Professional English teaching for civil engineering students based on multimedia-assisted instruction

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ABSTRACT: The study adopts a questionnaire and interviews as the main research methods to carry out a case study among students majoring in civil engineering at Luoyang Institute of Science and Technology, Henan, China. It explores the general status of multimedia-assisted instruction for civil engineering students in their professional English teaching, and examines the specific problems in terms of interaction, learning environment and teaching efficiency. Based on data analysis, it can be concluded that multimedia-assisted instruction contributes in a positive way to professional English teaching for civil engineering students. However, some problems still remain and, therefore, suggestions are put forward to address them. These suggestions may be beneficial to teachers conducting multimedia-assisted instruction in professional English teaching.

INTRODUCTION

With the rapid development of science and technology, there emerges vigorous promotion of modern educational technology. Information technology taking computer and network technology as the core, has not only brought extensive and deep influences to social life, but has also changed modern education. The application of multimedia technology became one of the characteristics of the computer age. Multimedia-assisted instruction shows another way to the development and reform of the professional English teaching method in class teaching for civil engineering students, and it has been praised for the advantages it bestows. However, what is the general status of multimedia-assisted English class teaching? What are the existing problems of multimedia teaching? These are important and worthwhile issues for teachers and educators, and it is necessary to research this field to make further improvement.

MULTIMEDIA-ASSISTED INSTRUCTION

Several scholars have come up with definitions of multimedia and multimedia technology, but there is no universally accepted one. Gayeski regarded multimedia as *a kind of computer driven interactive communication system which produce, reserve, send, and retrieve textual, pictorial, and acoustic networks of information* [1]. Alternatively, the generic term *multimedia* refers to *the continuing or synchronous application of all different kinds of media in a given presentation or self-learning program* [2].

In this study, multimedia can be regarded as a kind of computer-based technology mixing more than two media to produce, reserve, send and retrieve information. It is a combination of texts, images, sounds, animation and video. As for the usage and benefits, many educational resources can be provided on multimedia, for example, *databases, encyclopaedias, simulations and instructional games, electronic books, multimedia libraries, instructional aids, interactive tutorials, reference works and different teaching materials* [3].

Moreover, difficult concepts can be made easier by multimedia due to their vividness, which helps students to understand these concepts better. Gayeski also argues that multimedia can be helpful for practitioners to choose freely and decide about the rate, specific content and type of delivery of the message and can also provide immediate feedback and record keeping [1].

The term multimedia *is now firmly associated with computer-based delivery, usually over the Internet and accompanied and supported by interaction provided via some form of computer-mediated communication* [4]. Multimedia stems may consist of traditional media in combination or they may incorporate the computer as a display device for text, pictures, graphics, sound and video, but more is involved than simply integrating these formats into a structured programme in which each element complements the others, so that the whole is greater than the sum of the parts.

Multimedia-assisted instruction (MAI) is a constituent of modem foreign language teaching technology. It refers to the instruction that is operated by teachers, and it can nimbly use related media according to different classroom requirements by means of the media system, which integrates the computer, video recorder, tape recorder, projecting apparatus and the VCD software for teaching.

Multimedia application in English teaching has many advantages, which cannot be substituted by other traditional means. It offers an interactive learning environment with better interfaces accompanied by visual images and authentic sounds. Students are exposed to rich and contextual language with a high degree of authenticity, which is beneficial for their language learning. Application of MAI has altered considerably the instructional strategy and changed the way the teachers teach. MAI is used to enrich the language classroom through fostering human-to-human communication and creative endeavour, and it builds environments in which learners can learn through exploration and experience. With the significance of MAI mentioned above, MAI not only benefits the teachers' teaching environment and performance, but also improves the students' learning environment and performance. Kasim suggested that combining the educators' skills and the learners' needs could be considered as a symbol of MAI success [5]. Actually in an MAI class, in the situated learning made, students turn what they have learned into real life situations. According to a study by Dean and Webster, from the learners' aspect, MAI might improve their learning quality and develop their intelligence, and gradually students could get control of their own learning [6].

RESEARCH DESIGN

A teaching study was carried out between different classes in order to explore the characteristics of multimedia-assisted instruction in a civil engineering professional English class, and to establish the factors, which affect teaching, so as to improve the efficiency of English teaching. The study defines research questions, subjects, methods and data collecting.

Research Questions

- What is the general status of multimedia-assisted English teaching for civil engineering students?
- What are the existing problems of multimedia-assisted English teaching in terms of interaction, learning environment and teaching efficiency?
- Is teaching efficient? How can the efficiency of multimedia-assisted English teaching for civil engineering students be improved?

Research Subjects

The subjects in this study were students in Class 3, Class 4 and Class 5 in Grade 2 at Luoyang Institute of Science and Technology whose major was civil engineering. *In toto*, there were 90 students involved in the case study.

Research Methods

The study was carried out with a descriptive and qualitative analysis. Questionnaires and interviews were conducted at Luoyang Institute of Science and Technology. The data were collected during the investigation.

Data Collection

The questionnaires were distributed directly to the students and they were cooperative. Sufficient time was given to the students, and they read and finished the questionnaires carefully, so the data would be reliable. After that, the questionnaires were collected and a statistical analysis was conducted to uncover embedded problems in the practical application of MAI at Luoyang Institute of Science and Technology. The interviews were conducted with the 90 students. During the interviews, all the students shared their opinions and notes were taken by the interviewer. The notes were later analysed.

RESULTS AND DISCUSSIONS

This section mainly focuses on the results of data analysis and the information derived from it. The problems shown in the questionnaire were analysed by quantitative analysis. Three aspects in the questionnaires and interviews were analysed with the purpose of looking into the status of multimedia-assisted English instruction and exploring the underlying causes of existing problems.

Questions 1 and 2 in the questionnaire were designed to investigate the status of multimedia in English class. Q1: The teacher frequently makes use of multimedia to assist English teaching.

Table 1: Percentage of answer to Q1.

A. Strongly agree	B. Agree	C. Disagree	D. Completely disagree
26.2%	55.4%	13.8%	4.6%

Q2: The teacher can apply the multimedia skilfully and effectively.

Table 2: Percentage of answer to Q2.

A. Strongly agree	B. Agree	C. Disagree	D. Completely disagree
21.5%	59.2%	11.7%	7.6%

According to the investigation, most of the classrooms at Luoyang Institute of Science and Technology are equipped with modem multimedia facility, and they are frequently used in English instruction. As for the application, 80.7% of the students investigated claimed that the teacher could effectively and skilfully use the multimedia equipment, while 19.3% of them did not agree with it. It, therefore, seems that some disagreement exists about the teachers' capacity to use multimedia.

Q3: I will be involved in classroom interaction in a multimedia-assisted English class.

Table 3: Percentage of answer to Q3.

A. Strongly agree	B. Agree	C. Disagree	D. Completely disagree
32.1%	35.3%	18.7%	13.9%

Q4: MAI can help students to be the centre of the class and, thus, they can enjoy the learning process and interact with the teacher and with each other.

Table 4: Percentage of answer to Q4.

A. Strongly agree	B. Agree	C. Disagree	D. Completely disagree
34.3%	32.9%	22.1%	10.7%

Question 3 and 4 investigated students' opinions on the role of multimedia in classroom interaction. The results show that 67.4% of the students agreed that the multimedia could help to involve the students in the classroom activities and make the class teaching more vivid. With its help, students can be easily exposed to a range of information including sound, images and video. They can also get access to authentic language, which contributes a lot to the improvement of learning efficiency.

However, 32.8% of the students disagreed with this statement, probably for the reason that the multimedia-assisted English class was still focused on information transmission rather than providing an authentic language learning environment. The result of Q5, to some extent, confirms the hypothesis above.

Q5: Compared with the classroom activities, the teacher pays more attention to the explanation and transmission of the language.

Table 5: Percentage of answer to Q5.

A. Strongly agree	B. Agree	C. Disagree	D. Completely disagree
34.5%	42.2%	18.1%	5.2%

From the table above, almost 76.7% of the students agreed or strongly agreed that the teacher paid more attention to the teaching material instead of focusing on the development of learner's language skills. So, it can be concluded that MAI can help to involve students in the classroom activities and promote interaction, but not all classroom activities are student-centred.

Q6: Multimedia-assisted English teaching can help to build relaxing and favourable learning environment.

Table 6: Percentage of answer to Q6.

A. Strongly agree	B. Agree	C. Disagree	D. Completely disagree
14.9%	48.3%	33.4%	3.4%

More than half of the students considered MAI helpful in building a relaxed and favourable learning environment. Besides, MAI was always praised for its exclusive advantages. It can make abstract content more visual and vivid, stimulate learners' motivation, and control learners' attention by multimodal sensory perception. Furthermore, it can enrich the capacity of instruction and make full use of the time, thus, making a highly efficient English class.

Table 7 reports on the data collected from the interviews. The table shows students' attitudes and feedback to MAI classes during the interviews. The total number of students interviewed was 86.

Table 7: Teaching effects in MAI classroom.

Item	N = 86	Percentage
Interests	49	57.0%
Attention	57	66.3%
Following teachers	45	52.3%
Memorising	48	55.8%
Blackboard-writing useless	33	38.4%

Table 7 shows that 49 interviewed students (about 57%) felt that MAI could increase their interests in English classes, and 57 respondents (about 66.3%) felt that MAI helped them to be more attentive in English classes. This implies that more than half of the investigated students had an optimistic attitude to MAI in English class. Forty-five respondents (about 52%) reported that they could follow their English teachers in classes when applying MAI, and 48 respondents (about 56%) reported that they could memorise what they were learning in English classes when applying MAI. This implies that more than half of the students thought that the teaching effects of English classes were good when using MAI. In addition, 33 respondents (about 38%) thought that blackboard-writing was useless when MAI was deployed. This indicates that when applying MAI in English classes for civil engineering students, what attracts the students most may not necessarily be the teaching content, but still more than 60% of the respondents thought that blackboard-writing was necessary.

Table 8 shows what attracts students most when applying MAI in English classes. The number of students interviewed was 87.

Table 8: Element students like most.

Item	N = 87	Percentage
Layout	10	11.5%
Sound	19	21.8%
Photos	35	40.2%
Content	30	34.5%

In Table 8, photos are in the first place - 35 respondents (about 40%) chose photos as the most attracting item, and 19 respondents thought that sound attracted them the most, which resulted in neglecting the teaching content. Content is the second-most selected item, 30 respondents (about 35%) thought that the content attracted them most. In addition, 10 respondents (about 12%) chose layout as their favourite. Therefore, whether teachers rationally utilise multimedia or not is important. Teachers should make full use of photos, sound and layout, which are the elements supporting the teaching content.

ANALYSIS AND SUGGESTIONS ON THE APPLICATION OF MAI IN ENGLISH TEACHING

After discussions on the study results, it can be confirmed that MAI does have a positive influence on classroom interaction.

Firstly, the multimedia can help to involve students in classroom activities. With its help, students can be easily exposed to different kinds of information. However, to some extent, the multimedia-assisted English class still focuses on the information transmission rather than providing an authentic language learning context. Therefore, teachers should try to provide students with enough interactive space in the application of MAI in English class teaching.

Secondly, in the MAI classroom, abstract contents become vivid and active, which stimulates learners to participate in the instruction and make the learning environment favourable and comfortable. However, abundant multimedia will reduce the time for the communication between the teacher and students to some extent. In the process of English teaching, the teacher should provide well-designed tasks and authentic language context, so that the students can work on their own. At the same time, the teacher should give appropriate prompts. In the active and positive learning environment, learners can interact and communicate freely, and actively construct their own knowledge by making use of learning materials of all kinds through multimedia.

Thirdly, MAI can enrich the capacity of instruction and make full use of the time, and with the assistance of the audio-visual teaching material, MAI can attract students and arouse their interest in learning, thus, making a highly efficient English class. However, sometimes in the practical use of it, the teachers do not take the students' competence and needs into account. Also, occasionally, the design of the courseware seems to be inappropriate and some content is redundant, which may have a negative effect on teaching efficiency.

Considering these problems, an issue comes out of how English teachers optimise the application of MAI in English class teaching of civil engineering major.

Enhancing Teachers' Training

Multimedia technology can provide powerful assistance in the teaching process to promote learning, but it not only requires teachers to put more effort into considering the needs and interests of students, but it also requires them to make full use of the positive role of multimedia courseware so as to improve teaching efficiency. One of the major causes of English teachers not using MAI is the teachers' lack of theoretical and technical knowledge training. Their lack of theoretical knowledge may result in their application of MAI only for teaching display, and their lack of technical knowledge may result in their inappropriate use of MAI. As the survey reveals, many English teachers want to use multimedia, but are unable to use it or have no suitable courseware and could not make it by themselves. Therefore, opportunities should be provided to the English teachers for training in theoretical and technical knowledge on MAI.

Integrating the Interaction into MAI in English Teaching

As results of the questionnaire indicate, students' engagement, more or less, relies on the interactive space teachers provide. However, most English teachers rely too much on PPT courseware, and ignore the interaction with students and also ignore student-centred theory. Social constructivist theory represented by Vygotsky emphasises interaction and engagement with the target language in a social context [7]. Therefore, teachers should integrate the interaction into MAI teaching and provide students enough opportunities to make the MAI class interactive. First, teachers should consider this factor in the process of designing MAI teaching, and provide enough interactive space for the students in order to offer them the chance of thinking in English. Second, discussion in groups or in pairs should be considered more thoroughly in MAI English teaching. Discussion involves the exchange of ideas and opinions among students or among students and the teacher; it can be used to prepare learners for a presentation by arousing their curiosity or by directing their attention to key points. Regarding the argument from the interactive theory, MAI in the class should be interactive because it has a powerful function that can realise the interactive teaching to cultivate the students' communicative competence.

Optimising the Design of the MAI Courseware

The design of PPT courseware is a crucial factor that decides whether MAI in English classroom teaching is successful or not. Firstly, the design of courseware slides should be given more consideration. It covers the aspects of font choice, the design of background and transition, template choice and inserting multimodality information. In general, the font colour needs to provide adequate contrast with the background colour. Secondly, teachers should select appropriate media materials according to their functions. Different materials have different functions. Songs and video in the classroom are often used as a *filler* activity to change the mood or pace of a lesson. Many authentic songs are good classroom materials.

Visuals can motivate learners by attracting their attention, holding their attention and generating emotional responses, and can also simplify information that is difficult to understand. What is more, visuals can provide an additional channel; that is, when accompanying spoken or written verbal information they present that information in a different modality, giving some learners a chance to comprehend visually what they might have missed verbally. Furthermore, if teachers only select multiple media to assist the instruction, but not consider the function as a vital factor, the outcome of MAl will not be as effective.

Combining MAI and Traditional Teaching Methods

The introduction of multimedia technology into the classroom is the inevitable trend of modem education development, and teachers should realise that the modernisation of education requires the modernisation of the teaching methods. Even though multimedia can contribute substantially to English teaching, it is a kind of auxiliary method. To give full play to its advantages and achieve a better teaching effect not only requires teachers to use multimedia, but also teachers need to be effective in the organisation and control of the teaching process [8].

As an auxiliary classroom teaching method, MAI cannot take the place of the leading role of teachers. The merits of traditional methods should not be neglected. For example, teachers' language and handwriting on the blackboard have been shown to have a great positive influence on the students' understanding. One could, therefore, integrate the advantages of MAI with those of the traditional teaching methods; however, multimedia on its own is advantageous in the language teaching and learning processes.

CONCLUSIONS

Through discussion and analysis, it can be concluded that multimedia-assisted instruction contributes more to professional English classroom teaching for civil engineering students, and it is a crucial auxiliary method for professional English class teaching for this specialty. If the above suggestions are properly applied in the English teaching with MAI, the teaching will be more lively and interactive, and learners will have much more motivation to participate in the classroom and keep high engagement. Besides, the rapid development of multimedia technology and applications not only facilitates the process of learning a foreign language by students, but it also creates a new

challenge for teachers. Therefore, in professional English teaching for civil engineering, teachers need to explore continuously and try to be competent in using different teaching methods according to the characteristics of teaching content, so as to promote learning and achieve the best teaching effect.

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