Factors Interfering Students' Learning Effect in Multimedia-Based ESL Classes in China

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ABSTRACT

Multimedia technology has become a popular and indispensable part of ESL teaching with its distinguished features of richness in texts, graphics, animation, sound and etc. However, its drawbacks are recognized and studied by an increasing number of researchers. In this paper, the author analyzes three key factors that interfere students' learning effect in multimedia-based ESL classes in China, ie. overload information, aural and visual interference, shortage of affective communication, and proposes some countermeasures. It is suggested that instructors, as the guide of students' learning activities, should learn some theories of multimedia learning and put them into practice when designing the teaching content and making courseware for learners-oriented ESL classes assisted by multimedia technology.

1. Introducation

The rapid development of information technology in the 21st century lays a solid foundation for the development of knowledge-based economy and promotes fundamental changes in the content, form, methods, organization etc. of higher education. Informationized higher education is characterized by its digitization, internetization, intelligence and multimedia base. Teaching facilitated by multimedia technology has become a mainstream pattern of English as a second language (ESL) teaching pedagogy since knowledge and information are presented in such a different way from the traditional teaching style of teachers' illustration and words written on the blackboard that texts and pictures, audio and video are accompanying each other to arouse learners' interest in the teaching material, as well as increasing their learning efficiency in class. As its name suggests, multimedia technology combines two or more media into one system of presenting, so learning materials can be communicated in this way through different sensory channels. Multimedia technology helps to realize information interchange through delivering information combined with texts, graphics, animation and sound, providing feedbacks. Teaching content can be presented in a more attracting, flexible, diversified way in multimedia-based environment. However, with the popularization of multimedia-assisted education, educators and instructors carryout teaching experiments to research and think more profoundly about both the merits and demerits of the indispensable tool of multimedia in modern teaching. And the negative effect brought about by the application of multimedia in language teaching has been drawing more and more attention in the academic circle.

2. Literature Review

Problems found with multimedia language teaching can be summarized as three major types, as is shown in the following part.

2.1 Mismatching between the soaring development of technology and the increase of English teachers' ability to use informationalized education technology

Multimedia-based teaching of ESL requires that instructors of English are both proficient in language teaching, and quick to become skillful in using new technology, which is a great challenge to these "language masters" who specialize in liberal arts. As early as in the 1990s, scholars started to pay attention to the discrepancy of teachers' capability of applying the techniques and the rapid development of multimedia technology. Garrett (1991) thinks that the technical development is far ahead of the teachers' ability to integrate it with the classes and the teaching syllabus. It is a slow process for the teaching techniques to be

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incorporated with the teaching practice. Multimedia-assisted teaching is not simply to put the words written on the blackboard onto the slides or PowerPoints projected on the screen. It needs that the teachers are qualified enough to have the basic skills of using the technology, and the general understanding of how to put pictures, videos, audios, and texts beautifully and effectively together to best present the teaching content. Teachers are challenged to make the best use of the multimedia facilities to help students acquire knowledge more efficiently.

2.2 The gap between technology development and the researches of pedagogical theories

The booming of multimedia technology provides more opportunities and possibilities for the changes and improvement of ESL teaching models, style, methods, and strategies. However, in many cases multimedia resources have not yet been taken full advantage of to better and promote ESL teaching conditions. The major reasons can be summed up as: First, the research and development of education theories is not at the same pace with the multimedia growth. Secondly, the new teaching trends have not yet been given priority to, comparing with the traditional teaching models without the assistance of information technology. As Layman-Hager (1992) puts it, we are in shortage of education theories in accordance to multimedia technology. Although since the late 1990s and early 2000s quite a number of researchers started to become aware of this problem, among whom Richard E. Mayer has been well recognized in the academic circle with his Multimedia Cognitive Theory, the lack of pedagogical theories concerning multimedia technology is still a general problem.

2.3 The lack of deep and thorough understanding of the application of multimedia technology

Multimedia technology can be taken by many instructors as essential, since it releases them from constant repeating lesson preparation and stressful lecturing in class. The role that teachers play is now changing from the communicators of knowledge to powerpoint players. Fischer (1996) puts forward a thought-provoking question: should foreign language learners be tourists or explorers? That is, should teachers be tour guides who show the tourists around to appreciate the beautiful sceneries in the kingdom of languages, or should they assist the students during their exploration of foreign language learning? The use of multimedia teaching material is the surface form, under which lies the most important purpose of taking full advantage of modern educating technology to motivate students to study with initiative and creativity. Even though the assistance of multimedia technology is obvious and significant, learners will not really be able to comprehend the language or culture of the target language if they do not think, study with clear and explicit purpose or awareness.

Based on these previous researches and the author's teaching experience, this paper is going to analyze in detail the factors that may influence the learning outcome and efficiency in multimedia-based English as a second language learning classroom from the following three perspectives: The instructors' use of multimedia technology, the aural and visual influence exerted by the multimedia teaching materials, and the affective interaction in class.

3. Analysis of interfering factors

There are various elements that influence ESL teaching assisted by multimedia. In this paper, the author holds that from the English teachers' perspective, due to their ability to use the technology and their understanding of multimedia technology, they often attach too much information to their lectures with the help of multimedia courseware for students to comprehend effectively. Besides, from the perspective of learners' cognitive process and knowledge integration, aural and visual factors can also interfere students' learning efficiency in multimedia-based classes. What's more, during the education process, multimedia environment does not encourage affective communication either between teachers and students, or among students, so students are not highly motivated to learn initiatively.

3.1 Overload information

Information overloaded may prevent students from effective knowledge assimilation. Multimedia-assisted teaching promises to make the best use of the storage and transfer function of computers so as to enrich and expand the content of teaching by presenting more and faster knowledge about language and culture, and by increasing the information capacity of English classes. Multimedia classes have the typical feature of huge information capacity and transmission, which has originally been the advantage of multimedia teaching of ESL. However, this merit is subtly changing into demerit, since in limited time in class the more information does not necessarily lead to more efficiency of students' learning activity. The amount of information

presented is not in proportion to the information comprehended or learning efficiency. If teachers pursuit the exquisiteness and beauty, as well as the largest amount of information provided single-mindedly, they might arrive at the opposite purpose. The plenty and variety of learning material may bewilder the students and prevent them from better understanding. Teaching content in large amount but without a prominent focus or clear orientation may not arouse students' interest or may even be disliked by the students.

According to Krashen's (1982) language input-output theory, in second language acquisition teaching process, learners should be provided with an adequate amount of input which is a little bit higher than their comprehension ability, but not beyond it. That is comprehensible language input i+1. In second language acquisition process, the information comprehended is always less than the input, so in order to increase the assimilated knowledge, instructors should try their best to increase the amount of the comprehensible input. Multimedia teaching can provide a variety of materials. Instructors make the full use of this information technology plat form to introduce historical, cultural, geographical and conventional background knowledge related and helpful to ESL learning to the students, lest they could not take every advantage of multimedia technology. However, if simply list and present the mass and jumbled information about language and culture, there will be the shortage of cohesion and systematic logic, which will not do good to the highlight of key points. Presented with the multiple information, students' interest might be aroused, but they may also feel overwhelmed, or beyond their capability of digestion. Some of the may even get lost in the forest of pictures, words, video and audio about English, but cannot clearly see any tree of listening, speaking, reading or writing improvement. If information input is far beyond learners' current levels, students may feel anxious and frustrated. Researches show that (Zhang&Yin, 2012) with the increase in the complexity of information relevance, learners' selective attention may change accordingly and greatly, so that attention resources will be consumed in large amount to reduce working memory efficiency. The more mixed and larger amount of materials presented in multimedia ESL teaching environment, the less efficiency of students' learning. Therefore, during the teaching process, for students' better understanding of teaching content, it is of vital importance to control the amount and difficulty of information provided in lectures.

What's more, if instructors' do not have a good command of the speed and rhythm of presenting the teaching content with the assistance of multimedia, students' interest and learning effect may be reduced as well. Multimedia-technology releases teachers from blackboard writing with chalks and soothes their memory anxiety and physical labor in class. For those young and middle-aged instructors good at using information technology in their teaching process, they can have better preparation for the classes and more efficiency with the assistance of powerpoints, slides, videos, and so on. Yet the great efficiency improvement with the "teaching" does not necessarily promise the increase in "learning" efficiency, especially when instructors make full preparation to provide more than enough information (Liu, 2009) and speed of the knowledge input in class is much faster than students' acquiring speed. Comparing to the traditional force-feeding teaching style, scholars call it "digital-feeding" or "electronic-feeding" (Wang, 2009) if students are overwhelmed by the huge amount of knowledge presented with the assistance of multimedia technology by their instructors. Digital-feeding may follow the same old disastrous road of force-feeding teaching, challenging students' enthusiasm and confidence in learning. It would never stimulate the students' interest or patience to learn, but provoke their weariness, tiredness, or even hatred to learn. Some instructors, sometimes due to the overloaded information, demonstrate the multimedia courseware too fast to leave enough time for learners to process information in their brains, so students can hardly understand and digest what they are showed in limited time in class.

Knowledge acquired by students in the class is simply stored in the instantaneous memory, but not internalized into the short-term or long-term memory, so that much information becomes redundant to interfere their learning effect. According to Krashen's another important theory of the Affective Filter Hypothesis concerning second language acquisition, much information input do not equal to students' ability to master the target language. Besides the input, some other factors should also be taken into consideration during second language acquisition process, such as students' affective factors etc.

3.2 Aural and visual interference

Cognitive overload is one of the immediate consequences caused by overloaded information input, the essence of whose negative impact on students' learning outcome is the aural and visual interference to be analyzed in this part.

American educational psychologist Richard E. Mayer (1996) puts forward the SOI model (Fig. 1) of knowledge construction, explaining the three fundamental cognitive process of meaningful learning : (1) Selection, which involves attention selection of relevant part of presented information and adding it the short-term memory. When learners pay attention to information received with their eyes and ears, they are actually selecting at the same time information to be further processed. (2) Organization, which concerns the building of inner relations between the pieces of information in their short memories. When constructing the inner relations, learners need to organize the pieced information they selected into a whole. (3) Integration, which is to integrate the organized information in learners' short-term memory with the relevant knowledge existed in their long-term memory. This process is to build the relations between newly organized information with learners' familiar knowledge structure. Based on Paivio's (1986) Dual Coding Theory and Baddeley's (1992) Working Memory Theory, Mayer (2001) proposes three hypothesis about multimedia learning. The first is Duel Channels, the two independent information processing channels of human beings, in which aural/words, visual/pictures materials are processed. The second is Limited Capacity, the limited amount of information processed in each channel at the same time. The third is Active Processing Hypothesis, which means that man acquire knowledge actively, selecting on their own initiative relevant words and picture information, organizing the information in accordance to their inner knowledge structure, and integrating the latest material with the knowledge they've already known.

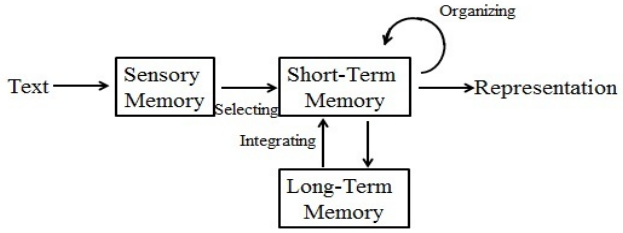

Fig. 1 Cognitive process model of knowledge construction (1996)

On the foundation of his SOI cognitive model and multimedia learning hypothesis, Mayer (2005) proposes his cognitive theory of multimedia learning, demonstrating the cognitive process of multimedia learning. With multimedia learning, learners select relevant words from presented texts or narrations, or images from the presented pictures. They organize the selected words into coherent and clear linguistic psychological representation, and the images into a pictorial representation. Then the word model and pictorial model are integrated with their prior knowledge, as is shown in Fig. 2.

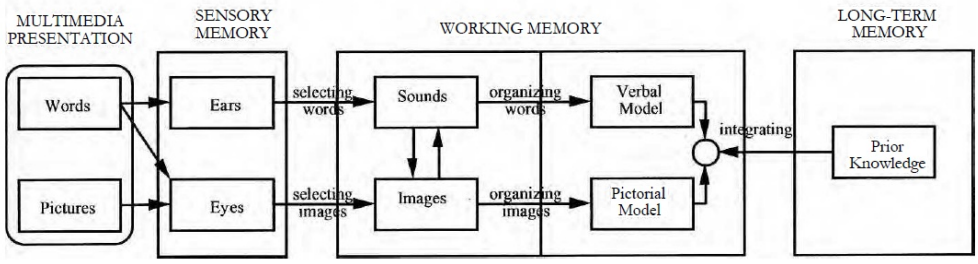

Fig. 2 Cognitive theory of multimedia learning (2001)

With multimedia learning, aural and visual interference may occur or even mingle with each other when information is being transferred into learners' visual channel (eyes) in the form of texts and pictures, while aural channel (ears) in the form of sound. According to Mayer's multimedia cognitive learning theory, after received by the ears and eyes, words and pictures are selected and passed to the processing procedure, becoming sounds and images. If words and images do not go with each other, or they are disordered or misplaced, learners will have to use more mental resources to organize them in the working memory. More attention will be have to be paid, with working memory burdened, cognition interfered and learning effect decreased. In multimedia-assisted classes, if less important or unimportant information attracts learners with dramatic colors, brightness, or texture, or impacts students' aural and visual organs in a special way, the aural and visual channels may be occupied, while attention could be misled to process unnecessary cognitive information in the working memory. In multimedia-bases classes, teachers often provide more than enough words, pictures, sounds to the learners' ears and eyes, trying every possible means to promote

and facilitate students' learning with representations with various functions made by rich and colorful teaching content. However, too much information causes problems to the working memory processing, resulting in recognition overload and negative effect to the aural and visual channels.

3.3 The shortage of affective communication

The shortage of affective communication in multimedia classes may cause learners' lack of initiative in learning. A well-known experiment about memory persistence conducted by psychologist Treicher (Liu, 2009) shows that man can remember 10% of what he reads, 20% of what he hears, 30% of what he sees, 50% of what he sees and hears, 70% of what he says in conversation. According the statistics, in second language acquisition, if learners could see and hear, as well as discuss and communicate what they learn, the study efficiency may be highly increased. Multimedia technology is based on computer network, which has the typical interactive feature. Yet the fact may be contrary to the expectation because multimedia courseware is relied on too much. In English classes, the communication and interaction between teachers and students, and among students are not as frequent and effective as expected.

The intuitive vividness of multimedia can make boring and tedious content vivid and interesting, specifying and visualizing abstract concepts, so as to help students better comprehend what they should learn. Since the design of teaching material in multimedia environment usually encourages man-machine interaction, its negative effect on language teaching is obvious: in English classes full of powerpoint, picture or video, students' attention is usually on the screen, but rarely do they pay attention to the instructors' non-verbal behavior such as their expression, gesture, as well as their classmates' action or emotion. With man-machine interactive multimedia courseware assisted English-teaching environment, students look and listen more than they communicate with the teacher and each other during the learning process. Even though some interactive questions or activities are designed in the courseware, it often follows the mechanical procedure of raising questions on the computer, and then students give the answers to be checked as feedback by the computer. So man-machine interaction becomes merely formalistic. Students cannot be taught in accordance with their aptitude, or highly motivated to learn. Even worse, to release pressure, some teachers saturate their multimedia courseware with more than enough videos, audios, words, and so on in order to be quite sure that they have a lot to teach in class. What they do in class is reading or showing the materials they prepared. If they cannot finish them, students will be allowed or encouraged to have a copy of the courseware and learn from it with their own computers, which really becomes the blunt interaction between man and machine.

Furthermore, teaching with multimedia courseware usually follows a strict procedure in which the timing is accurately controlled. For the aesthetic beauty and tidiness in content, there is often fixed set in the courseware. This kind of a unified model does not take individuality of students of different specialty, learning level, or cognitive capability into consideration when teaching. Some teachers lecture with the multimedia courseware in the way of pipeline in factory, arranging the class in terms of time allotment, teaching process and rhythm, strictly by following the courseware. As a matter of fact, it is dynamic and very hard to control or expect how students' think about what they learn, express what they feel, and communicate with each other. If strictly timed or controlled by procedure, the chances for students to think and communicate will be stopped or even deprived by the rigid pattern of the courseware. As far as language teaching is concerned, students' language capability can be trained in real communication practices, among which interaction and exchange are the most effective ways to acquire English. The learning methods and process should be in accordance with the ultimate goal of learning English, ie. to express and interchange information in the target language, which requires that language learning should be realized in using the language. The most important is for learners to communicate with each other, so even if multimedia helps to communicate and learn more effectively, it is still the chief assistance but not the dominant that steers the show.

The reduction of affective interchanges in multimedia classes shows the emphasis in input, while neglect in output. The consequence is that the courseware made either by the instructors or the publishers (published together with the textbooks) play the dominant role in teaching, while students are still the passive receivers of stimulates from the outside, that is, the objectives of knowledge feeding. The passive status of students' goes against the cultivation of students' comprehensive ability of using the language they acquire. According to the popular education theory Constructive Learning Theory put forward by Swiss philosopher and psychologist J. Piaget in the 1960s, students should be the learning subjects, the subjects of cognition and information process, and active constructor of meaningful knowledge. They should not be taken as

vacant containers to be filled with the knowledge. On the contrary, learners actively create meaning, selecting and pursuing their own learning (Hu, 2008). Instructors, as designers of classroom activities, should assist, guide and lead the students to promote their knowledge construction. The design and use of teaching content, methods, pattern, and process should be learners-oriented.

4. Countermeasures

To deal with the above summarized factors that influence and interfere students' learning outcome in multimedia-based ESL classroom, the author is hereby proposing some tentative countermeasures from the perspective of teaching design, students' affective interaction and courseware designing.

First of all, a clear and proper teaching objective should be set, based on which teaching content is organized and presented with focuses. Teachers should be careful with multimedia materials selection, only to select closely related materials that benefit the teaching objective, but not overwhelm students with too much knowledge. Materials, especially words in text and pictures should be well organized to present to the learners, instead of being simply piled up or listed with everything else as they are.

Secondly, in the multimedia-assisted teaching environment, teachers should still play the role of guide and lead, while students, subjects. Multimedia technology is only one of the most popular and effective means to aid ESL learning, but never the dominator or soul of the class. Education and classes should be students-oriented, rather than anything else, especially the teaching tool of information technology.

Thirdly, from technical perspective, multimedia courseware makers such as teachers should make an effort to learn and master theories of multimedia teaching and put them into practice. Pay less attention to the apparent beauty of the courseware, but more to the inner logic that serves the purpose of teaching. Try to improve the capability of courseware designing and making, avoiding aural and visual interferences brought by unnecessary information and making the best use of the advantages of multimedia technology.

5. Conclusion

In conclusion, the development of multimedia computer technology has influenced ESL education in an unprecedented way. It is changing profoundly and driving ESL teaching to develop forward, and meanwhile it exerts various adverse impacts on learners' learning efficiency in English classes. Overload information, aural and visual interference, and the shortage of affective communication in the classroom are three of the key elements that affect students' learning effect. To deal with these problems, it is suggested that learners should be oriented when designing and presenting teaching information. Taking into consideration learners' characteristics and demands is the key to increase multimedia teaching efficiency. To eliminate the side-effects brought by multimedia technology though theoretical and careful designing is the inevitable choice. It is the goal that every teacher pursues to find out how to use teaching media selectively according to the rules of language teaching itself, to integrate hardware technology skillfully into teaching activities, taking the advantages of multimedia courseware.

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