

Analysis on Psychological Effects in Multimedia Teaching

Xiaoqin Xu

Modern Educational Technology Center of Wuhan University of Technology, Wuhan, Hubei Province, China

Keywords: Multimedia Technique; Multimedia Teaching; Computer Technology; Psychology.

Abstract: In the field of information technology, multimedia is the most active technique with the highest development speed. In the twenty-first century, computer multimedia technology, which integrates text, graphics, animation, voice, video and other kinds of media, is an important branch of computer science and technology. This paper summarizes the concept of multimedia technology, and analyzes its characteristics: conformity, integration, multidimensional, digitization and distribution. Multimedia teaching is carried out on the basis of these features. The multimedia teaching techniques depend not only on computer technology, but also on learners' psychological characteristics and basic education principles.

1. Introduction

With the rapid development of computer technology, multimedia technique with its unique merits receives increasing attention, and is applied to various fields. It changes the traditional way of working and living, and has a great impact on the development of human society.

1.1 The connotation of multimedia technology.

The so-called multimedia is a kind of human-machine interactive media deals with information communication and dissemination; it combines two or more kinds of media, including text, image, graphics, animation, audio and video. Various media with different forms integrate with each other, trying to achieve combined action.

1.2 The features of multimedia technique.

Digitization. Multimedia information has a digital network structure, which can be transmitted with high speed through broadband network.

Distribution. The interactivity of computer can be achieved; the distribution of network and the comprehensiveness of multimedia information link the fields of computer and communication.

Multidimensional. Multidimensional pattern construction is realized.

High level of conformity. Various kinds of sensory cognition, diversified equipment, multiple disciplines and fields integrate with each other and form an organic whole.

High level of integration. The collection of text, graphics, images, sound, animation, film and television forms a comprehensive system.

1.3 The advantages of multimedia teaching.

Multimedia technology is expressive and controllable. It can clearly represent some graphics, images and complex spatial structures which cannot be expressed through language or words.

Multimedia technology enhances the sense of the times of teaching content, and makes teaching methods, teaching approaches and teaching means more flexible and convenient.

The use of multimedia teaching saves a lot of time for teachers in blackboard writing; teachers can impart more content in a short period of time, and improve the efficiency of classroom teaching.

Multimedia technology has strong reproducibility. In the process of teaching, teachers can repeatedly represent important contents according to their needs, which can facilitate the connection of teaching contents, and deepen students' understanding and memorization.

The multimedia courseware made by teachers is easy to copy; students are able to review through

the courseware after class.

2. Analysis on Multimedia Teaching and its Psychological Effects

Interactive teaching achieved through multimedia computer is helpful to arouse students' learning interest, and emphasizes their role of cognitive subject. The multimedia computer technique combines the audio-visual integration function of TV with the interactive function of computer, and produces a new interactive way of human-machine interaction with colors, texts and pictures. Instant feedbacks are realized. This kind of interaction is of great significance for teaching process; it can effectively stimulate students' learning interests and learning desire, so as to form the learning motivation. Interactivity is the unique feature of computers and multimedia devices. Thus, multimedia computer technique is not only an approach of teaching, but also an important factor of changing the traditional teaching mode, and even the teaching thought.

The external stimuli provided by multimedia computers are not a single stimulus, but comprehensive stimuli for a variety of sense organs. It is very important for the acquisition and maintenance of knowledge. A large number of experiments have proved that for human beings, 83% information comes from watching, 11% comes from hearing, 3.5% from smelling, 1.5% from touching, and 1% from tasting. The multimedia can not only be seen, but also be heard, and be operated by hands. The large amount of information obtained through multiple sensory stimuli is much stronger than knowledge acquired through mere listening. Information and knowledge are closely related. A large amount of knowledge can be learned by students through acquiring a lot of information. A large number of experiments also proved that, people usually can remember 10% of their reading content, 20% of their listening content, 30% of their watching content, 50% of listening and watching content, and 70% of communication content. That is to say, if students can hear and see the information, and then express it in their own language through discussion and communication, knowledge retention will be much stronger than that of traditional teaching. This means that the application of multimedia computer to teaching process is not only conducive to the acquisition of knowledge, but also beneficial to the maintenance of knowledge.

The basic principle of multimedia technology goes as following. Through the organic combination of text, images, audio, video, animation and other media, multi sensory stimulation to students are achieved to make the abstract content concrete and visualized, so as to deepen students' impression, and help them to understand, memorize and analyze the knowledge. It can be seen that the psychological effects of multimedia teaching are very huge.

2.1 Visual effect.

The emergence of multimedia teaching technology increases visual modes of material presentation. Visual materials include text information, graphic image information and video information. Visual information is integrated into multimedia information through the digitization process of visual media technology.

In order to make the visual materials of the multimedia teaching be accepted by learners, visual psychological characteristics of people should be considered. That is, the three visual effects caused by the three physical characteristics of lights should be taken into account. The stimulus of vision is light, and lights are electromagnetic waves. The frequency spectrum of electromagnetic wave is very wide; lights with wavelength from 0.76 μ m to 0.38 μ m are visible light of red, orange, yellow, green, green, blue and purple. The wavelength (or frequency) corresponds to the hue of light. The visual perception of different light is related to the brightness (or intensity) and saturation (or chromaticity). The so-called brightness (or intensity) is the vibration amplitude of visible light wave, which is the description of the intensity or brightness. The degree of saturation is the purity of the emitted or reflected light, which is the proportion of various monochromatic lights. The relationship between hue, intensity and saturation should be fully considered to give learners the best visible sense of vision. Red, orange and yellow are warm colors; they make people feel warm and excited. Blue, purple and green are neutral colors; they make people feel elegant, light and soft. Purple, blue purple and blue green are cold colors; they make people feel quiet and comfortable. Bright colors have great

influence on people's emotions. Bright colors bring burning sensation; light colors bring simple and elegant feelings. Indoor light devices should be used to adjust the light. Secondly, visual processes should also be considered during the multimedia teaching process. Seeing with eyes is a process of encoding. Different nerve cells in retina have their respective functions; different cells stimulate and reaction to information with different characteristics respectively like a computer system, and then encode the information. The encoding process is the identification of image. Therefore, multimedia teaching should make use of the features of information and human vision. The horizontal movement of human eyes is faster than vertical movement; long time vertical movement is more easily to bring fatigue. The size and proportion on horizontal level are more accurate than those in vertical direction. In horizontal direction, the efficiency is high, and the error is small. Eyes are used to move from left to the right, from upper parts to lower parts. We see circles clockwise, and we rank these four quadrants from superior to inferior: the upper left, the upper right, the lower left, the lower right. These features should be considered in multimedia layout. The recognition of target in the best range of vision is rapid and accurate, and it is not easy to cause visual fatigue.

2.2 Audio effect.

In the multimedia teaching process, audio and visual effects are closely linked. Auditory materials are mainly composed by sound, including language information, music information and the effects of different sound. The information is integrated into multimedia information through audio media technique. In order to make the auditory material of multimedia teaching be accepted by learners more easily, the auditory psychological effects of the people must be taken into account. Specifically speaking, the auditory psychological effects include three physical characteristics of sound, namely tone, intensity and timbre. From the perspective of physical properties of sound, the three kinds of attributes of sound are vibration frequency, vibration amplitude, and the multiple relations between pitch and harmonic. People have different sensitivity to different tones. Sounds can be divided as audible sound, ultrasonic sound and infrasound sound from the angle of auditory. Human cannot hear infrasound and ultrasonic sounds. Human can hear sound with the frequency of 16~20000 Hz, and are especially sensitive to sound of 500~4000HZ; sound system is sensitive to that of 1000~3000HZ. It is not sensitive to sound intensity, and the sensitivity is not a linear relationship but a logarithmic relationship. That is, when the sound intensity increases 10 times, the sense of intensity increases only 1 time. People can tell the direction of sound through sound intensity and the arrival order when sound comes into two ears. Hearing sensitivity decreases with time. If the sound intensity is not big, and the time is not long, the hearing organs can be restored after sound stimulation stops for 10~20 seconds. If the sound is strong, and the time is long, hearing fatigue appears. Hearing fatigue takes hours, and even a few days to disappear. Strong sounds can cover up light sounds, so the useful information must be stronger than the noise of environment for 10dB. It is suggested that the interval signal with the frequency of 500HZ~3000HZ should be used, which can be heard by human clearly, and does not cause hearing fatigue.

2.3 Brain stimulation and fatigue effects.

Human physiological and psychological factors affect the potential of human beings in a variety of forms; excitement and fatigue of brain is one of them. When the brain is excited, it follows the procedure of stimulation sensation judgment action. High excitement degree will lead to quick acceptance of knowledge. During fatigue moments, hypoesthesia occurs, while sensitivity degree decreases, which lead to psychological inattention, slow thinking and response, as well as irritable moods: these are not conducive to the acceptance of knowledge. People's reflection on information enhances with the increase amount of information. But after information exceeds brain capacity, efficiency decreases, and error rate increases. The sense of human and brain are greatly influenced by the external environment of education. Therefore, the environment temperature of multimedia classrooms should be 19 ~21 C. The standard temperature is 21 + 3 C, which is the most comfortable for human beings.

3. Necessary Improvements in Multimedia Teaching and Countermeasures

Multimedia technology helps us to realize multimedia teaching, but the traditional teaching method cannot be abandoned. Multimedia teaching saves a lot of time for blackboard-writing and improves teaching efficiency. But during teaching process, key and difficult points, reasoning process and conclusion should be written on the blackboard as before, which is convenient for students to understand, memorize and review. Different curriculum has different features; teachers need to choose teaching methods accordingly, and achieve better effects through the combination of the two methods.

Teachers should pay attention to the speed of multimedia teaching. The teaching process cannot be too fast to be followed by students.

In multi-media teaching process, teachers and students should interact with each other, in order to give full play to the interactive teaching method which is provided by multimedia technique. Both teachers' leading role and students' dominant role should be fully played. The two-way communication between teachers and students should be realized to avoid the transformation from "repeat what the book says" into "repeat what the courseware says", and to create a lively classroom atmosphere.

Increase support in investment and multimedia equipment maintenance. For instance, in the Yu District of Modern Educational Technology Center of Wuhan University of Technology, the new multimedia classroom of Nan Lou is upgraded. Advanced and well protected hardware is an important guarantee for good multimedia teaching effects.

4. Conclusions

This paper analyzes the connotation of multimedia, points out the characteristics and advantages of multimedia teaching, analyzes students' physiological and psychological features, and proposes measures to improve multimedia teaching effects. When analyze related skills of multimedia teaching, we also need to pay attention to the psychological factors of learners. When design and construct multimedia classroom, the size and position of screen should be taken into consideration since these factors influence distance and angles of viewers. We should not only consider the physiological and psychological effects of beneficiaries, such as the vision and hearing effects, but also consider physical and psychological factors such as sitting position, brain excitement and brain fatigue, in order to provide the most appropriate environment. Multimedia hardware facilities should be well protected. Multimedia courseware makers should take into account of learners' physiological and psychological factors. It is also necessary for them to consider psychological factors such as position relationship, brain excitement and brain fatigue, so as to fully play the role of multimedia and improve the teaching effects. The combination of technology and psychology can help us to achieve the best teaching effects.

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