

Application of Multimedia Information Processing in English Flipped Classroom Teaching in the Age of Internet of Things

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Abstract: Since the implementation of the new curriculum reform, the content of English teaching has paid more attention to cultivating students' interest in learning and thinking ability, the flipped classroom has developed along with the trend of the times. Although flipped classroom gives students the initiative in the classroom, the students are generally not motivated and dare not ask questions, and the effect is not ideal. In the era of Internet of Things, multimedia assisted English classroom teaching has become a trend. Multimedia information processing technology screens, processes and displays information, stimulates students from multiple senses, and optimizes the English flipped classroom teaching process. This document has mainly studied the application of multimedia information processing technology in the English flipped classroom, and explored the teaching effect of the English flipped classroom after the introduction of multimedia technology. In this paper, multimedia information processing technology has been studied from three aspects: video technology, audio and image technology. The instantaneous frequency of the signal is calculated by the Hilbert transform, and the probability density is compared by the Gaussian mixture model, so as to improve the multimedia information processing process. Through the request test of multimedia information processing technology in English flipped classroom, the results are obtained: the learning efficiency of English flipped classroom using multimedia information processing technology has increased by 7.19%. Student academic performance has also improved. In multimedia classrooms, students are more willing to actively interact with teachers, stimulate their learning interest and have stronger experience. English teaching based on Internet of Things and multimedia information processing technology can promote the modernization of teaching methods and the diversification of teaching content. It is very beneficial to cultivate compound talents.

1. Introduction

With the implementation of modern information software, as a new generation of teaching reform, flipped classroom is slowly being adopted by more and more individuals, and it creates a new model for curriculum reform. The flipped classroom is widely used in various subjects, and English as a language skills training course is gradually adopting this teaching mode. At present, the Internet of Things technology has been widely used in the field of education and teaching, especially the construction of multimedia teaching resources integrated with information technology and curriculum has become an important direction of the current teaching reform. The most extensive and earliest application of multimedia technology is in the field of education, which has benefited many students a lot. However, how to use multimedia information processing technology to attract students' attention, induce and encourage students to develop interest in learning, enhancing teaching effects in the process of flipped classroom teaching is what should be paid more attention to now.

The flipped classroom has gradually become one of the hotspots of contemporary education, and many scholars have done research on the flipped classroom. Burak A has effectively released the motivation of students to learn independently through flipped classroom teaching practice [1]. Chi C has quantitatively analyzed whether the flipped classroom teaching method is helpful for students to improve their knowledge of course topics, and the results have been unanimously affirmed by students [2]. Yang Y has explored and improved the design of flipped classroom teaching in order to achieve students' scientific literacy requirements and mobilize students' interest and enthusiasm [3]. Kostaris C has studied the effect of flipped classroom teaching method in the teaching of information technology in primary and secondary schools to enhance students' learning experience [4].

Christopher R has found that the flipped classroom is increasingly used in undergraduate medical education, where learning content is exposed through online resources, and face-to-face classroom time is used for student-centered activities to promote active learning [5]. Baytiyeh H has investigated the effectiveness of the flipped classroom model in teaching, enriching students' learning experience and developing the soft skills students need to be successful in any career [6]. Gough E has studied the relationship between flipped teaching and teacher-student interaction, and the flipped classroom creates time for active learning and higher-order thinking, increasing the effective communication between students and teachers [7]. Flipped classroom can encourage students' creativity for learning, and is an effective teaching form to lead students to consciously move towards deep learning.

With the growth of information technology and network systems, multimedia technology has been commonly used in various fields of community. Wei has devoted himself to the analysis of cloud computing-assisted multimedia conference system, which distributes images, voice, text, pictures and other information to the terminal devices of each user, so as to enhance the information exchange and content comprehension ability of both parties in the conference [8]. Chenguang Z has explored the effectiveness of multimedia information technology-led teaching mode, which not only improves students' academic performance, but also improves students' behavioral skills and independent thinking ability [9]. Fan C has introduced multimedia technology into modern aerobics teaching, changed the traditional teaching mode, and improved teachers' proficiency in using multimedia systems and teaching quality [10]. Wang F has established a multimedia teaching platform, and has implemented specific educational and instructions according to different factors of each student, creating more captivating teaching content, stimulating students' initiative in learning, and ensuring teaching efficiency [11]. Zhou Z has proposed a three-dimensional construction of Huizhou environment by combining multimedia technology and geographic

information database, enriching the language and thought of contemporary landscape, and creating a more humanized landscape space with the characteristics of the information age [12]. Xin M has assisted efficient art teaching through multimedia, and has expanded the resources of art teaching in colleges and universities to improve the learning ability and artistic quality of college students [13]. Li X research has found that multimedia information technology has been integrated into college English classrooms, improving the design, development and management of college English teaching, and promoting teaching reform [14]. The form of educational informatization presents various characteristics, and multimedia information processing technology also presents the icing on the cake in teaching activities. It makes the collection of classroom resources more timely, the classroom display more three-dimensional, the students' learning process more interesting, and the learning form more concise and efficient.

The flipped classroom has subverted people's previous perception of the way teachers teach. Since the implementation of this model, the abilities of both students and teachers have been greatly improved. As a language subject, English pays more attention to students' oral expression ability in flipped classroom teaching, and multimedia is closely related to life. It can help students quickly master the language of daily life. This paper has mainly explored the auxiliary role of multimedia information processing technology in the teaching of English flipped classroom.

2. Advantages of Multimedia Technology in English Flipped Classroom Teaching

2.1. English Flipped Classroom Teaching Mode

With the continuous development of globalization trend, people use English more and more in their daily work and students' study. The importance of English is self-evident, and it is not easy to learn English well. As a language subject, it is ultimately inseparable from the four aspects of "listening", "speaking", "reading" and "writing". Learning these four aspects well requires schools to build a wonderful language classroom environment for students. The flipped classroom model is favored by schools and teachers because it creates a good atmosphere of language interaction between teachers and students. Through the online education platform, teachers provide learning videos to students before class. After students study independently, they can actively interact with teachers and classmates in class to discuss problems together. This is called flipped classroom. Figure 1 shows the basic teaching mode of English flipped classroom.

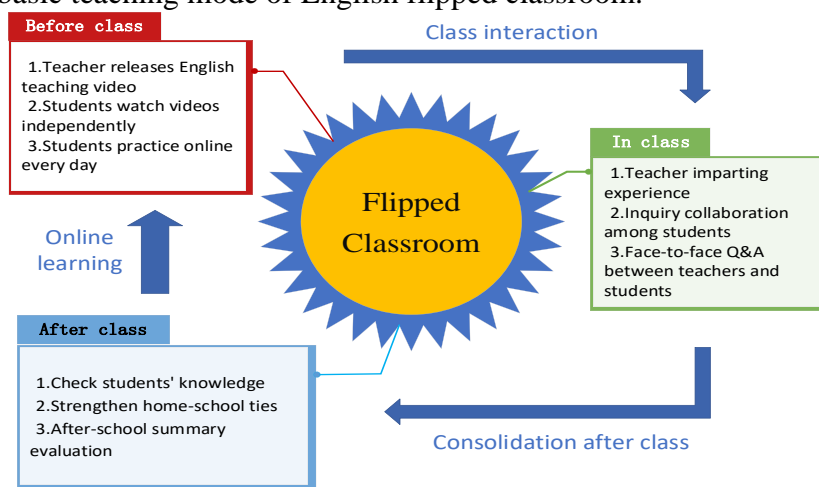


Figure 1: English flipped classroom teaching mode

As shown in the figure, the English flipped classroom is a cyclical movement. Like the traditional classroom, the flipped classroom is also composed of three parts, and these three parts

are closely combined, but the traditional classroom generally focuses on the teacher's unilateral explanation, and the students passively accept the experience and knowledge passed on by the teacher, ignoring the students' subjective initiative. In flipped classroom, students are encouraged to study independently before class, and students are encouraged to express their opinions in class, and students dare to think and speak out of curiosity. In this way, students gradually learn to learn actively, and the flipped classroom is student-centered, which is beneficial for teachers to design teaching links, ensure students' in-depth learning, and gain a sense of achievement [15].

The core difference between the flipped classroom and the traditional classroom is that the traditional classroom is centered on "teaching first and then learning". The flipped classroom is centered on "learning first, then teaching". The specific comparison of the two is shown in Figure 2.

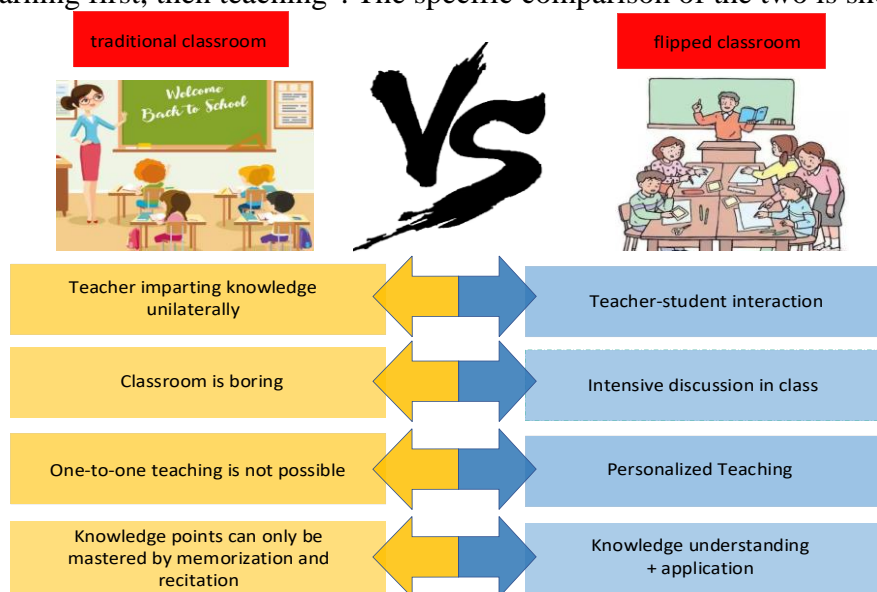


Figure 2: Comparison of flipped classroom and traditional classroom

As shown in the figure, in the traditional classroom, the teacher is the disseminator of knowledge and the manager of the classroom. Students can only rely on rote memorization to master the knowledge points, and the classroom is boring. In addition, with the rapid development of information explosion and network technology, the emergence of new media such as the Internet of Things has given students more extensive and comprehensive opportunities to contact with new knowledge, and the traditional classroom teaching model is increasingly unable to adapt to modern education reform and innovation. In the flipped classroom, students actively research knowledge, and teachers are only facilitators of learning. Teachers can provide personalized teaching according to the different learning levels of students. Students have already mastered what they have learned before class. In the classroom, teachers can have more time to answer questions and interact, and students can understand and apply. In this way, the motivation to learn will be stronger, and the confidence will be more abundant.

The introduction of the flipped classroom teaching method into the English subject can promote students' enthusiasm and initiative in learning, and stimulate them to actively acquire knowledge and skills in the classroom. However, there are still some challenges in this process, which need to be further considered and solved.

First: develop high-quality learning resources. Standardization of the flipped English classroom requires the design and development of better instructional videos. However, the development of high-quality video is not something one or two teachers can do. The production of high-quality English videos requires the joint efforts of English teachers.

Second: improve teachers' information technology teaching ability. The blended teaching method adopted by the flipped classroom not only requires teachers to change their teaching strategies, but also challenges their informatization teaching ability. On the one hand, teachers have high standards on the level of information technology when making teaching videos. Incorporating visuals, interactivity, and topical points into concise videos is key to guiding students to actively engage before class. On the other hand, teachers also need to have the ability to build online courses, use information technology to establish a network interactive platform, and use technical means to maximize the effect of the course.

Third: strengthen students' autonomous learning ability. Whether it is the self-learning of pre-class teaching videos or the interaction of all aspects of the classroom, it needs to be based on the students' good self-learning ability. During the teacher's explanation, the students' attention is easily distracted, and the cognitive ability and self-learning ability need to be further strengthened.

No matter how difficult the process is, the construction of the English flipped classroom teaching model is undoubtedly a beneficial exploration and attempt. This paper has introduced multimedia information processing technology into English flipped classroom teaching. With the in-depth research and further practice of this teaching mode, English flipped classroom teaching will also enter a new stage of development.

2.2. Technical Structure of Multimedia Information Processing

Driven by the rapid development of the education industry and Internet of Things technology, multimedia has been rapidly progressed and promoted. Multimedia has become very common in work and life. But everyone's understanding of multimedia information processing technology is only superficial. Multimedia has penetrated into every aspect, including: audio technology for sampling, compression, synthesis, processing, speech recognition, etc., and video technology for image processing and graphic dynamic generation. Image compression, image recognition image technology, and the technologies are integrated together to make multimedia more graphical and visual. Through technical standardization specifications, audio, video, and images can also be comprehensively processed to make the the presented results clearer [16]. Multimedia plays an irreplaceable role in the convenience of processing information. Multimedia can be seen everywhere, affecting people's perception. Figure 3 is a structural diagram of multimedia information processing technology.

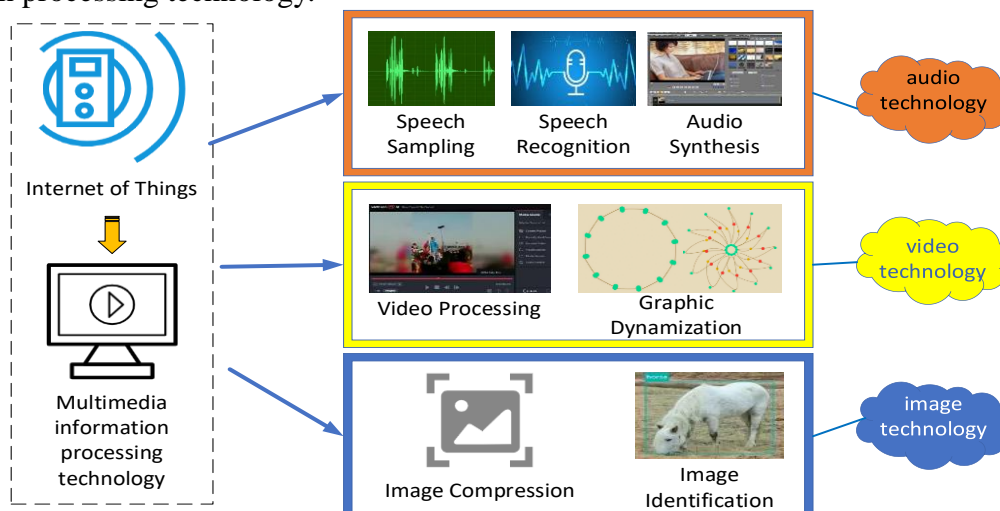


Figure 3: Multimedia information processing technology structure diagram

As shown in the figure, multimedia information processing technology is mainly composed of

audio technology, video technology and image technology. Images serve as a backing for video. It mainly includes image compression and image recognition. The process of dynamically processing the recognized images is video processing technology. Video technology is the core technology of multimedia applications. The video and audio that have been edited by video technology are synthesized to form a complete multimedia video. The main work of audio technology includes audio capture and speech recognition in addition to audio synthesis. Under the interaction of these basic technologies, multimedia information processing technology provides favorable conditions for multimedia teaching.

2.3. Teaching Mode under the Action of Multimedia in the Era of Internet of Things

The Internet of Things is a new generation of information infrastructure developed after computer, Internet and mobile communication. In the field of social education in the future, people will increasingly use the new media platform based on the Internet of Things technology to help students complete their learning tasks and realize the organic combination of knowledge and ability, process and method, emotional attitude and values. With the rapid development of modern information technology and multimedia education, multimedia information processing technology has been widely used in school education. It is widely sought after by teachers and students. It is because the use of multimedia technology in teaching can make theoretical knowledge visualized, specific and intuitive. For content that is not clear enough in language, multimedia technology can be used to add pictures, animation effects and sound effects in teaching. It makes information transfer easier. Figure 4 is a teaching process diagram using multimedia information processing technology.

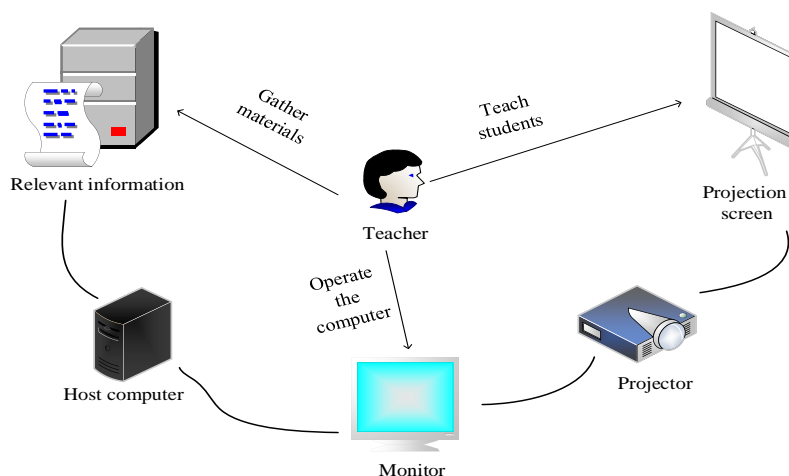


Figure 4: Diagram of the teaching process using multimedia technology

As shown in the figure, the teacher plays a decisive role in using multimedia in the flipped classroom. First, teachers need to collect and integrate information related to classroom content through various channels. Then multimedia technology is used to elaborate courseware and design teaching links. Finally, the finished courseware can be put on the screen through the projector and other equipment. In this way, English flipped classroom teaching can be carried out by using multimedia teaching methods. Multimedia can integrate pictures, texts, sounds, images, etc. into an integration, allowing various information to cross-appear, helping students achieve the best effect of acquiring a large amount of knowledge information in a short period of time.

2.4. Advantages of Multimedia Information Processing Technology in English Flipped Classroom

2.4.1. The teaching Process is More Interesting

Since the implementation of the new curriculum reform, teachers have been exploring new teaching methods. The role of multimedia technology in supporting classroom teaching is becoming more and more obvious. Through multimedia, teaching information can be displayed, viewed and processed intelligently. The rich resource combination, vivid scene playback, audio view, etc. substitute English learning into a relaxed and comfortable environment. For example, when learning new words, teachers apply some related small videos and small games to multimedia. By playing real sounds to assist students to increase memory points, the classroom atmosphere is activated, making the learning process more interesting.

2.4.2. The Teaching Process Display is More Intuitive

Students have less life experience and lack personal experience of the content described in the textbook. At this time, multimedia comes in handy. It "moves" real life into the classroom through various information processing technologies, and helps students gain physical experience from hearing and vision. The immersive feeling turns the abstract into concrete, and through the authentic real language environment, one can vividly and intuitively experience the charm of the language.

2.4.3. Teaching Results are More Effective

The communication time in class is limited. In the past teaching activities, teachers usually spend a lot of time explaining the background, basic knowledge, explaining vocabulary and so on. These complicated and trivial matters occupy half of the classroom time, and the use of multimedia information processing technology can easily address this problem. Teachers prepare courseware in advance before class, increase the time for communicative training in the classroom, and improve the efficiency of teachers' teaching and students' learning.

The application of multimedia information processing in English flipped classroom teaching in the era of Internet of Things is conducive to the integration of traditional teaching and new media technology, and the construction of a more efficient and complete English teaching environment. It can not only promote students' independent inquiry learning, but also cultivate their good innovative thinking and practical operation ability. It can also stimulate students' interest and form certain hobbies and lifelong learning habits, improve students' English listening comprehension and reading ability, and effectively improve the efficiency of English learning.

3. Related Technologies of Multimedia Information Processing

3.1. Video Processing Technology

Moving object detection is a method of extracting moving objects from video images and obtaining the characteristic information of moving objects, such as color, shape, outline, etc. The difference method between consecutive frames is a commonly used detection method. By performing differential operations on consecutive images, the pixels respectively to different frames are subtracted to find the absolute value of the grayscale difference. If the absolute value exceeds a certain threshold, it can be regarded as a moving target [17].

The images of the n th frame and the $n-1$ th frame in the video sequence are denoted as G_n and

G_{n-1} , and their corresponding gray values are denoted as $G_n(a,b)$ and $G_{n-1}(a,b)$, then the difference image K_n is:

$$K_n(a,b) = |K_n(a,b) - f_{n-1}(a,b)| \quad (1)$$

Then the image containing the full moving target is:

$$S_n(a,b) = \begin{cases} 255 & K_n(a,b) > B \\ 0 & \text{else} \end{cases} \quad (2)$$

Among them, B is the threshold value, the pixel point whose gray value is 255 is the foreground point, and the gray value is 0 is the background point.

3.2. Audio Processing Technology

Speech stream detection is one of the important contents in audio information processing. Speech stream is a kind of non-stationary signal, and Hilbert-Huang transform is an effective tool to deal with non-stationary signal, which can be used for time-frequency analysis of signal [18].

3.2.1. Instantaneous Frequency

The Hilbert transform is defined as:

$$Y(t) = \frac{1}{\pi} p \int_{-\infty}^{+\infty} \frac{X(t)}{t-T} dT \quad (3)$$

Among them, p represents the principal value of Cauchy, and $X(i)$ represents any non-stationary time series signal.

It can be seen from Formula 1 that the analytical signal $S(i)$ corresponding to the complex conjugate pair $X(i)$ and $Y(i)$ is:

$$S(i) = X(i) + mY(i) = d(i)e^{j\theta(i)} \quad (4)$$

$d(i)$ represents the instantaneous amplitude, and $\theta(i)$ represents the instantaneous phase.

$$d(i) = \sqrt{X^2(i)Y^2(i)} \quad (5)$$

$$\theta(i) = \arctan\left(\frac{Y(i)}{X(i)}\right) \quad (6)$$

It can be seen from Formula 1 that the instantaneous frequency can be obtained by derivation of the instantaneous phase:

$$w(i) = \frac{d\theta(i)}{di} \quad (7)$$

Then the phase derivation of the analytical signal is:

$$f(i) = \frac{1}{2\pi} \frac{d\theta(i)}{di} \quad (8)$$

3.2.2. Hilbert-Huang Transform

After Hilbert-Huang transform, the instantaneous phase, instantaneous envelope and instantaneous frequency of the signal at any time can be obtained.

The Hilbert transform of the function $G(i)$ is defined as:

$$F(i) = H[G(i)] = \frac{1}{\pi} P \int_{-\infty}^{+\infty} \frac{G(B)}{i - B} dB \quad (9)$$

P is the principal value of Cauchy, namely:

$$F(i) = H[G(i)] = g(i) * \frac{1}{\pi i} \quad (10)$$

Then the frequency domain response of the Hilbert-Huang transform is:

$$H(jw) = \begin{cases} -j, & w > 0 \\ j, & w \leq 0 \end{cases} \quad (11)$$

3.3. Image Processing Technology

3.3.1. Pixel Estimation Method

Image compression has always been a technical hotspot. It has huge potential value and is the basis for processing computer images and videos. Currently, pixel estimation is a commonly used background initialization algorithm in image compression processing [19].

To use the pixel estimation method, it is necessary to first calculate the median time gray value of each pixel point according to the N frame image before the current frame, and then select the pixel point with the same brightness value to generate the background. Assuming that U is a set of N frame image sequences, $U^k(m, n)$ represents the pixel gray value at the pixel point (m, n) in the k th frame image. The mean value of each pixel in the set U is $\mu(m, n)$ and the variance is $\sigma(m, n)$, then the background model at the pixel point (m, n) can be expressed as:

$$B(m, n) = [m_n(m, n), m_x(m, n), d(m, n)] \quad (12)$$

$$\begin{bmatrix} m_n(m, n) \\ m_k(m, n) \\ d(m, n) \end{bmatrix} = \begin{bmatrix} \min_z \{U^z(m, n)\} \\ \max_z \{U^z(m, n)\} \\ \max_z \{U^z(m, n) - |U^{z-1}(m, n)|\} \end{bmatrix} \quad (13)$$

z satisfies the condition:

$$|U^z(m, n) - \mu(m, n)| \leq 2\sigma(m, n) \quad (14)$$

All invariant points in the set U are composed of $U^z(m, n)$.

3.3.2. Mixture Gaussian Model

Mixture Gaussian background modeling is a background representation method based on pixel sample statistics. It describes the shape, size and location of objects in images with features such as

different colors, textures and contrasts, and combines various processing techniques to achieve classification and recognition of the environment [20].

It is defined pixel process λ as:

$$\lambda = \{x_m = I_m(x, y)\}_{m=1}^n \quad (15)$$

$I_m(x, y)$ represents the gray value of the m th frame image of the pixel point (x, y) .

Then the probability density of the mixture Gaussian model is:

$$f(x|o) = \sum_{i=1}^k w_i g(x|o_i) \quad (16)$$

k represents the k Gaussian distributions given by the pixel, and o represents the set of model parameters.

$$o = \{w_i, o_i\}_{i=1}^k \quad (17)$$

The weight of the i -th Gaussian component C_i is:

$$\sum_{i=1}^k w_i = 1 \quad (18)$$

$$o = \{\mu_i, \sigma_i^2\} \quad (19)$$

μ_i represents the mean of C_i , and σ_i^2 is the variance.

The probability density P can be expressed as:

$$P(x|o_i) = \frac{1}{\sqrt{2\pi o_i}} e^{-\frac{1}{2} \left(\frac{x-\mu_i}{o_i} \right)^2} \quad (20)$$

4. English Flipped Classroom Experiment under Multimedia Information Processing Technology

4.1. Experimental Method

The teaching design of the English flipped classroom was set up, and set up the experimental group and the control group. The experimental group established multimedia technology teaching method. The control group established the traditional situational teaching method to teach the same content to the parallel classes A and B for a week. Finally, 5 students were selected from each of the two classes to analyze and compare the teaching effects from four perspectives: grades, initiative, learning experience, and learning efficiency. Class A is the experimental group and class B is the control group. The 5 students selected from class A are group A, numbered A1-A5, and the 5 students selected from class B are group B, numbered B1-B5. The experimental results are sorted out, and the effect of multimedia information processing technology on the English flipped classroom is analyzed.

4.2. Data Analysis

4.2.1. Results Comparison

The two classes were given a one-week teaching task. During the teaching process, the two classes were tested in the classroom every day, with a full score of 100 points. The results of the selected 10 students are shown in Figure 5.

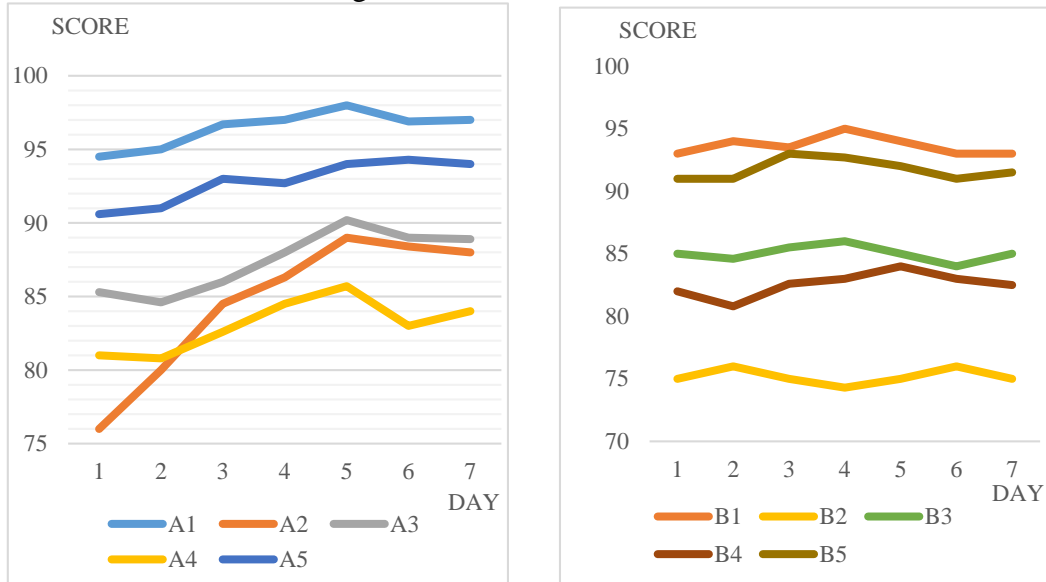


Figure 5: Academic performance comparison

As can be seen from Figure 5, before the start of the experiment, the selected 10 students were basically at the almost same level. A week later, class B who used the traditional teaching method did not change. The grades of A class of students have been significantly improved, and with the growth of time, the grades of the English flipped classroom using multimedia technology are getting better and better. Among them, the A2 grades have improved most obviously, indicating that the lower the starting grades, the greater the room for improvement. The grades of students using multimedia technology reached the highest point on the 5th day, and remained unchanged or decreased slightly on the 6th and 7th days. It shows that the teaching work should not rely too much on multimedia technology. Teachers should take the lead, students should take the lead, and multimedia only plays an auxiliary role.

4.2.2. Comparison of Students' Initiative

The English flipped classroom was given a one-week teaching task, and the number of times the 10 students actively interacted with the teacher every day was recorded during the teaching process. The results are shown in Figure 6.

From Figure 6, the overall number of interactions among the students in group A has been improved. Among them, A2 has the most obvious change, increasing from 1 to 4 at the beginning. The other four students also basically increased the number of interactions by 2 after a week of teaching. It indicates that the use of multimedia information processing technology in teaching can improve the communication between teachers and students. It shows that the traditional teaching method has little effect on the interaction of students and the interaction rate using this method is low.

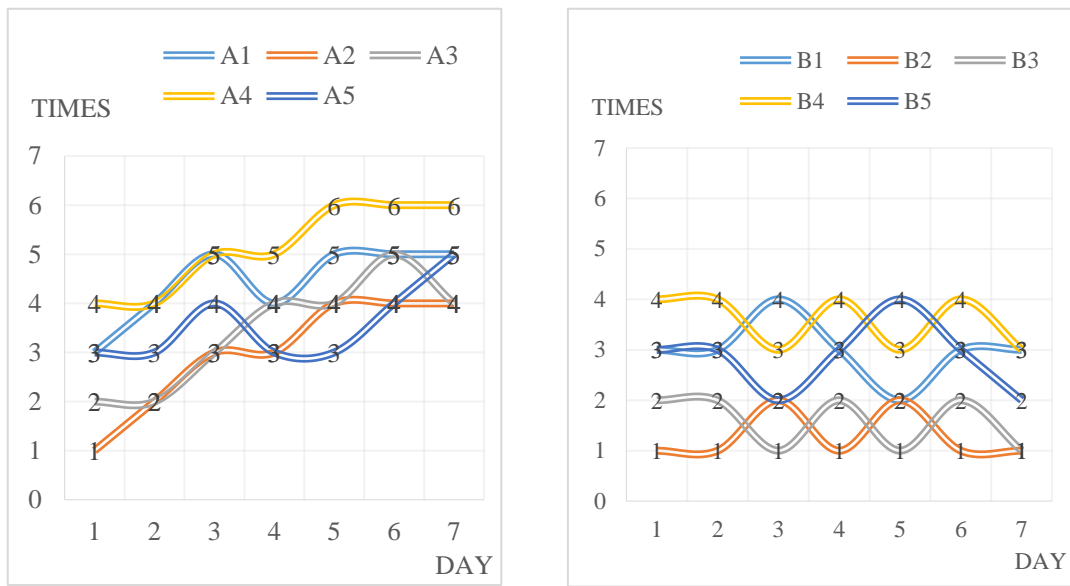


Figure 6: Student initiative comparison

4.2.3. Comparison of Learning Experience

Learning experience refers to students' learning status and interest. After a week of teaching, the 10 students were invited to score the learning experience of the week, with a full score of 10. The scoring results are shown in Figure 7.

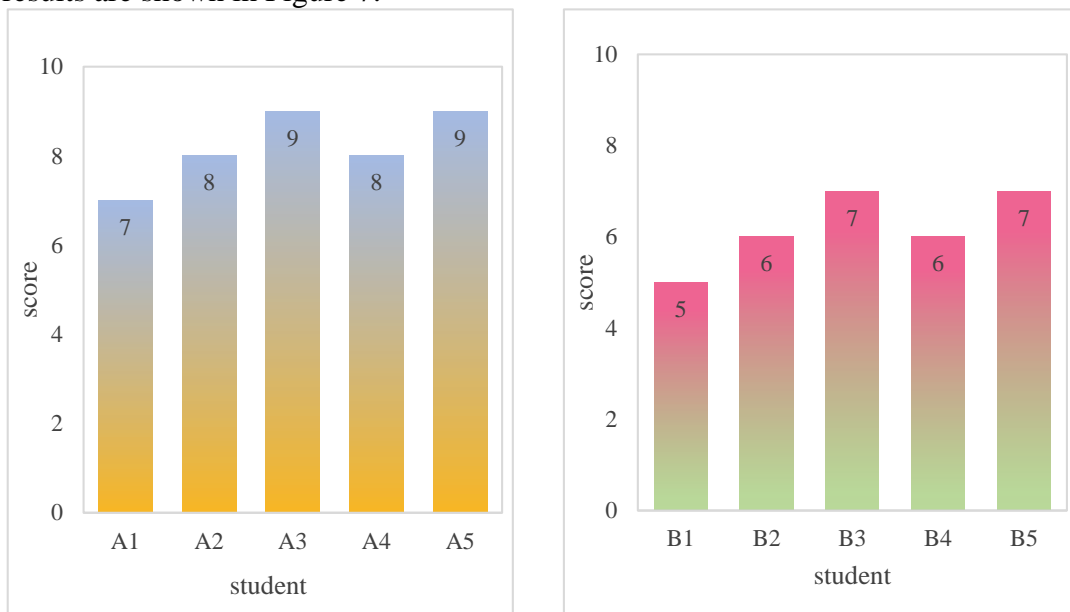


Figure 7: Student learning experience comparison

As can be seen from Figure 7, after teaching comparison, group A generally scored higher, with an average score of 8.2 points, which is at a high level, and the average score in group B is 6.2, which is at a medium level, indicating that the students in group A are in the learning process. In the classroom, the state is better, and the interest in learning is also higher under the blessing of multimedia. It is easier for students to develop the study habit of loving thinking and inquiry in the classroom, thereby stimulating their enthusiasm for learning and exerting their learning initiative.

4.2.4. Comparison of Learning Efficiency

After a week of teaching, the 10 students were provided with the same English test paper, set the test time to 120 minutes, and recorded the time they spent answering the questions. The results are shown in Table 1 and Figure 8:

Table 1: Comparison table of answering time

student	Group A	Group B
1	99	109
2	112	120
3	108	116
4	97	108
5	103	112

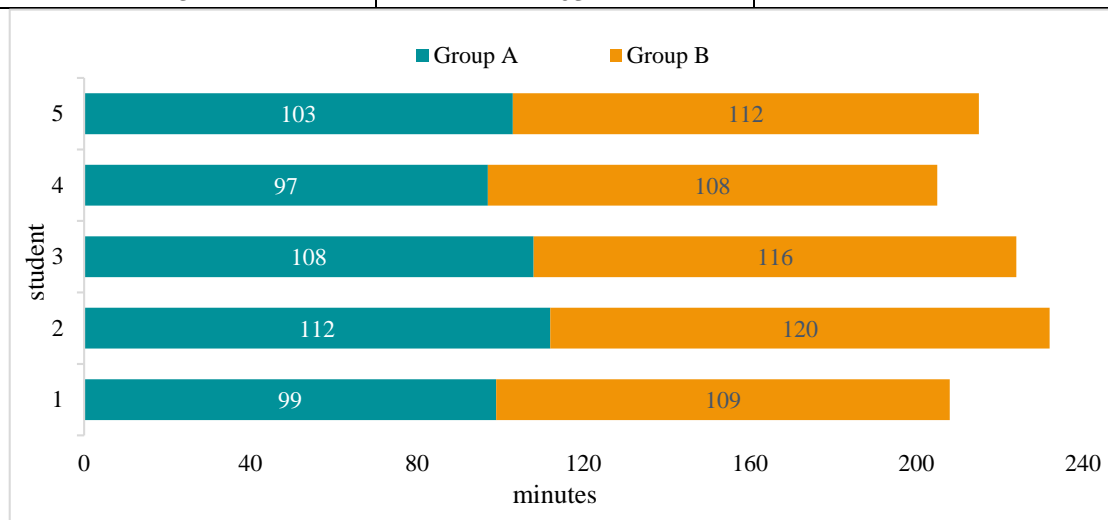


Figure 8: Learning efficiency comparison

As can be seen from Figure 8, the students in group A took the shortest time of 97 minutes and the longest time of 112 minutes to complete the test paper. The longest answer time for group B students was 120 minutes, and the shortest time was 108 minutes. Similar to the longest time spent in group A, the students in group A spent less time on the same answer sheet. It shows that the students in group A have higher learning efficiency. It is known that before the start of the experiment, the learning efficiency of the two classes is at the same level, so the multimedia information processing technology promotes the students' learning efficiency. After calculation, the use of multimedia information processing technology can improve the learning efficiency by 7.19%. To sum up, the teaching effect of English flipped classroom using multimedia information processing technology is better.

4.2.5. Problems in Multimedia Teaching

Multimedia teaching has both advantages and disadvantages. At the same time, multimedia information processing technology has been favored by the majority of teachers. There are also some practical teaching problems. If these problems are not handled properly, unsatisfactory teaching effect will be obtained. (1) Not all courses are suitable for multimedia teaching. (2) Teachers rely too much on multimedia teaching, ignoring the dominant position of students. (3) The speed of multimedia teaching is too fast, and the students' ideas cannot keep up, which affects the learning effect. (4) The quality of courseware produced by teachers through multimedia is not up to

standard, and students cannot learn important subject knowledge.

4.2.6. Countermeasures to Solve the Problem of Multimedia Teaching

In order to solve these problems, the following countermeasures are proposed. (1) To maintain the better professionalism of teachers, teachers should use multimedia selectively according to the types of the subject and teaching content. (2) Teachers are organized to carry out multimedia information processing technology training to help teachers systematically understand and master multimedia teaching theories and skills. (3) The school establishes a sound multimedia teaching evaluation system to guide teachers to strengthen practice and improve teaching quality.

5. Discussion

Based on the relevant materials and the research results of the English flipped classroom, combined with the specific research of the content, the main work and achievements of the article are as follows:

(1) The evolution of the flipped classroom in domestic and foreign is summarized through data analysis and literature research, and the connotation of its teaching mode is drawn. On this basis, the practice and development of the flipped classroom mode based on multimedia information processing technology is discussed.

(2) The video, audio and image technologies involved in multimedia information processing technology are studied, including voice stream detection and image compression. Through these technologies, a large amount of effective information can be obtained, thus providing a basis for the application of multimedia information processing technology in classroom teaching.

(3) Through experiments to compare the English flipped classroom under the traditional situation and multimedia information processing technology, the results have proved that the application of multimedia processing technology in the English flipped classroom can effectively improve the learning efficiency of students.

In the era of the Internet of Things, multimedia technology, as the product of the application of modern information technology in classroom teaching, can more effectively mobilize students' enthusiasm for learning and realize independent learning. Electronic devices are becoming more and more popular, multimedia teaching has become a trend, in all operations, students' various thinking abilities are cultivated and developed. This paper has firstly expounded the application of multimedia information processing technology in education and other fields through the literature research method, and analyzed the current situation of flipped classroom teaching. The multimedia information processing technology is discussed from three aspects: video, audio and image. Finally, through the experimental design, it is verified that the English flipped classroom under the influence of multimedia information processing technology can enhance students' participation in learning better than the traditional English flipped classroom teaching. Through multimedia information processing technology, students' academic performance has been improved, and they are more willing to interact with teachers in the classroom, which improves students' learning efficiency and teachers' teaching effect. Multimedia based on Internet of Things technology has brought new opportunities and challenges to school education. Therefore, attention must be paid to the application of multimedia information processing technology in daily teaching.

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Practice Project: A Practical Exploration on the Construction of “Blended Teaching Mode” and “Blended First-class Course” Based on Online Self-built Courses.

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