Application of Zoom in Multisensory Teaching from the Perspective of Multisensory Integration

Hai-yan Li* and Man-rui GUO
North China Electric Power University in Huilongguan, Beijing, China.
*Corresponding author

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Abstract. The thesis aims to analyze the feasibility and popularity of emerging multimedia tools like Zoom in multisensory teaching. The thesis discusses the theoretical base—multisensory integration and its application in multisensory teaching. On the base of this teaching method and with innovation in educational practice, educators are more inclined to use multimedia, especially video tools like Zoom. Besides the benefits of traditional multimedia, Zoom shows other superiorities: supporting collaborative learning, sharing texts and materials on the screen and supporting saving multimedia contents and keeping records. However, multimedia is a double-egged sword, teachers should use it properly.

Introduction

Innovation in educational practice is in demand in a changing global world. Multitudes of educators are more inclined to teach by using various video tools in mobile device. Nowadays, Zoom is widely accepted by people in teaching and learning, not only because it is convenient and entertaining, but it has strong theoretical basis—multisensory integration. This thesis is to discuss the theory of multisensory integration, its application in teaching methodology, and on the basis of that, how Zoom and other emerging multimedia become so popular and widely used in teaching and learning.

Multisensory Integration Theory

Multisensory integration is a study of how information from different modalities, such as sight, sound, touch, smell, self-motion and taste, may be integrated by the nervous system[1]. A coherent representation of objects combines modalities, through which we can have meaningful perceptual experiences. Multisensory integration is significant to adaptive behavior, because it enables us to perceive a world of coherent perceptual entities [2].

In our daily life, most of the events carry multiple informations, which were perceived by brain through different sense organs. For example, when a ball from the top of the tower drops on the ground, you may both see the falling and hear the sound when it hits the ground. From this example, we can say that when people perceive the external environment, the whole perceptual organization settle to work to grasp information in a very short time. Although the information is gathered through different sources by different organizations, it still makes up to an integration, instead of becoming independent parts, like sound, form, distance, color and material[3].

The multisensory integration works not only in quiet environment, but also works in the noise. The ability to track an individual’s speech amid other sounds retains the characterization [4]. Just as “the cocktail party problem” shows, no matter how noisy the environment is, when a person talks to you, you can still focus your attention on his talking and grasp the main idea of the speaker. In this kind of situation, a perceiver regards speech as a multimodal event, visually and audibly. And the perceiver was seen as an audio-visual synesthesia, in whom visible and audible ingredients blend so thoroughly, rather than as a blind listener or a deaf viewer [5].

The theories above are all based on the experiments. Among the researches of neuro mechanism of audio-visual integration, the most typical is that Calvert adopted Functional Magnetic resonance
imaging (fMRI) to investigate the cerebral regions activated by audio speech and silent lip reading. It drew a conclusion that when we see the movement of lip and hear the voice of the speaker simultaneously, we can find that the activation on both visual cortex and audio cortex is stronger than the activation only on a single modality.

It is confirmed that the integrating of visual and audio information does happen when perceiving. Then when does it happen during the course of processing? Andres adopted Event-Related Position (ERP) to reveal the course of the processing time in integrating of visual and audio information. It concluded that the integration happens in the early stage, but have an influence on the processing of later stage.

From the first experiment, we know that we can form coherent, valid, and robust perception by processing sensory stimuli from various modalities at the same time. The second experiment expresses that this kind of perception happens only in the early stage of the processing. For the perceiver, the perishable auditory form asks us to integrating of the constituents of speech in a very short time; once the integration is delayed, the auditory properties are lost.

Application of Multisensory Integration—Multisensory Teaching

The thesis above discussed what multisensory integration is. The following is about the application of multisensory integration, which is widely used in many fields by combining with varieties of subjects, such as teaching, linguistics, neurology and so on. In the aspect of teaching, audio-visual method, as we all know, can trace to the theory of multisensory integration based on the audiovisual perceptual organization. So multisensory integration lays solid foundation and provides theoretical support for multisensory teaching, which plays an indispensable role.

Introduction of Multisensory Teaching

Multisensory teaching means that teachers, by adopting varieties of means, stimulate students’ different senses, including auditory sense, visual sense, language, feeling and so on[6]. Multisensory teaching method stimulates learning by engaging students on multiple levels. It encourages students to use some or all of their senses to gather information, link the information with what they have already known, and tap their language or other potentials.

Most teaching in schools is done by using either sight or hearing. The student’s sight is used in reading information and looking at pictures or blackboard. The sense of hearing is used in listening to what the teacher says. However, it may be difficult for a student with learning disabilities. As a result, multisensory teaching method is widely used in this circumstance. Students with learning disabilities usually have defectiveness or not as good as others in one or more aspects of listening, speaking, reading and writing. Multisensory teaching method enables students to use their strength to make up for their weakness in learning. What’s more, this teaching method is not only suitable for students with learning disabilities, but also good for normal students. As we all know, every student has his or her own learning style, which means personal sensory learning strength. When students are taught with method consistent with their learning styles, they tend to learn more easily, faster, and can apply concepts more readily to future learning. Therefore, generally speaking, most students, with disability or not, enjoy the learning style under the multisensory teaching method.

Multisensory teaching designs diverse activities for students with different inclination in learning method and sensory preference. For visual learners, teachers can take advantage of photos, multimedia video information. For example, before students learn new words, a relevant video provides an easier and more accessible way for students to learn the words. For auditory learners, teachers can fully utilize video information. For example, students can see a fragment of American drama when learning a new sentence pattern. And for tactile learners, multitudes of activities are to the benefit of learning, which involve students in class as much as possible. Just as Albert Einstein says, “Learning is experiencing. Everything else is just information.” It means we are supposed to make use of our senses when we’re teaching and learning. It is necessary to see, touch, taste, feel, and hear the things, which helps us to learn new things better.
In summary, the application of multisensory teaching method effectively improves foreign language learning. So, to some extent, we can say that multisensory integration is the theoretical basis of multisensory teaching, and multisensory teaching is the practice of multisensory integration.

**The Characteristics of Class in Multisensory Teaching**

On the base of multisensory teaching method, and with the development of information technology, multimedia is more and more used by teachers in class, creating a new world for teaching. Under this condition, combination of the shape, sound and color, stimulates students’ multisensory when they are learning. It breaks the dead Chinese classroom situation, active classroom atmosphere, and optimize the classroom teaching. With the help of multimedia, the class presents several characteristics:

**Interactivity.** Multisensory teaching contributes to forming favorable relationship between teachers and students, students and students as well as teachers and texts. In the learning environment of images and sounds, students perceive, communicate and practice in a vivid situation. Through imitating and dubbing, students view the class as their own stages. Under this circumstance, it is easy for them to be relaxed and initiative to seek knowledge.

**Diversity.** This characteristic means more than two modalities, the channel by which signs are transmitted, act to work in the class. The visual modality includes subtitle and listening text, while the audio modality includes singing and listening material. Two different kinds of modality supplement each other and play diverse roles which are devoted to students’ memory. Although it may be impossible for students to change the information into long-time memory in a short time, it provides a recipient and impressing way for them to make the transformation from the short-time memory to long-time memory.

**Openness.** With the help of computer assisted teaching, the multimedia teaching changes the mode and form of the class, which asks students to pay more attention to self-regulated learning. Therefore, students themselves become the subject of cognition. This, to a great extent, improves their input and output abilities.

**The Video Tool Zoom in Multisensory Teaching**

As the global world changes, modern education makes a request of innovation in educational practice. And teachers are being encouraged to become more skillful to use technology in teaching learners. More and more teachers not only adopt multimedia teaching, but also tend to choose video tools in mobile device, breaking the traditional multimedia teaching in fixed classroom.

**Background**

Multimedia teaching can largely provide concrete benefits to students who are audio and visual learners, but the traditional way has some shortcomings. First, it is almost used in a fixed classroom and can’t be adopted to distance learning. Second, the class time is limited, so teachers have not enough time to interact with students deeply and acquire the effective feedback. Under this situation, a new kind of multimedia emerged.

Nowadays, smartphone become the fastest spreading technology. In this new smartphone-obsessed world, multitudes of people are more inclined to study and communicate by using various video tools in mobile device such as WeChat, QQ, WhatsApp, Skype and more [7]. Teaching and learning with them are attractive, effective in cost and suitable for distance learning. In china, people prefer to choose WeChat, which is convenient especially for tutors. With a mobile device, they teach at anytime and anywhere, which is a kind of important method of distant teaching. While there is an apparent disadvantage of it, text can’t be showed on the screen, so it is not an ideal tool for visual learners. Under this condition, Zoom comes into our sight.
Zoom in Multisensory Teaching

Zoom, produced in 2011, is most known for Zoom Video Conferencing. It combines video conferencing, online meetings, and mobile collaboration into one platform [8]. Zoom featured the ability to host conferences with up to 50 participants now. Based on the functions of the apps above, it shows other superiorities:

First of all, it supports collaborative learning, each group accommodating up to 50 members. Usually in traditional class, we can only hear the teacher’s voice, but can’t capture what other students’ thought and answer, because their voice is too low to hear. While, with Zoom, everyone’s voice can be spread clearly and loudly in an order. So it is good news for audio learners.

Secondly, during the course of teaching in Zoom, not only teachers can show texts and other studying materials on the screen, but also other learners have chances to share their own understanding of a topic and the homework they prepared. Different from classroom teaching, where teachers teach almost through the whole class, in Zoom every participant can also attempt to play a role of teacher. This is excellent for visual learners who prefer video teaching. Through screen, they can take notes or just have a screen capture when there is some important information needed to be written down.

Thirdly, it supports saving multimedia contents and keeping records, which can help learners to review the contents quickly and easily after teaching. Sometimes students can’t keep up with the pace of their teacher, and feel confused after class. And with this function of Zoom, students can review the knowledge after class themselves immediately.

It is fun, effective, and beneficial for us all to implement technology in the classroom. These technologies are especially of assistance to learners who are audio and visual learners. Instructional technology, like Zoom, provides wonderful tool for teaching and learning in the future, and it is an easy way to build bridges between teachers and young students.

Strategies of Using Multimedia for Teachers

A teacher, as the master of the class, should not only know the professional knowledge of a certain field, but also know how to use multimedia apps and internet as well as possible in teaching, in order to create a vivid context. However, multimedia is a double-edged sword. On one hand, it can focus learner’s attention on the point of the knowledge and play a part in strengthening memory, if it is well used. On the other hand, learner’s attention and memory will be disturbed if it is used incorrectly [9]. So teachers are supposed to use it scientifically and appropriately. For teachers, there are at least 3 things they should do:

First, improve language ability, especially English communicative competence. It is necessary for English teachers to have professional quality. In this way, students can improve their spoken language, listening competence and communicative ability by imitating them. Second, learn to master multimedia technology and internet skills. With the development of modern technology, teachers should keep up with the trend and draw the advanced equipment to enrich the teaching. Third, strengthen to regulate the autonomous learning mode. Although multimedia is helpful in learning, it is not wise to let students have decision-making power totally, for most of them are not possessed with self-control ability [9]. So it is necessary for teachers to make specific study requirement and supervise and urge students to accomplish the tasks.

Summary

All in all, a perceiver treats speech as a multisensory event, sampling visually and auditory, no matter in quiet or noisy environment. From multisensory integration, we know how information from different modalities integrated by perceptual organization. As more and more experiments verify the rationality of the multisensory integration, multisensory teaching is widely used in class, because most students, with disability or not, enjoy the learning style under this method. With the help of multimedia, especially various video tools, like Zoom, students can learn in an active and effective way, but the opposite effect of multimedia also asks educators to use it scientifically and
appropriately. With the fast development of society, it is obvious that, in the future, the instructional technologies may become an indispensable part in teaching and learning.

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