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Research on Teaching Practice of English for Science and Technology Based on Multimedia Technology

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ABSTRACT

The purpose of this paper is to study the practice of multimedia technology in the teaching of scientific and technical English. With the rapid development and popularisation of computer technology and the deepening of educational concepts, multimedia-assisted English teaching has become one of the most important foreign language teaching modes at present. This study firstly analyses the impact of multimedia technology on English teaching, secondly faces the advantages and challenges of multimedia technology in the teaching process, and finally explores the use and effect of multimedia technology in scientific and technological English teaching based on the data of the survey and research. The results of the study show that for college English teachers in colleges and universities, they should fully explore the advantages of multimedia technology in the process of using it and use it skillfully in teaching practice, which will have a positive effect on improving the quality of English teaching and deepening the reform of college English teaching.

KEYWORDS

Multimedia Technology, Teaching Practice, Technical English

With the advancement of technology, the application of multimedia technology in the field of teaching is becoming increasingly widespread. However, the teaching of technology English courses faces some challenges, such as abstract teaching content and single teaching methods. These issues may affect the learning outcomes and motivation of students. Multimedia technology, with its rich presentation forms and convenient resource acquisition methods, provides new possibilities for teaching scientific English. This article aims to explore the application of multimedia technology in the practice of teaching scientific English in order to improve teaching effectiveness and student learning experience. This study uses empirical research methods, including questionnaire surveys and interviews, to explore the application of multimedia technology in science and technology English teaching. In analyzing the collected data, the effectiveness of multimedia technology in teaching scientific English is evaluated to explore its impact on students' learning experience. Finally, specific

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suggestions and strategies are proposed to optimize the teaching practice of scientific English and improve student learning outcomes and satisfaction. This study can provide useful reference and guidance for the practice of teaching scientific English.

LITERATURE REVIEW

Multimedia technology is an interdisciplinary subject, which comprehensively uses computer, communication, audio, video, image, and other technologies to realize the processing, transmission, storage, and display of digital media (Lai et al., 2023). Specifically, multimedia technology is a technology that combines text, image, sound, animation, and other media information. It collects, edits, stores, and displays a variety of media information through computers (Sarifa & Jabeen, 2024), providing users with richer and more diversified information experiences (Zain et al., 2024). The main features of multimedia technology include diversity, interactivity, and real-time (Roche et al., 2024). Diversity is reflected in the integration of various media forms including text, pictures, audio, video, animation, etc. (Qazi et al., 2022). Interactivity means that users can interact with multimedia information such as selecting, dragging and dropping (Fowler & Leonard, 2021), pausing, etc. Real time is embodied in the fact that multimedia technology can process and display all kinds of media information in real time (Mogavi et al., 2023).

Multimedia technology is widely used in various fields, such as education, entertainment, advertising, news, medical imaging, and so on (Buzdar, 2024). In the field of education, multimedia technology can improve students' learning interest and understanding ability through the form of sound and emotion. In the field of entertainment, multimedia technology can meet the diverse needs of users by providing entertainment content in various media forms (Ismailova, 2024). In the field of advertising (Tamara et al., 2024), multimedia technology can improve the communication effect of advertising through the impact of vision and hearing (Guillén-Gámez et al., 2023).

With the rapid development of science and technology, a multimedia- and network-based teaching mode has become an indispensable part of English teaching (Ernazarova, 2024). Based on the constructivism theory (Chaivisit et al., 2024) this paper analyzes some related problems surrounding the theoretical basis of the present network and multimedia technology assisted teaching, English teaching practice in the network information age, and network English teaching. Khadjamovna (2024) combines the technology of multimedia teaching, web serviceman, and network resource sharing with modern English teaching and improves the English teaching mode based on computer and network technology. Thapaliya et al. (2023) describe the new English teaching mode trends that will definitely influence English teaching profoundly. The rapid development of science and technology has created a new condition for teaching methods of higher English education, which has greatly enriched English teaching resources and prompted a renovation of English teaching methods. Compared with previous English teaching, modern college English teaching is convenient, efficient, and easily accepted by students. Considering the diversity and comprehensiveness of college English, it is necessary to divide it into such secondary subjects as vocabulary, grammar, and reading in order to help students develop a learning interest in English in their daily lives and to achieve the purpose of reducing students' burden. With the development of modern science and technology, more and more computer technologies have been successfully applied in English teaching. Computer-aided technology and big data corpus management (Khaki et al., 2023) improve the traditional teaching method into an innovative teaching mode with big data corpus as an English learning resource. Taking college English teaching, for example, incorporates the traditional teaching methods along with the development of new media technology. Sanulita et al. (2024) take college English teaching under the influence of the new media era as an object of research, briefly analyzing the existing teaching problems and putting forward effective suggestions, aiming to provide certain reference for relevant education work. Atstsaury et al. (2023) should combine information technology and English teaching to design a computer-assisted English learning system. Otaxonova and Dilshoda (2024) discuss how

to design each module of the computer-assisted English learning system. Other influential authors are Roche et al. (2024).

RELATED MATERIALS AND METHODS

Multimedia Technology

Multimedia technology is a technology that combines various media elements such as text, images, sound, and video together (Mundy et al., 2024). It includes multiple aspects such as digitization, encoding, compression, decoding, software, and hardware equipment. The application scope of multimedia technology is very extensive, involving multiple fields such as education, culture, art, entertainment, etc. In the field of education, multimedia technology can help teachers better present content, enhance students' learning effectiveness, and spark interest among learners. Through multimedia projectors, televisions, computers, and other devices, teachers can use various media forms such as images, sound, and videos to explain abstract knowledge points, making it easier for students to understand and master. In addition, multimedia technology can also assist teachers in teaching design and textbook production, improving teaching quality, and maintaining efficiency (Chang et al., 2024). In the fields of culture and art, multimedia technology can help artists and cultural workers better express their works and creativity. Through digital, coding, and compression technologies, they can transform various art forms such as music, dance, painting, sculpture, etc. into digital media for editing, production, and display. In the entertainment industry, multimedia technology can help game developers, film and television producers, and other entertainment professionals create more diverse, exciting, and interesting entertainment products. By using various media elements such as images, sound, and video, they can create a more realistic and vivid virtual world, attracting the attention of audiences and players.

The development of multimedia technology began in the 1980s and has made significant progress and achievements after decades of development. The following are the latest developments in multimedia technology:

- The combination of artificial intelligence and multimedia technology: The rise of artificial intelligence technology provides more possibilities for the application of multimedia technology. Currently, many enterprises and research institutions are exploring how to achieve automated generation, analysis, and recommendation of multimedia content through artificial intelligence technologies such as deep learning and natural language processing.
- The development of virtual reality technology: Virtual reality technology is a new type of technology that integrates various advanced concepts such as artificial intelligence, computer graphics, and sensor technology. Virtual reality can simulate realistic virtual scenes and immerse users in them, providing a more realistic and vivid experience.
- Application of multimedia big data: With the popularization of the Internet and the improvement of the degree of digitalization, the generation development and storage of multimedia content are also growing exponentially. The application of multimedia big data can help enterprises and research institutions better understand user behavior and needs, improve service quality, and optimize efficiency.
- The popularization of 5G technology: 5G technology is a new type of mobile communication technology with characteristics such as high speed, low latency, and high bandwidth. The popularization of 5G technology will provide more convenient and efficient network support for the application of multimedia technology and promote its development.

In short, there is developing trend of diversification and comprehensiveness in multimedia technology advancement, and the future development prospects are very broad.

The combination of multimedia technology and high-tech technology has made significant breakthroughs and applications in many fields, yielding convenience and innovation in the lives and work of people. Here are some examples:

- Virtual Reality (VR) and Augmented Reality (AR): Virtual reality and augmented reality technologies combine multimedia technology, artificial intelligence, and sensor technology to create a brand new immersive experience. These technologies have been widely applied in fields such as gaming, education, healthcare, architecture, and military. For example, through virtual reality technology, users can put on headsets and enter a completely virtual environment to interact with other virtual characters.
- 3D printing: 3D printing technology combines multimedia technology, computer-aided design, and materials science. It can transform digital models into physical objects, enabling designers and manufacturers to quickly create complex product prototypes and customized products. This technology has been widely applied in manufacturing, healthcare, and art and design.
- Artificial intelligence (AI) and audio and video processing: The combination of AI technology and audio and video processing technology achieves such functions as speech recognition, image recognition, and video analysis. For example, voice assistants (such as Siri and Alexa) utilize speech recognition and natural language processing techniques to understand user voice commands and respond accordingly.
- Cloud computing and streaming media: Cloud computing technology centralizes the management of computing, storage, and network resources and has been widely applied in the multimedia field. Through cloud computing, users can access and share multimedia content, such as videos, music, and games, anytime and anywhere. Streaming media technology is the real-time transmission of multimedia content through the network, allowing users to enjoy high-quality audio and video experiences in real-time without downloading.

Teaching Science and Technology English

Science and technology English teaching refers to the combination of English teaching and technological knowledge and aims to cultivate students' English communication and application abilities in the field of science and technology (Yang & Hong, 2023). Below is some relevant information on teaching English for science and technology:

- Course content: Teaching science and technology English mainly involves the cultivation of skills in reading scientific literature, writing scientific papers, and giving scientific reports. At the same time, it also includes learning technology vocabulary and professional terminology, as well as cultivating cross-cultural communication skills in the field of technology.
- Teaching method: Science and technology English teaching usually adopts a comprehensive teaching method, combining various skills training such as listening, speaking, reading, and writing. Teachers can guide students to learn and apply scientific English through classroom lectures, discussions, group activities, practical projects, and other means.
- Textbook selection: Textbooks and materials related to the field of science and technology should be selected, such as articles in scientific journals, academic conference papers, scientific reports, etc. At the same time, it can combine Internet resources and multimedia technology to provide real scientific English context and cases.
- Training objective: Science and technology English teaching aims to improve students' English reading and writing abilities, oral expression abilities, and listening comprehension abilities in the field of science and technology. The training objective is to cultivate students' understanding and ability to apply technological knowledge, enabling them to participate in international scientific and technological exchanges.

- Practical opportunities: In order to enhance students' practical application abilities, scientific English teaching should provide practical opportunities, such as scientific project training, scientific paper writing competitions, academic conference participation, etc. These practical opportunities can help students apply their knowledge of scientific English to practical scenarios.

Overall, the teaching of scientific English aims to cultivate students' English communication and application abilities in the field of science and technology, in order to meet the needs of technological development and international communication. Through teaching English for science and technology, students can better understand and apply technological knowledge, improve cross-cultural communication skills, and prepare for future career development in science and technology.

The application of multimedia technology in English learning has received widespread attention and application. The impact of different media types on learners' English learning outcomes varies, as follows:

- Video teaching: Research has shown that video teaching can improve students' listening comprehension and oral expression abilities. A study found that students who watch video teaching perform better in understanding and applying English grammar. Another study also found that learning English through watching English TV programs can improve students' English listening, pronunciation, and oral expression abilities.
- Interactive learning: Interactive learning can enhance students' learning motivation and engagement. Research has shown that using interactive software for English learning can improve students' learning effectiveness and interest. Students can participate in learning by clicking and interacting, deepening on their understanding and memory of English knowledge.
- Virtual laboratory: Virtual laboratory can enhance students' practical experience and application ability in science and technology English. Research has shown that students completing English experimental operations in virtual laboratories can promote their understanding and application of English technology concepts.
- Mobile learning: Mobile learning can improve students' flexibility and learning efficiency. Research has shown that using mobile devices for English learning can improve students' learning motivation and engagement. Students can access English learning resources and application software anytime and anywhere through mobile devices, improving the convenience and efficiency of learning.
- Online social media: Online social media can promote cooperation and communication among students, as well as improve the interactivity and sociality of English learning. Research has shown that online social media can help students enhance their English listening and speaking abilities and cross-cultural communication abilities, while also enhancing their learning interest and motivation.

Overall, data analysis shows that multimedia technology plays an important role in English learning, which can improve students' learning outcomes and motivation. The impact of different media types on the effectiveness of English learning for learners also needs to be evaluated and selected based on actual situations.

Although the significance and importance of teaching technology English are increasingly recognized by more and more people, there are also some difficulties in practical teaching:

- Lack of textbooks: Because teaching science and technology English requires knowledge in the field of technology, and there are relatively few textbooks in this area, it is difficult for teachers and students to learn science and technology English through existing textbooks. At the same

time, the development speed of the technology field is very fast, and the updating of textbooks is also quite frequent.

- Shortage of teaching staff: Teaching English for science and technology requires teachers with professional knowledge and English teaching experience in the field of science and technology, but such talents are relatively scarce, especially in some small cities or rural areas, where the overall quality of the teaching staff is relatively low.
- Low student interest: science and technology English teaching requires students to use English in the field of technology, but most students may not be interested in knowledge in the field of technology, resulting in low enthusiasm and initiative in learning.
- Outdated teaching methods: Traditional teaching methods may not meet the current needs of scientific English teaching. For example, simple teaching and memorization are not effective enough in improving students' scientific English abilities, and more innovative and personalized teaching methods need to be adopted.
- The assessment method is unreasonable: Currently, most assessment methods only focus on students' grammar and vocabulary level, which is difficult to truly reflect their English application ability in the field of science and technology. Therefore, it is necessary to explore more scientific and effective assessment methods.

In today's era of rapid technological development, scientific English has become an indispensable discipline. However, there are still some difficulties in teaching scientific English. The lack of textbooks, shortage of teaching staff, low student interest, outdated teaching methods, and unreasonable assessment methods all constrain the quality and effectiveness of scientific English teaching. Nevertheless, the introduction of multimedia technology has brought new hope to the teaching of scientific English. By utilizing multimedia technology, teachers can enrich textbooks, provide the latest technological information, increase teaching interactivity, provide high-quality audio-visual effects, and support personalized learning.

Rich and Diverse Textbooks. Multimedia technology can provide a more diverse range of textbook resources. Through the Internet and electronic databases, teachers can access a large number of scientific English works of literature, journal papers, academic reports, etc., providing students with richer learning materials.

Real Time Updates. Multimedia technology can make textbooks updated in real time. The development speed in the field of technology is very fast, and traditional textbooks often find it difficult to keep up with the latest technological knowledge. Through multimedia technology, teachers can timely obtain the latest technological information and share it with students, improving the timeliness of teaching.

Strong Interactivity. Multimedia technology can increase the interactivity of teaching. Teachers can use multimedia technology to design various interactive activities, such as online discussions, virtual experiments, technology project simulations, etc., to stimulate students' interest and participation, and improve their enthusiasm in learning scientific English.

Good Audio-visual Effects. Multimedia technology can provide better audio-visual effects. Teaching scientific English involves a large amount of technical terminology and professional knowledge. Through multimedia technology presentation, relevant concepts, experimental processes, technical applications, etc. can be presented more vividly and intuitively, improving students' understanding and memory effects.

Personalized Learning. Multimedia technology can support personalized learning. Through multimedia technology, teachers can provide personalized learning resources and paths based on the different needs and levels of students, helping them better engage in self-directed learning and self-evaluation.

It should be noted that the introduction of multimedia technology cannot fully solve all the difficulties in teaching English for science and technology. It still requires guidance from experts and guidance from teachers, as well as improvement on the overall educational environment. In addition, for some areas with poor infrastructure conditions, the introduction of multimedia technology may face some challenges. Therefore, when promoting the application of multimedia technology in scientific English teaching, it is necessary to comprehensively consider various factors to ensure the maximization of teaching effectiveness.

Research Method

The empirical research method used in this study is the questionnaire survey and interview method.

Questionnaire survey is a method of data collection which is carried out by designing and sending out questionnaires. The researcher designs a series of questions that the respondents are asked to fill in. Questionnaires are suitable for large-scale data collection and can be statistically analyzed to produce objective and quantitative results. The researcher can choose different types of questionnaires according to the purpose of the study, including structured questionnaires, semi-structured questionnaires, and open-ended questionnaires. In this study, the questions focus on inquiring about the participants' views on multimedia technology, as well as their perceptions and experiences.

Interviewing method is a way of obtaining detailed information and opinions through face-to-face, one-on-one dialogue with interviewees. The researcher can choose different types of interview formats such as structured interviews, semi-structured, or unstructured interviews, according to the purpose of the research. Interviews can help the researcher gain an in-depth understanding of the interviewees' views, attitudes, experiences, and beliefs on focused topics. Through interviews, the researcher can ask more in-depth and follow-up questions and interact with the interviewees to obtain more in-depth clues and information.

The questionnaire method works best for this study because it allows the researcher to collect the insight into the feelings and views of students and teachers regarding the use of educationally purposed multimedia technology. Through the designing of relevant questions, the researcher can get a better understanding of participants' acceptance and willingness to use multimedia technology. The interview method is chosen to provide the opportunity for researchers to understand the views and suggestions of teachers and students regarding multimedia technology through in-depth exchanges with participants in order to further improve the teaching methodology. Finally, data analysis of the collected data is applied to illuminate the impacts and effects of multimedia technology on the teaching and learning of English in the university.

Therefore, multimedia technology, as an important tool in university English teaching, needs to be verified by empirical research to verify its practical application effect. Empirical research can mine more useful information from the data for in-depth analyses of teaching methods and effects, and it meets the scientific and objective requirements of university English teaching research.

Questionnaire. In order to gain a deeper understanding of the current status of the application of multimedia technology in English teaching in colleges and universities, I prepared two questionnaires, a teacher's volume and a student's volume. To ensure the effectiveness and validity of the results of the questionnaire, before preparing this questionnaire, the questionnaires used in the literature that has studied multimedia-assisted English teaching were referred to.

Subjects of the Survey. A university in Xianyang has 66 English teachers and 11,000 students enrolled in more than ten classes of different majors, and the weekly English class hours are 2. According to the needs of the survey, the author took 200 students among the non-English majors in the second year of the university and 39 teachers who undertook the public English course as the survey subjects.

Sample Data Sources. The questionnaires were used for data collation using Microsoft Excel in order to accomplish different analytical purposes. The questionnaires that were returned were validly utilized questionnaires. The set of questionnaires is divided into two sections: teachers volume and students volume.

The students volume contains the following contents: (a) non-English majors' English learning; (b) students' use of learning resources; (c) students' knowledge of teaching with multimedia technology; (d) students' perception of the role of multimedia-assisted learning; and (e) students' use of multimedia-assisted learning.

The teachers volume contains the following contents: (a) the team building of college English teachers in a college in Xianyang; (b) the knowledge of English teachers about multimedia technology teaching; (c) the application of multimedia-assisted English teaching in teaching practice; (d) the role of multimedia technology teaching in English teaching; (e) the attitudes of English teachers towards multimedia technology teaching; (f) the construction of multimedia equipment in colleges and universities; and (g) the school leadership's attitude of multimedia technology teaching.

The specific receipt and distribution of the above questionnaires are shown in Table 1.

RESULTS AND ANALYSIS

Analysis of Experimental Results

The school has introduced multimedia technology for teaching practice for the English program. Specifically, teachers use multimedia equipment to combine scientific and technological English texts, pictures, videos, audio, and other forms to create a real and vivid English learning environment for students. At the same time, teachers also use the network platform to achieve real-time interaction between teachers and students, which improves the teaching effect. Through a semester of multimedia technology teaching practice, the school has achieved remarkable teaching results. Firstly, students' interest in English learning has improved, and students are more willing to take the initiative to participate in classroom activities and express their own opinions. Secondly, students' English listening, speaking, reading, and writing skills have been significantly improved, and they are able to understand and use scientific and technological English better. Finally, students' independent learning abilities are exercised, which teaches students to arrange learning time and content, independently, through the online platform.

Age Ratio of English Teachers. The English teachers in this university are highly educated and young, and those who teach at the front line are mainly young or middle-aged. The age ratio of English teachers in a university in Xianyang is shown in Figure 1.

Distribution of English Teachers' Academic Qualifications. The young teachers have all obtained postgraduate qualifications, so the ratio of academic qualifications and age of English teachers in a university in Xianyang is within the range of the basic national requirements. The distribution of English teachers' academic qualifications in this school is shown in Table 2.

Table 1. Questionnaires Sent and Received

Questionnaire Types Sending and Receiving	Number of Releases (Unit: Copies)	Number of Recoveries (Unit: Copies)	Recovery Rate (Unit: Percent)
Teachers' questionnaire	39	39	100%
Student Questionnaire	200	196	98%

Figure 1. Age Distribution of English Teachers in the School

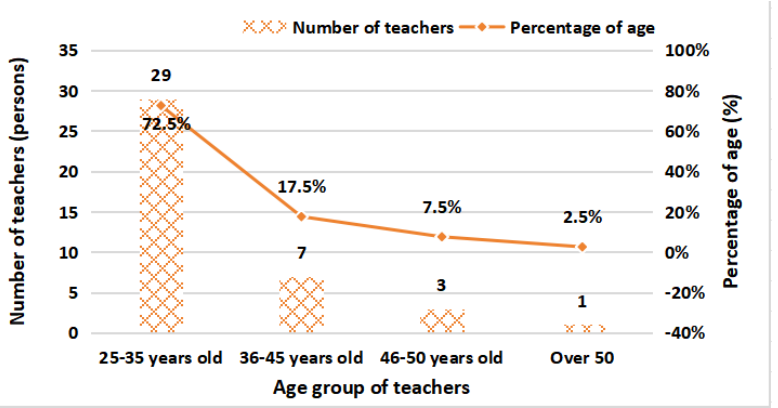


Table 2. Distribution of English Teachers' Academic Qualifications in the School

Teacher's Education Level	Number of People (One)	Proportion (%)
polytechnic	0	0%
undergraduate	12	30%
postgraduates	28	70%
doctorate	0	0%

Knowledge of English Teachers in the School. Table 3 shows the knowledge of English teachers regarding multimedia-assisted English teaching.

Table 3 shows English teachers in the school are still in the primary stage of understanding multimedia-assisted English teaching. Only 15% of the teachers can operate multimedia proficiently, and 57.5% of the teachers can independently study the software to produce the required courseware.

Table 3. English Teachers' Knowledge of Teaching With Multimedia Technology

Question	Option	Number of People	Proportion
Teachers' proficiency with multimedia courseware?	master	6	15.0%
	skilled	23	57.5%
	understand	10	25.0%
	can't	1	2.5%
How easy or difficult do teachers find multimedia instruction?	be prone to	7	17.5%
	simple	22	55.0%
	difficult	10	25.0%
	very difficult	1	2.5%
Are teachers willing to teach using multimedia technology?	acceptable	5	12.5%
	It doesn't matter	2	5.0%
	unwilling	0	0.0%

Most of the teachers do not exclude the use of multimedia teaching and can take the initiative to learn to produce multimedia courseware. Among the teachers surveyed, 82.5% believe if the school multimedia equipment is complete and easy to use, they would be willing to accept a multimedia teaching mode. Although multimedia technology is more complicated than a traditional teaching mode, 72.5% of the teachers still think multimedia technology teaching is simpler after having a chance to use it. This provides a platform for the development of multimedia in the English classroom of higher education institutions.

Factors Affecting the Development of Multimedia Technology Teaching as Perceived by the English Teachers in the School. Table 4 shows the factors that make multimedia technology teaching not work at an optimal level in English teaching sessions in colleges and universities, as well as the factors that affect development of the mode.

The Basic Situation of Students' English Learning in the School. The number of years students in the school have studied English is shown in Figure 2.

Figure 2 shows English as a second foreign language as being popular in China.

Student Attitudes Towards Learning English. The school's students' current English learning goals are not clear enough, and 13% of the many English learners have no interest in learning English at all. This is exactly what English teachers should pay attention to. Teachers should focus on improving students' interest in learning English and gradually improve their English learning level. The attitudes of the students toward learning English are shown in Table 5.

Table 4. Factors Affecting the Implementation of Multimedia Technology in Teaching and Learning as Perceived by English Teachers

Teachers' time-consuming pre-course preparation	13	32.5%
Low level of self-computerization	24	60.0%
Lack of hardware and software teaching environment for teaching with multimedia technology	33	82.5%
No better multimedia-assisted approach to teaching and learning English	26	65.0%
Rigid system of multimedia use does not facilitate access	32	80.0%

Figure 2. Years of English Language Learning for Students at the School

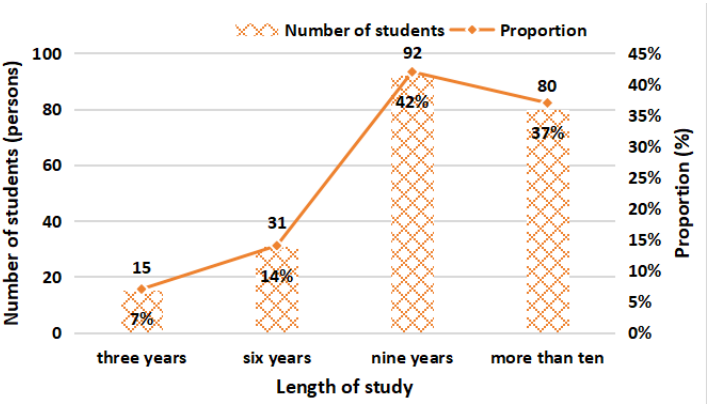


Table 5. Student Attitudes Toward Learning English in this School

Level of clarity of purpose	Very clear	118	60%
	Basically clear	56	29%
	Undefined	22	11%
Level of interest	Very interested	90	46%
	Common	81	41%
	Have no interest.	25	13%

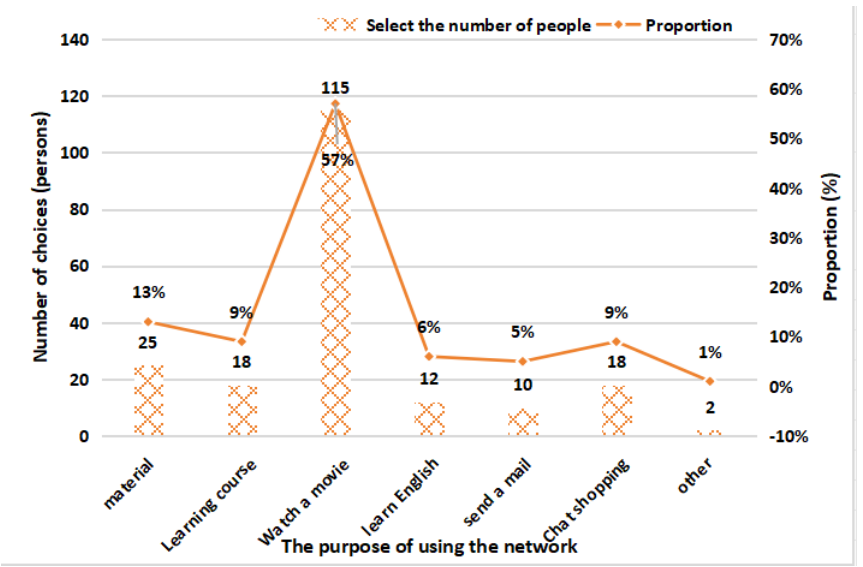
The Use of the Internet by Students in this School. English is the official language of the largest number of countries and the most widely used second language in the world, and it is a necessary skill required by modern society. Computer skills are also a basic requirement of employers for job applicants. How well students master these skills will directly affect the nature of their work following graduation. The students' use of the Internet during their school years is shown in Figure 3.

Figure 3 reveals students in higher education are computer literate enough to make full use of computers for learning but have poor access to online information. Furthermore, half of the students are doing something other than studying and are less likely to do English learning on their own.

Analysis of Practical Applications

Nowadays, with the rapid development of technology and the trend of globalization, English, as an internationally recognized language, plays an increasingly important role in the field of technology. However, many students still encounter difficulties in learning scientific English and struggle with an insufficient vocabulary, grammar errors, and poor listening comprehension abilities. In order to improve the effectiveness of learning technology for English learning, some schools and teachers have begun to use multimedia technology to support English teaching. Although the research in this

Figure 3. Internet Use by Students at the School During the School Day



paper explores the application of multimedia technology in scientific English teaching, there are also some limitations and corresponding measures as indicated below.

Limited Sample Selection. This study may only involve a small number of schools, classes, or students as samples, and therefore, cannot fully represent the situation of students in different regions, schools, or age groups. The universality and generalizability of research results may be limited. An increased sample size and diversification of participants in the study by including more regions, schools, and student groups will improve the representativeness and generalizability of research results.

Time Constraints. Due to time and resource constraints, this study may not be able to track the learning outcomes and changes of students in the long term and can only provide observations during a single brief timespan. Therefore, the research results may not capture long-term impacts and changing trends. Consider conducting long-term research in the future to track the learning outcomes and trends of students after using multimedia technology over time. Through continuous observation and evaluation, more accurate data and conclusions can be obtained.

Method Limitations. This study employs specific research methods and tools, such as questionnaire surveys and experimental designs. These methods have certain subjectivity and limitations and cannot fully cover all possible influencing factors. Other research methods and tools may lead to different conclusions. Combining different research methods and tools, such as experimental design, observation, interviews, etc., to obtain more comprehensive and objective data is ideal. At the same time, quantitative and qualitative data can be used to mutually confirm and fully consider the influencing factors of different dimensions.

Differences in Educational Environment. There are differences in the educational environment of different regions, schools, and classes, including the level of teaching staff, teaching facilities, and student backgrounds. This study may not fully consider the impact of these differences on the application of multimedia technology, leading to limitations in the research results. Conducting a more detailed investigation and comparison of the educational environment in different regions, schools, and classes, including the level of teaching staff, teaching facilities, and student backgrounds would produce more well-rounded data. By understanding the differences in educational environments, it is possible to better evaluate the application effects of multimedia technology in different environments.

Subject Self-Report. Some research data may rely on students' self-report, such as learning motivation and academic performance. The subjective consciousness and biases of the subjects may have an impact on the research results. Thus, attention should be paid to the objectivity and reliability of the results. In addition to student self-report, the application effect of multimedia technology can be evaluated by combining multiple indicators such as teacher evaluation, academic performance, and learning motivation. This can reduce the impact of subjective consciousness and bias on the results of the subjects and improve the objectivity and reliability of the evaluation.

Through the above improvement measures, researchers can gain a more comprehensive understanding of the application effect of multimedia technology in science and technology English teaching and provide targeted suggestions for teachers to further improve the quality of science and technology English teaching. The significance of this study is mainly reflected in the following four aspects described below.

Education Practice Guidance. This article provides guidance and reference for English teaching practitioners by analyzing the application of multimedia technology in science and technology English teaching. Teachers can choose appropriate multimedia technology based on the data and conclusions provided in this article to improve the learning effectiveness and motivation of English learners.

Education Policy Support. The research results of this article can provide a basis for the formulation of relevant education policies. The government and education departments can pay attention to the role of multimedia technology in English teaching, and formulate relevant policies based on actual situations to encourage and support schools and teachers to use multimedia technology in English teaching.

Educational Research Expansion. This article provides data analysis and empirical research on the application of multimedia technology in English learning, filling the research gap in related fields. These research findings can provide a foundation and reference for future educational research and promote the further development of multimedia technology in the field of English learning.

Cross-Cultural Communication Promotion. This article emphasizes the importance of technology English teaching in cross-cultural communication and multilingual support. Through the application of multimedia technology, learners can better understand and apply technological English, improving their cross-cultural communication skills. This has positive significance for promoting international education cooperation and a global perspective.

In summary, the research significance of this article lies in providing useful references and guidance for English teaching practice, educational policy formulation, educational research, and the promotion of cross-cultural communication. The application of multimedia technology in scientific English teaching has been widely adopted. Some specific practical applications are detailed below.

Interactive Courseware. Teachers can use multimedia software to create interactive courseware, combining elements such as text, pictures, audio, and video to make the classroom livelier and more interesting. Students can actively participate in learning and improve their understanding and memory of scientific English knowledge by watching, clicking, and participating in interactive activities.

Online Learning Platforms. Many schools and institutions offer online learning platforms, including multimedia teaching resources. Students can access these resources anytime and anywhere through the internet, watch teaching videos, complete online exercises, and participate in discussions, thereby improving the learning effectiveness and flexibility of scientific English.

Virtual Laboratory. Through virtual laboratory software, students can conduct various technology-related experiments and simulation operations. They can observe the experimental process, collect data, analyze results, and gain practical experience in a virtual environment, deepening their understanding of the concept of scientific English.

Multimedia Learning Resource Library. Schools and educational institutions can establish a multimedia learning resource library including videos of science and technology English courses, academic lecture videos, teaching demonstrations, etc. Students can choose which resources to watch according to their learning needs and interests, improving their mastery and application ability of scientific English knowledge.

Online Collaboration Tools. Multimedia technology can also support online collaboration and communication among students. By using online collaboration tools, students can share documents, engage in real-time discussions, and collaborate on projects, improve teamwork and communication skills, and enhance their ability to apply scientific English.

These applications effectively enhance student learning outcomes and engagement and provide teachers with more innovative and diverse teaching methods. In the teaching of English for science and technology, this article provides several suggestions for the future development directions that multimedia technology can consider. These suggested media outlets are explained below.

Virtual Reality (VR) and Augmented Reality (AR). Virtual reality and augmented reality technologies can provide an immersive learning experience, immersing students in scenarios related to technology English. By using VR and AR devices, students can engage in virtual experiments, simulated operations, and interactive learning, further enhancing their understanding of the concepts and applications of scientific English.

Intelligent Education Assistant. With the continuous development of artificial intelligence technology, intelligent education assistants will become the future development trend. These assistants can provide customized learning materials, exercises, and feedback based on the learning needs and personalized characteristics of students, helping them learn technology English more efficiently.

Adaptive Learning System. Based on big data and machine learning algorithms, the adaptive learning system can automatically adjust the learning content and difficulty according to the learning performance and needs of students. This system can provide personalized learning paths and teaching resources for technology English based on individual differences among students, improving learning outcomes and meeting their learning needs.

Learning Analysis and Evaluation Tools. Learning analysis and evaluation tools can analyze and evaluate data on students' learning processes and outcomes. By analyzing students' learning behavior and performance, teachers can better understand their learning situation, adjust teaching strategies in a timely manner, and provide personalized guidance.

Mobile Learning and Social Learning. The popularity of mobile devices and social media provides opportunities for mobile learning and social learning. Future multimedia technology can combine mobile learning and social learning to provide anytime, anywhere learning resources and interactive platforms, promoting cooperation and communication among students.

Cross-Cultural Communication and Multilingual Support. Teaching scientific English should not only focus on the English language itself, but also on cross-cultural communication and multilingual support. Multimedia technology can provide online translation, multilingual subtitles, and teaching content from diverse cultural backgrounds, helping students better understand and apply scientific English.

CONCLUSION

Multimedia technology has brought excellent results in solving the difficulties of traditional scientific English curriculum teaching. This study aims to explore the application of multimedia technology in the practice of teaching scientific English and evaluate its impact on teaching effectiveness and student learning experience. Through empirical research methods, relevant data, collected and analyzed using questionnaire surveys and interviews, indicates that multimedia technology has significant advantages in teaching scientific English. Firstly, multimedia technology provides teachers with better teaching tools through its rich presentation forms and convenient resource acquisition methods. Teachers can use media such as images, sounds, and videos to explain abstract scientific English knowledge and improve students' comprehension abilities. Secondly, the interactivity of multimedia technology enables students to actively participate in the learning process and increase learning motivation. In addition, the study also found that multimedia technology has a very positive impact on students' learning experiences. The vivid presentation and interactive nature of multimedia technology stimulate students' interest in learning and increases their participation in learning. Students generally have positive feedback on multimedia teaching, believing that this teaching method is more interesting and easier to understand. The above research results lead the researchers to propose some specific suggestions and strategies to optimize the teaching practice of scientific English.

In summary, multimedia technology has important application value in the teaching of scientific and technological English. By fully utilizing the advantages of multimedia technology, teaching effectiveness and student learning experience can be improved. This study provides useful reference

and guidance for the teaching practice of scientific English, and serves to provide assistance to relevant educators. However, there are some problems in the practice of using multimedia technology in teaching English for science and technology such as excessive use of multimedia, which may lead to student distraction and affect teaching effectiveness. Therefore, in future teaching practice, multimedia technology should be reasonably utilized, and attention should be paid to the design of teaching content and methods to improve the effectiveness of scientific English teaching. In the future, further research will reveal how to apply multimedia technology more affectively in scientific and technological English teaching, such as developing multimedia resources suitable for scientific and technological English teaching and optimizing multimedia teaching design.

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