



**International Journal of Continuing Engineering Education
and Life-Long Learning**

ISSN online: 1741-5055 - ISSN print: 1560-4624

<https://www.inderscience.com/ijceell>

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DOI: [10.1504/IJCEELL.2025.10072600](https://doi.org/10.1504/IJCEELL.2025.10072600)

Article History:

Received:	17 January 2025
Last revised:	09 April 2025
Accepted:	27 June 2025
Published online:	10 October 2025

Multimedia-based evaluation on the intelligent distance education mode of college English

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Abstract: As society develops, distance education (DE) has become increasingly important in modern education. The implementation of the DE mode provides learning opportunities for more and more people. Applying modern information technology (IT) to DE can effectively change the current education mode, especially applicable to the opening and growth of DE. With the help of modern IT, English distance learning can solve the serious shortage of educational resources and provide a good infrastructure for the implementation of distance learning. Therefore, this paper analysed the characteristics and functions of English DE, studied the application and existing problems of multimedia network English DE, and put forward some corresponding optimisation strategies to solve the current issues. Through comparison, the new mode's teaching content design effect was 9.1% higher than the traditional ones, and the quality of teaching was 10.8% better than the conventional model. In other words, intelligent teaching and network multimedia can promote the English DE and improve its implementation quality.

Keywords: college English teaching; information-based intelligent distance education; network multimedia; teaching optimisation strategy.

Reference to this paper should be made as follows: Song, J. and Feng, Z. (2025) 'Multimedia-based evaluation on the intelligent distance education mode of college English', *Int. J. Continuing Engineering Education and Life-Long Learning*, Vol. 35, No. 8, pp.41–57.

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1 Introduction

The traditional English teaching model mainly relies on classroom lectures, with fixed teaching content, fewer students' independent learning and personalised needs, and a long feedback cycle. The English distance education (DE) model provides a flexible learning environment through multimedia and network technology, which can update course content in real-time to meet students' personalised learning needs. DE has a faster resource update speed and more interactive opportunities than the traditional model. Students can not only learn comprehensively through various forms such as video and audio, but also get instant feedback. The DE platform's flexibility, personalised content recommendation, and interactivity give it significant advantages in improving learning effects and stimulating students' enthusiasm. Therefore, regarding flexibility, resource updates, and individualised learning, the DE approach outperforms the traditional teaching model.

The distant education model, particularly the teaching approach paired with the neural network algorithm, has emerged as a significant solution to these issues in this context. This research aims to investigate how to use neural network algorithms to determine adaptability and teaching output value through DE to enhance the effectiveness and quality of English instruction. The main research goal of this paper is to improve students' autonomous learning ability and promote interactive communication between students and teachers by applying multimedia-assisted distance learning. This study's comparative analysis reveals that teaching English remotely can not only significantly increase students' excitement for learning but also encourage the reform and enrichment of the curriculum and successfully raise the standard of instruction.

Based on clarifying the advantages of DE, this paper further analyses the implementation effect of the teaching model, application of multimedia technology, and algorithm optimisation and verifies the feasibility of an intelligent DE model through empirical data. The following first evaluates the actual application effect of the English DE model, then explores the specific role and existing problems of multimedia technology in teaching, and finally proposes an optimisation path combined with a neural network algorithm.

The paper is structured as follows: Section 2 introduces the relevant theories and research background of DE; Section 3 explains in detail the application and advantages of neural network algorithm in DE; Section 4 shows the experimental design and data analysis results; finally, Section 5 summarises the research findings and proposes the direction of future research.

2 Related work

Multimedia technology has a vital role to play in teaching and learning. Hazaea et al. (2021) combined emergency DE with English teaching, introduced emergency distance English teaching, investigated the challenges of virtual classrooms, and suggested remedial measures for Arab English teachers when providing emergency distance lectures. Devkota (2021) analysed three overriding mechanisms that exacerbated inequality in education and society. Ismail (2018) discussed the enhanced blended learning method of the postgraduate learning theory course of the Arabian Gulf University and evaluated its impact on the satisfaction of the mixed learning experience of the subjects. To overcome this problem structurally, Ayu developed a theoretical framework by discussing theories and methods (Ayu and Zakiyah, 2021). Albiladi reviewed the relevant research on the use of blended learning in the context of English as a second language or foreign language and examined the academic and social benefits of this teaching method, which could be effectively used to develop language skills and improve the English learning environment (Albiladi and Khlood, 2019). Zhang (2022) through the online teaching practice in this special period continuously strengthened the cognition of teachers and students. With the deepening of the Internet concept in online teaching, English teaching methods and teaching process management were also improved (Zhang, 2022). Lee (2021) focused on communication-oriented comprehensive English education by improving the utilisation of various online platform functions and effectively applying vocabulary activities to enhance communication, autonomy, and cooperation capabilities. The above studies have described the role of distance learning in English classes, but they have not been analysed in combination with network multimedia.

Multimedia technology plays a vital role in teaching. Sun et al. (2021) applied the artificial intelligence module with knowledge recommendations to the system and developed an online English teaching system compared with the common teaching assistant system. Amin et al. (2018) introduced the benefits of using multimedia projectors for English teachers and discussed the benefits of using multimedia projectors for language teachers and learners in English teaching. Vadivel elaborated on how the English classroom could be full of vitality and effectiveness through the use of multimedia and how it fully affected students' actual communication and performance (Vadivel and Beena, 2019). Aljazzaf (2020) found the important factors that affected the use of multimedia in teaching and determined the factors that affected the use of multimedia technology in Kuwait English teaching. The above studies have described the role of multimedia technology in English DE, but there are still some deficiencies in the innovation of DE strategies.

3 Impact and module evaluation of the implementation of English intelligent DE Mode

3.1 *Evaluation of the impact of the introduction of English DE mode on English classroom*

The adoption of the English DE mode has a significant impact on classroom instruction in the context of contemporary remote learning. First, by integrating diverse online

learning resources, distance learning platforms can effectively promote the innovation of English vocational education mode. For example, interactive teaching based on online platforms can track and feedback students' personalised learning process so that teaching content can be more in line with students' needs. In addition, DE helps students find and correct language errors in time during self-study by providing an intelligent error correction system, overcoming the problem of delayed feedback in the traditional teaching mode.

Scientific resource classification and storage methods become particularly important for the management mode of English learning resources. On this basis, teachers can accurately select and recommend learning materials suitable for students' levels and needs through online platforms, such as determining which types of content can improve students' learning motivation through data analysis. Distance learning also integrates feedback data from different educational resources through big data technology, greatly enriching the breadth and depth of teaching resources. DE data is more comprehensive and dynamic than traditional classroom teaching data, which helps to better understand students' learning status.

Specifically for the English vocational education model, distance learning provides flexible learning time and space, providing students with more practical opportunities. For example, online simulation classes, remote internships, and interactive discussions allow students to practice language application in a real environment, improving the practicality and pertinence of learning (Nashir and Roudlotun, 2021). In addition, the error correction mode has also been significantly improved. The online English platform uses intelligent technology to automatically identify students' language errors and provide personalised feedback, thereby enhancing the efficiency of students' self-correction.

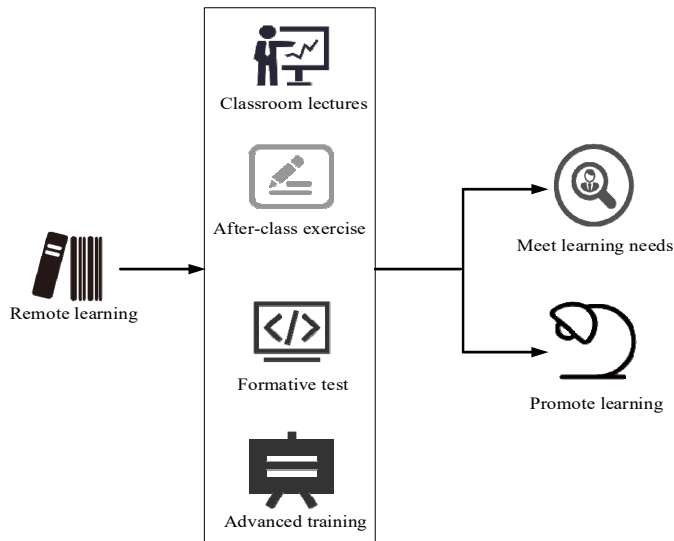
Therefore, this study believes that the effective implementation of the English DE model depends on the combination of advanced resource management models, personalised vocational education models, and intelligent error correction mechanisms. Teachers need to make reasonable use of online learning platforms in the process of distance teaching and formulate teaching plans that meet students' needs, so as to achieve continuous improvement in teaching quality. The optimisation of the above resource management and error correction mechanism has laid the foundation for the design of subsequent course modules. The following further analyses it from teaching module composition and student learning experience perspectives.

3.2 Module evaluation of English DE mode

English distance learning meets the needs of modern English learners. English teaching is conducted on the Internet. Students can learn English by themselves, and teachers can be consulted through the Internet in case of difficulties. The English distance learning mode includes multiple modules, such as classroom lectures, after-class exercises, stage tests, and advanced training, as shown in Figure 1. Listening, speaking, reading, and writing are organically combined when learning English. Students can learn not only grammar but also many other ways, including reading. They can also communicate directly with teachers during online consultations and practice English in many aspects. Students who encounter online learning problems can seek advice from individual teachers. Under their guidance, students can systematically summarise their English skills and improve their English level and the teaching efficiency of English courses.

The network platform updates the distance English learning content faster. However, the update speed of traditional English content is slower. Some textbooks need to be revised for several years, and online distance learning is very flexible. It can update the existing teaching content in a short time, or it can bring the latest global results or ideas to teaching at any time. Multimedia textbooks are presented in new forms. They are rich in content and also meet students' individual learning needs. Teachers suggest that maintaining a stable internet connection should be a priority for teaching (Nartiningrum and Arif, 2021). Multimedia learning resources can be created by means of hypertext, hyperlinks, and other ways. At the same time, they provide students with a more realistic environment and improve their interest in learning English. Learning resources include a large number of reference materials and learning materials. The training materials can provide a wide range of basic knowledge, relevant information, and word explanations. To facilitate students at different levels to learn English, there are a lot of easy-to-understand introductions and reference materials. It can meet the learning needs of students with high English proficiency and attract the attention of students with low English proficiency. Even students with different knowledge levels can meet their personal learning needs through additional interaction. By learning multimedia learning materials, students can complete the systematic process of building their own knowledge system. Although DE has performed well in resource updating and personalised learning, its in-depth impact on students' learning behaviour still needs to be quantitatively evaluated. This paper comprehensively analyses the actual benefits of the DE model through student feedback data and teaching output value.

Figure 1 Module analysis of English DE mode



3.3 Evaluation of the impact of English DE on students' learning

The introduction of distance learning in current English teaching not only maximises the use rate of students, but also creates a good atmosphere for learning English and reduces the teaching pressure of teachers. The first is to stimulate students' personality. To make

full use of students' personality characteristics and teach according to their own characteristics, each student is unique, which is very different from each other. In traditional college English teaching, teachers teach uniformly, but the level of students is high and low, and teachers do not know the level of students' English. Some students lose their interest in learning because the learning content is too complex. Distance learning can let them choose the learning content and time independently, form good learning interests, and eliminate this defect. The second is to establish a good learning situation. A real language environment can increase the effectiveness of English learning. In traditional English teaching, some students are unwilling to speak English in front of teachers and students because of low self-esteem or poor oral expression. Distance learning creates a real language environment for students and makes them feel comfortable. The third is to relieve the pressure of teachers. DE can be carried out by multimedia teachers in large classrooms, which partially alleviates the pressure of teachers. In addition, DE puts forward higher requirements for teachers and gives them more experience and professional ability. This requires college English teachers to have strong skills and professional depth in using computers and networks.

In summary, DE forms a virtuous circle by stimulating students' personality, constructing learning situations, and optimising teachers' roles. However, its effectiveness still needs to be verified in combination with the application of specific technical tools, which is discussed in the third part.

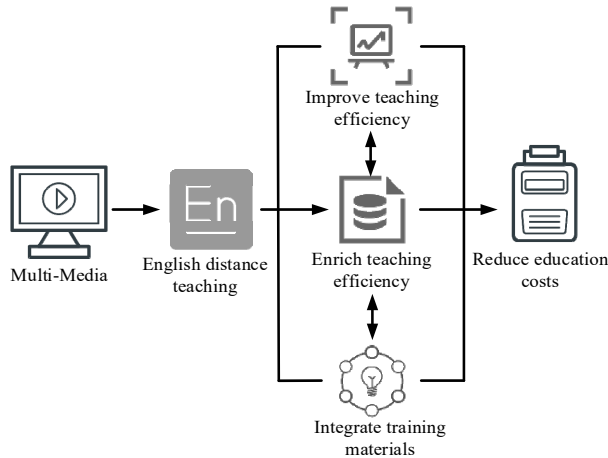
4 Application of multimedia network in English DE mode

4.1 Role of network multimedia in English DE

Multimedia learning has improved the teaching efficiency. At present, English distance learning and multimedia are inseparable. Multimedia learning in English teaching is crucial to the current English teaching research. The role of multimedia in English teaching is displayed in Figure 2. The first is to improve teaching efficiency. In the teaching process supported by multimedia, teachers can integrate and design the teaching content according to the teaching needs. In particular, the teaching image and voice elements are combined to create richer teaching content. According to the law of information recipients, developing learning content is to improve education levels. Second, teaching methods and textbooks are rich. Traditional teaching is based on teachers' teaching. The existing textbooks are very limited. Many textbooks are limited to textbooks and cannot be moved in the classroom. Although the emergence of multimedia learning materials has provided more classroom design methods and materials for teachers, multimedia learning teaching applications have greatly enriched students' vision and provided resource support for teaching innovation. The third is to realise the integration of training materials. High-quality textbooks are extremely rare in the whole society. The teachers evaluate the teachers' preparation before the course, but express contradictory attitudes towards using technology in language teaching (Canals and Amenah, 2019). Through multimedia teaching materials and network technology, teachers can teach more knowledge to students across time and regions. Through multimedia means, excellent teachers' classroom video materials can be converted into teaching materials and posted on the network platform, which can meet students' learning needs anytime and anywhere without time constraints. Using this method greatly reduces

students' learning costs. In modern society, integrating teaching materials has greatly reduced the cost of education. For students, the use of multimedia can improve their learning efficiency, which is also the key advantage of the rapid development of DE and Internet education.

Figure 2 Multimedia's role in English teaching



4.2 Technical challenges and coping strategies faced by teachers in multimedia distance learning

Although multimedia technology has significantly improved teaching efficiency, its practical application in DE still faces the challenge of conflicts between technical adaptability and teaching concepts.

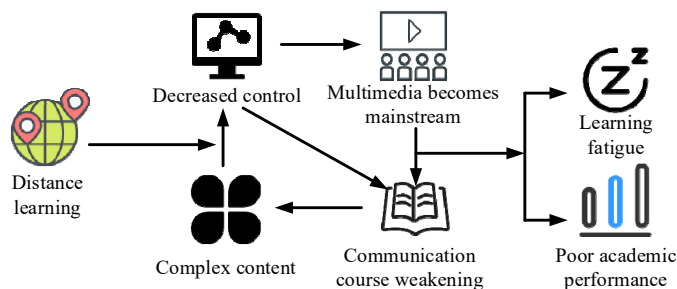
In multimedia distance learning, teachers face many technical challenges, such as unstable network connection, software and hardware compatibility issues, and unfamiliarity with multimedia tools. These technical difficulties may interfere with the teaching rhythm, reduce teaching efficiency, and weaken teachers' self-confidence. To meet these challenges, educational institutions need to take comprehensive measures. On the one hand, technical training should be carried out regularly to help teachers master the operation process and functional characteristics of multimedia tools and improve their technical application capabilities; on the other hand, network infrastructure should be optimised to ensure the smoothness of the teaching process. At the same time, multimedia tools and platforms with strong compatibility should be selected to reduce technical failures caused by equipment or system differences. In addition, a technical support team should be set up to provide real-time help to teachers and students and solve problems encountered during use in a timely manner. Through these measures, the technical pressure of teachers can be effectively alleviated; the smooth development of teaching activities can be guaranteed; the quality and effect of multimedia distance learning can be improved.

4.3 Application of network multimedia in English DE

Multimedia learning is extensively applied to English teaching and learning, which has greatly enhanced the level of English distance learning, as shown in Figure 3. However, while studying the status of distance learning, people find that there are some problems in multimedia learning. The first is that teachers' control over students is weakened. The personal qualities of the students participating in the research vary greatly. Students' self-control abilities are also different. In DE, teachers' direct control over students is very weak. In some schools, teachers can not even supervise students' learning. The teaching model under the constructivist learning theory is usually student-centred, which corresponds to the online teaching model (Xu and Shi, 2018). Compared with the traditional learning mode, distance learning has obvious defects in controlling students. The traditional learning mode weakens teachers' direct control over students, and is only a learning form for students with a low degree of autonomy. Although some students with low self-control levels associate different learning concepts with multimedia distance learning, they still feel uncomfortable with multimedia distance learning.

The second is that the complex content is not conducive to student enrolment. The production of learning CDs and related teaching materials is of great help to English teaching and greatly improves the ability of teaching content. Too much information in limited time leads to relatively less time spent by students in the classroom, thus increasing the complexity of key points and knowledge. This means that this kind of education cannot be overemphasised, leading to learning fatigue, decreased interest, poor learning performance, and failure to achieve educational goals. Third, multimedia has become the mainstream. The emergence of multimedia enriches teaching resources. In some DE institutions, they overemphasise the development of multimedia education, making multimedia education become the mainstream teaching mode. Under their influence, multimedia has become the most important educational tool for distance learning. The fourth is the weakening of English communication courses. DE is increasingly using multimedia teaching mode, and the interactive learning between teachers and students is very limited. Due to the lack of necessary oral communication, students can only learn English through audio-visual means. This enables them to understand and read rather than verbally explain. In fact, students tend to be more introverted. The weakness of English learning is usually manifested in students' lack of oral English skills, extensive use of multimedia teaching methods, and neglect of oral interactive learning, which leads to students' lack of learning ability. The above problems show that the application of multimedia technology needs to balance its instrumentality and teaching nature.

Figure 3 The application of network multimedia in English DE (see online version for colours)



5 Application of NN algorithm in English DE

To study the multimedia English DE mode practical effect, this paper analyses the training objective function of teaching through the NN algorithm, studies the teaching optimisation, and finally obtains DE's fitness and normalisation effect. First, the training objective function of English DE is calculated as follows:

$$A = (1/m) \sum_{m=1}^M [\bar{n} - n]^2 = (1/m) \sum_{m=1}^M A_j \quad (1)$$

Among them, m is the total number of teaching and training; n is the output value of the teaching and training program; \bar{n} is the expected value of the teaching and training program. This paper then analyses the optimisation of the connection weight of English DE, which can be obtained as follows:

$$\min(B) = f(x_1, x_2, \dots, x_i) \quad (2)$$

Among them, B is the total error value of teaching training, and X_i is the updated connection weight. This paper then analyses the adaptability of English distance teaching:

$$f_1 = \begin{cases} T - B, & B < C \\ 0, & B \geq C \end{cases} \quad (3)$$

Among them, C is the maximum of all error values. Finally, this paper can get the normalised teaching output value of English DE under multimedia:

$$O = \frac{R - R_{\min}}{R_{\max} - R_{\min}} \quad (4)$$

Among them, R is the unprocessed teaching input value, and R_{\max} , R_{\min} are the maximum and minimum value of DE input.

Through the modelling analysis of formulas (1)–(4), this paper aims to quantify the adaptability and teaching output of DE and provide a theoretical basis for the comparison between subsequent experimental data and traditional models.

6 Optimisation strategy of intelligent distance learning of English under multimedia network

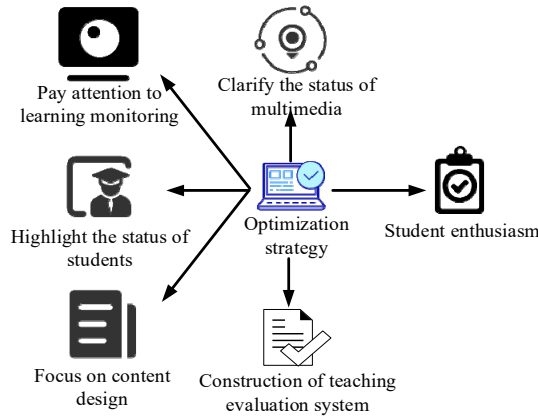
Distance learning has certain educational advantages in training English talents. It is necessary to emphasise the research on the use of multimedia learning in DE teaching and to facilitate the rapid growth of DE. The specific optimisation strategy is shown in Figure 4.

6.1 Paying attention to students' learning monitoring

In DE, lack of self-control among students is a common problem, especially teachers' lack of control over students. Therefore, it is necessary to introduce a learning monitoring mechanism in the learning process to help students maintain their enthusiasm and

progress in learning. In specific implementation, teachers can track students' learning progress in real-time through multimedia platforms, and stimulate students' sense of participation and responsibility by designing interactive sessions. To encourage students to participate more actively in their education, interactive sessions might entail students answering questions and taking part in discussions. The final grade evaluation can then incorporate these interactive outcomes. Teachers can use this to dynamically modify their lesson plans and instructional strategies, ensuring that pupils keep improving as they learn. At the same time, real-time learning monitoring can also help teachers identify students' learning problems and provide timely feedback and guidance. However, during the implementation process, there may be challenges such as low student participation or excessive monitoring that limits students' ability to learn independently, so it is necessary to find a balance between monitoring and student autonomy.

Figure 4 Optimisation strategy of English intelligent DE under multimedia network (see online version for colours)



6.2 *Highlighting the main position of students*

The traditional teacher-centred teaching model is broken by DE, which places more emphasis on the idea of student-centred learning. To assist students develop their capacity for independent learning, teachers must offer tailored instruction based on each student's unique learning style and traits. Teachers should specifically create learning activities that cater to the needs of their students, motivate them to actively engage in the learning process, and address real-world learning challenges. Students can learn at their own pace and with their own interests thanks to the flexible learning environment offered by the virtual classroom. In addition to raising students' proficiency in English, this learning environment piques their curiosity about the language. Additionally, the virtual classroom can offer students individualised learning services to accommodate their various distance learning demands. Teachers must provide more direction and assistance during the deployment phase to guarantee that students can utilise the many learning resources in the virtual classroom efficiently, nevertheless, as students' capacities for independent learning may differ.

This paper discusses in detail how teachers can use online platforms and technology to guide students to learn independently and cultivate their self-management ability. First,

teachers can guide students by setting clear learning goals and providing personalised learning plans. Second, online quizzes, discussion forums, and other functions are used to promote students' active participation and interaction. In addition, it is also possible to help students develop good learning habits by regularly checking their learning progress and giving feedback.

6.3 Paying attention to the design of teaching content

Despite its flexibility and openness, DE may not have enough oversight over the creation of its instructional materials, making it impossible to guarantee the calibre of instruction. Teachers must create lesson plans catering to students' cognitive structures and learning styles to enhance instruction quality and guarantee that learning goals are met. Teachers should assist students in setting specific learning objectives and offer tailored learning recommendations based on each student's unique characteristics. Teachers can increase the depth and efficacy of learning by encouraging students to participate in collaborative learning, which fosters knowledge exchange and interaction among students. To help students create successful learning plans and methods, teachers should simultaneously employ computer technology to give them access to an independent learning platform. Teachers must, however, deal with the challenge of striking a balance between the flexibility and complexity of instruction, as well as how to promptly modify their methods in response to student input. Overly complicated individualised learning programs and delayed content updates can be obstacles to this approach.

To better meet the interests and needs of students, teachers should adopt flexible and diverse teaching content design methods. For example, different course modules can be customised according to students' English level and interests. At the same time, multimedia resources (such as video, audio, animation, etc.) can be used to enrich the form and connotation of teaching content, making the learning process more vivid and interesting. In addition, students are encouraged to participate in the selection process of teaching content, giving them the opportunity to express their preferences and needs, thereby improving their enthusiasm and effectiveness in learning.

6.4 Clarifying the status of multimedia

Multimedia technology's function in instruction is growing in significance as it gradually gains traction in distance learning. In the current educational environment, teachers need to clarify the concept of multimedia use, so that it is not just an auxiliary tool, but a core tool for leading learning. To make sure that multimedia is fully integrated into the educational process, educators should create explicit guidelines for its use. Due to space constraints, the traditional distance learning approach frequently fails to meet the oral interaction demands of students, particularly when teaching oral English. Therefore, teachers can use modern communication tools to implement oral interactive courses, break through the space limitations, and provide students with a richer learning experience. In addition, teachers should also update multimedia content regularly to ensure the cutting-edge and practical nature of the course content and help students keep up with the pace of the times. However, how to ensure the effective application of multimedia tools and avoid them becoming a burden rather than a help for students is still a key issue that needs to be solved in teaching. The maturity of technology, students'

adaptability, and the coordination of teaching content are challenges that may be faced during implementation.

6.5 Construction of teaching evaluation system

In the network multimedia environment, the teaching evaluation system should introduce an interactive learning evaluation model, combining the comprehensive evaluation and mutual evaluation of teachers and students. This model not only stimulates students' active learning awareness through diversified evaluation methods, but also provides real-time feedback on teaching effects by dynamically tracking students' learning process.

Three components make up the assessment system's distinctive composition: teacher, peer, and student evaluations. The self-evaluation link encourages students to reflect on their learning progress and effectiveness; peer evaluation enhances the interaction and cooperation between students; teacher evaluation comprehensively considers students' participation, homework quality, and classroom performance. In terms of operating mechanisms, the system generates real-time reports through data analysis based on students' learning activities and grades, helping teachers to adjust teaching strategies in a timely manner.

To ensure the fairness and effectiveness of the evaluation, the system adopts anonymous evaluation and multiple verification mechanisms to avoid the interference of individual bias. In addition, the system also introduces a weighted evaluation method, setting different weights according to the importance of different evaluation items to ensure the comprehensive evaluation of various factors. Through these measures, the fairness and justice of the evaluation results can be ensured, and the improvement of students' learning motivation can be promoted.

7 Experimental evaluation of multimedia English intelligent DE

To evaluate the specific teaching effect of English intelligent distance courses in a network multimedia environment, this paper selected three universities for a comparative experiment, focusing on comparing three core indicators: student enthusiasm, teaching adaptability, and content design effect. This paper analysed the enthusiasm of students in learning and the enthusiasm of students in autonomous learning in a multimedia environment, and analysed the adaptability and teaching output value of DE with the help of the NN algorithm. Finally, the design effect and teaching quality of English DE in a multimedia environment were compared with the traditional teaching model, and the feasibility of English DE proposed in this paper was analysed. Among them, 50 English majors were surveyed in each school, focusing on the complexity of the classroom environment and content, as shown in Table 1.

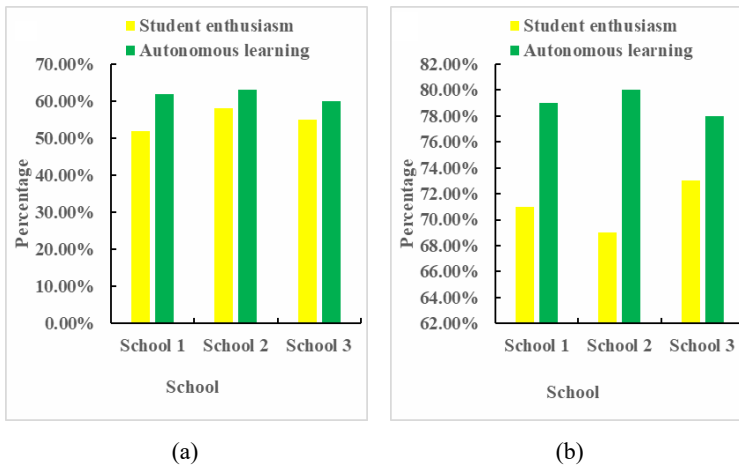
It can be seen that satisfied students believed that network multimedia can help teachers design simple and beautiful teaching content, improve their learning interest to a certain extent, and also promote the progress of distance learning. However, the unsatisfied students thought that it was not easy for teachers to monitor students' learning dynamics in English DE, and they cannot effectively intervene or correct. This paper then analysed the students' enthusiasm and autonomous learning in the three schools under the network multimedia English DE, and compared it with the original teaching mode. The

survey took the average of students' enthusiasm and autonomous learning, respectively, for a week. The specific survey is shown in Figure 5.

Table 1 English majors' satisfaction in English DE

	<i>Satisfied</i>	<i>Commonly</i>	<i>Dissatisfied</i>
School 1	42	5	3
School 2	40	4	6
School 3	38	8	4
Total	120	17	13

Figure 5 Students' enthusiasm and autonomous learning in three schools under the network multimedia English DE, (a) traditional teaching mode, (b) new teaching mode (see online version for colours)



Under the conventional teaching mode, school 1's learning enthusiasm was 52%, and students' autonomous learning was 62%; school 2's learning enthusiasm was 58%, and students' autonomous learning was 63%; school 3's learning enthusiasm was 55%, and students' autonomous learning was 60%. Under the new teaching mode, school 1's learning enthusiasm was 71%, and students' autonomous learning was 79%; school 2's learning enthusiasm was 69%, and students' autonomous learning was 80%; school 3's learning enthusiasm was 73%, and students' autonomous learning was 78%. English DE course under the multimedia network was rich in content, and it can attract students' interest more and make students dare to express. It can not only exercise their oral expression ability, but also promote students' autonomous learning. This paper then used the NN algorithm to analyse the fitness and teaching output value of distance learning. The specific investigation is shown in Figure 6.

Through comparison, it can be seen that the adaptability of the new model was 0.2 higher than that of the traditional model, and the teaching output value was 0.09 higher than that of the traditional model. It can also be seen that the adaptability of multimedia networks and English DE was increasing, and the teaching resources were also increasing, which can improve students' adaptability and knowledge acceptance ability, allowing students to solve their self-learning needs. This paper later analysed the design

effect and teaching quality of teaching content in English DE, and compared it with the original teaching mode. The specific comparison is shown in Figure 7.

Figure 6 Adaptability of different teaching modes and teaching output value, (a) traditional teaching mode, (b) new teaching mode (see online version for colours)

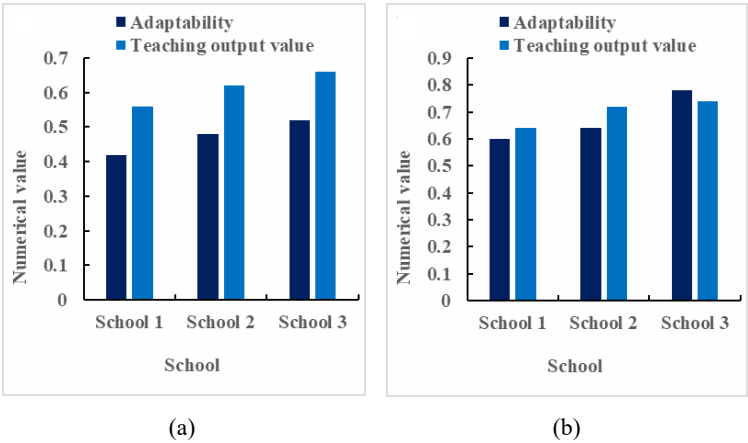
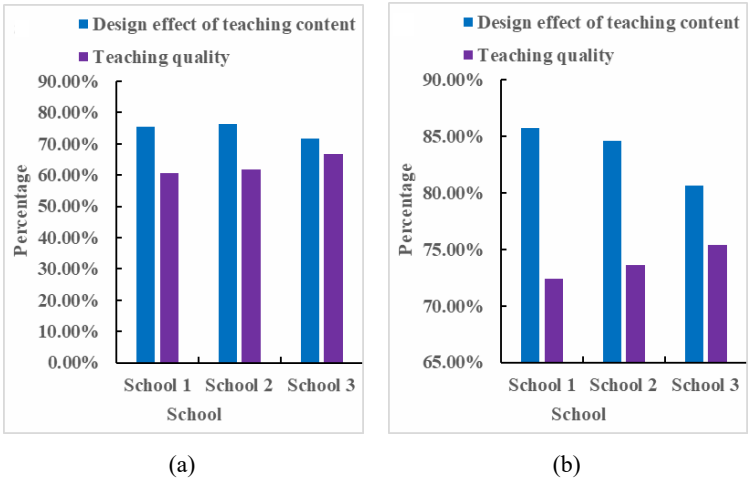


Figure 7 Teaching content design effect and teaching quality under English DE, (a) traditional teaching mode, (b) new teaching mode (see online version for colours)



Students' enthusiasm and autonomous learning under the multimedia network English DE were better than the original teaching mode, and the teaching adaptability and teaching output value were greatly improved compared with the previous mode. Compared with the traditional English teaching mode, multimedia helps students make full use of the voice and image advantages of English teaching to learn English. In addition, the design of teaching content is also more in line with the psychological needs of students and is easy for students to accept, thus promoting an increase in teaching quality. Under DE, teachers can not only reduce pressure, but also monitor students'

learning status in real-time, and carry out different resource teaching for different students.

To gain a deeper understanding of students' views on the English DE model and their satisfaction with it, as well as to collect suggestions for improvement, questionnaire surveys and group interviews are conducted at the end of the semester. The data collected through these methods can not only help evaluate the current teaching effect, but also provide a basis for future teaching improvements. At the same time, the process of analysing student feedback is also an essential part of constantly adjusting and improving teaching strategies.

8 Conclusions

As an essential part of the education system, improving the quality of DE is crucial to promoting the development of DE. With the continuous development of information technology (IT), the English DE model is also continuously updated and improved. As an essential tool of modern education, multimedia has greatly improved learning efficiency through scientific application, created a new learning environment for students, stimulated students' interest in English learning, enhanced students' autonomy in distance learning, and cultivated students' ability to think independently. However, DE is still an emerging learning model, and there are many challenges in the implementation process. These problems directly affect the goals of DE resources and information platform construction. Therefore, it is particularly important to develop effective teaching methods and give full play to the guiding role of teachers. With the continuous advancement of technology, new technologies such as artificial intelligence, big data analysis, and virtual reality (VR) are gradually being used in English DE. These technologies not only provide more interactive and personalised services for distance learning, but also enhance the immersion and interactivity in the learning process. For example, artificial intelligence can automatically adjust teaching content according to students' learning situation, provide personalised learning suggestions, and help students overcome learning difficulties; big data analysis technology can monitor students' learning progress and results in real-time and provide teachers with accurate teaching feedback; VR technology creates an immersive learning environment for students, enhancing the practicality and experience of learning. In the future, as these new technologies continue to mature and be applied, English DE is more efficient, interactive, and personalised, promoting further improvement in the quality of education. It should be pointed out that the universality of the conclusions of this study still needs to be verified in a wider range of teaching scenarios. Future research can combine artificial intelligence and big data technologies to further explore the dynamic optimisation mechanism of DE.

Acknowledgements

This work was supported by Innovation Research on Intelligence-driven Cross-cultural Talent Training Model for College English from the Perspective of New Liberal Arts, Ministry of Education Industry-university Cooperative Education Project, 2024; Research on Multi-media Communication of Chinese Excellent Traditional Culture under the Background of Digital Humanities, Jilin Province Higher Education Association Project, 2024.

This work was supported by Innovation Research on the Blended College English Teaching Model under the Background of Artificial Intelligence, Undergraduate Teaching Reform Project of Qingdao University of Technology, 2024; Research on the Integrated Dual-Major Program Based on the Reform and Practice of College English Education, Annual ‘World Languages and Cultural Studies’ Project, 2023; ‘Shandong Model’ of Digital Educational Resource Construction for University Talent Cultivation, ‘Internet+Education’ Application Research Base Project of Shandong Province, 2023.

Declarations

The authors declare that there is no conflict of interest with any financial organisations regarding the material reported in this manuscript.

Data availability statement

Data is available upon reasonable request.

References

- Albiladi, W.S. and Khlood, K.A. (2019) ‘Blended learning in English teaching and learning: a review of the current literature’, *Journal of Language Teaching and Research*, Vol. 10, No. 2, pp.232–238.
- Aljazzaf, Z. (2020) ‘Factors influencing the use of multimedia technologies in teaching English language in Kuwait’, *International Journal of Emerging Technologies in Learning (iJET)*, Vol. 15, No. 5, pp.212–234.
- Amin, M., Mahedi, A. and Kalam, M. (2018) ‘The benefit of using multimedia projector in English Language teaching classroom’, *International Journal of Social Sciences & Humanities*, Vol. 3, No. 1, pp.62–76.
- Ayu, M. and Zakiyah, F.P. (2021) ‘The implementation of online learning in English language teaching during pandemic: the teachers voice’, *Journal of Research on Language Education*, Vol. 2, No. 2, pp.93–99.
- Canals, L. and Amenah, A.R. (2019) ‘Teacher training and teachers’ attitudes towards educational technology in the deployment of online English language courses in Jordan’, *Computer Assisted Language Learning*, Vol. 32, No. 7, pp.639–664.
- Devkota, K.R. (2021) ‘Inequalities reinforced through online and DE in the age of COVID-19: the case of higher education in Nepal’, *International Review of Education*, Vol. 67, Nos. 1–2, pp.145–165.

- Hazaea, A.N., Wagdi, R.A.B.H. and Marwa, M.T. (2021) 'Emergency remote English language teaching in the Arab league countries: challenges and remedies', *Computer-Assisted Language Learning Electronic Journal*, Vol. 22, No. 1, pp.201–222.
- Ismail, A. (2018) 'Empowering your students satisfaction with blended learning: a lesson from the Arabian Gulf University DE and training program', *International Journal of Information and Education Technology*, Vol. 8, No. 2, pp.81–94.
- Lee, M.K. (2021) 'Development of a college English teaching and learning model in online synchronous/asynchronous platforms to enhance competencies', *The Journal of the Convergence on Culture Technology*, Vol. 7, No. 4, pp.35–42.
- Nartiningrum, N. and Arif, N. (2021) 'English teachers' perspectives on challenges, suggestions, and materials of online teaching amidst the global pandemic', *Indonesian Journal of English Education (IJEE)*, Vol. 8, No. 1, pp.101–119.
- Nashir, M. and Roudlotun, N.L. (2021) 'English teachers' perception toward the switch from offline to online teaching during lockdown in the midst of COVID-19 outbreak', *Edukatif: Jurnal Ilmu Pendidikan*, Vol. 3, No. 2, pp.250–260.
- Sun, Z.M., Anbarasan, M. and Kumar, D. (2021) 'Design of online intelligent English teaching platform based on artificial intelligence techniques', *Computational Intelligence*, Vol. 37, No. 3, pp.1166–1180.
- Vadivel, B. and Beena, P.V. (2019) 'The impact of multimedia in English language classroom of undergraduate students in engineering colleges', *International Journal of Advanced Science and Technology*, Vol. 28, No. 2, pp.194–197.
- Xu, Z.L. and Shi, Y.L. (2018) 'Application of constructivist theory in flipped classroom-take college English teaching as a case study', *Theory and Practice in Language Studies*, Vol. 8, No. 7, pp.880–887.
- Zhang, H.X. (2022) 'Online teaching model construction and practice of college English in post-epidemic period', *Canadian Social Science*, Vol. 18, No. 1, pp.56–60.