7. During the listening training, the teacher explains how to obtain the required information	69.80	55.11	62.92	96
8. Be able to obtain information from pronunciation and intonation during listening training	61.57	56.44	59.17	96
9. Be able to infer information from information obtained from known options during listening training	70.59	48.89	60.42	96

5. Conclusion

This study conducts quasi-experimental research and uses questionnaire surveys to explore the effectiveness of multimodal instruction model in improving listening instruction effectiveness of rural middle school, and verify the effectiveness of multimodal listening instruction on getting detailed information and inference information in listening comprehension. The results show that the multimodal listening instruction model can greatly improve the listening performance of students in rural middle school and has greater effectiveness on detailed information listening than on inference information listening by effectively solving the key problems affecting English listening instruction in rural middle schools. The research results could supplement and refine the multimodal instruction model, and enhance the applicability of the multimodal instruction model in classroom instruction of English listening. Considering *The 2022 version of the English Curriculum Standards*, the results can guide middle school teachers to explore new breakthroughs in English listening instruction, explore the causes of listening comprehension difficulties. Especially, the result could guide middle school teachers to refine the instruction process in English listening instruction and to distinguish between the instruction models in instructing detailed information listening and inference information listening by giving priority to the use of multimodal listening instruction model in detailed information listening.

This study also has the following limitations. First, this research takes the eighth grade students in rural middle schools as subjects. If data can be collected in other learning stages, the coverage of research subjects will be expanded, so that the research results can better serve English listening instruction. Secondly, the research employs self-assessment questionnaires from the subjects to verify the effectiveness of the multimodal listening instruction model. In future research, we can use online data, such as eye movement tracing and other advanced technologies, to analyze the influencing factors affecting students' listening process.

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