

Research on the Application of Modern Information Technology in English Teaching——An investigation based on the perspective of technology acceptance

Jiawei Wang^{1, #}, Ying He^{2, #}, Wenxuan Tan^{3, *, #}

¹ Shihezi University, Shihezi, Xinjiang, 832003

² Foreign Languages Northwest Normal University, Lanzhou, Gansu, 730000

³ Liaocheng University, Liaocheng, Shandong, 252003

* Corresponding author: 2012826087@qq.com

#These authors contributed equally.

Abstract. In the information age, science and technology have profoundly impacted the education industry with their wide penetration. Scientific development advances new demands and challenges for education, influences traditional areas of education, leads to conflicts in education between the new and the old, the advanced and the backward, and ultimately promotes educational innovation and development. Many new technology products have been adopted in education. These new technologies are being applied to improve teaching effectiveness on the one hand and to promote the popularisation and popularisation of education on the other. As a kind of humanities, English has undergone many changes in English education in recent years due to informatization. Most academics now concentrate on how and whether students, the audience, can embrace this transformation. There is, however, no clear assessment system for the effect of teaching English, and in the process of teaching English, effective feedback is an important component of effective instruction. The key factors to determine whether to give effective feedback are students' self-efficacy and learning engagement. Therefore, this study adopts an adaptation-mode integration technology acceptance questionnaire to analyze the influence of general self-efficacy and learning engagement on English teaching effectiveness. Drawing on the learning theory of modern educational technology, this study conducts an empirical investigation based on the technology acceptance perspective, comprehensively reviews the application of modern information technology in English language education, and advances plans and options for improving the effectiveness of education in the future.

Keywords: college students, information technology, English education, technology acceptance, application program.

1. Introduction

1.1. The Need for English Teaching Research

Language is of great significance in real life as a communication tool. As a global language, English plays an irreplaceable role in the communication of people all over the world because it is the most widely used language. In the information age, all countries in the world use English as a medium to transmit various kinds of information resources, so mastering English is an important means to obtain valuable information and sorts of resources in the information age, and the high percentage of people who have a good command of English is of strategic importance to the country. Therefore, it should be the right strategic choice to strengthen English teaching, and it is far-reaching to research English teaching [1].

However, with the high development of information technology, the traditional education model is outdate. And the research on English teaching cannot just stay in the study of traditional teaching. The application of modern educational technology in English teaching has had a profound impact on the teaching methods, teaching contents, and even teaching objectives of the education industry. Studying the application of modern information technology in English teaching plays an important role in the study of English teaching. [2]

1.2. The current situation of the application of modern information technology in English teaching

1.2.1. The teaching goal of English teaching is shifted from mastering the basic competence of listening, speaking, reading, and writing to the development of comprehensive English literacy

In traditional English teaching, teachers are more inclined to master students' basic English skills, that is, the cultivation and improvement of listening, reading, writing, and translating abilities. They even focus only on students' reading and writing skills, and English teaching serves the phenomenon of exam-oriented education but rarely touches on language expression skills, English thinking skills, cultural knowledge background, etc.[3] Therefore, for a long period, English teaching in China has shown problems such as "dumb English" and "small-town swot". How to fundamentally solve such teaching problems, the introduction of multimedia technology in English teaching and its integration provides ideas to solve the dilemma of English teaching. In the context of multimedia technology and the diversification of world cultures and the increasingly frequent interaction and cooperation among countries, English teaching has gradually formed a new teaching task and teaching goal out of the need for its reform and the objective need to adapt to social development: to cultivate talents with comprehensive qualities in English[4]. English teaching no longer aims to cultivate students' basic English ability, but to focus on students' language ability, cultural awareness, thinking quality, and learning ability in four dimensions (9 literacies, 25 basic points), to achieve a level of education and quality of education that unites knowledge and action in subject teaching[5]. The integration of multimedia technology into English language teaching reflects the latest requirements of socio-economic and technological information development, emphasizing the requirements of creativity and innovation, information literacy, international perspective, communication and exchange, teamwork and cooperation, social participation, and social contribution, and self-planning literacy for contemporary students' multidimensional abilities[6].

1.2.2. Positive impact of multimedia technology application in English classroom

The application of multimedia technology in the English classroom is also a major measure to solve the timeliness and promote the balance of resources and educational equity. With the upgrading of educational hardware facilities in colleges and universities and the influence of Internet technology on society at large under the technological revolution, students' dependence on offline English teachers and English classes has gradually decreased, and students' self-learning ability has been improving[7]. Students can change their learning mindset and study habits through access to rich learning resources to improve their English proficiency and thus achieve the effect of narrowing the educational gap between different places. Due to the fast and wide dissemination of information in the Internet era, students from all over the country can synchronize their information. And the reduction of information differences is also a key step to achieving educational equity. With the assistance of multimedia technology, the quantitative change in English teaching content has caused a qualitative change in English teaching quality, thus improving the English teaching level and teaching efficiency in China[8].

1.3. Effects of Learning Engagement and Self-Efficacy in English Language Teaching

Learning engagement, which first appeared in the field of psychological research, is one of the most important elements to measure students' learning achievement and persistence and considered as the degree of students' commitment to and participation in learning activities. Self-efficacy theory is a theory of motivation proposed by American psychologist Bandura, which refers to the beliefs, judgments, or self-perceptions that individuals have about the level at which they can complete a behavioral operation before performing it [9]. Butkowsky & Willows showed that superior and intermediate students have higher self-efficacy and higher persistence in learning than poor students. The superior students were higher than the intermediate students. Several empirical studies have also shown that learning self-efficacy is significantly and positively related to academic performance.[10] According to Bandura's self-efficacy theory, students' expectations and judgments

about their abilities during learning activities influence their motivation, learning behaviors, and academic performance. When students believe they are capable of completing a learning activity, they are more motivated to participate in it and their engagement in learning is higher[11]. Empirical studies have also shown that academic self-efficacy is related to learning engagement and that academic self-efficacy can be a positive predictor of learning engagement. The higher a student's academic self-efficacy, the more engaged he or she is in learning [12].

The selection of self-efficacy and engagement in learning as the two major factors reflecting the effectiveness of English language teaching was based on multiple considerations. Effective feedback is an important part of effective teaching and learning. The key factors in determining whether or not to give effective feedback are students' self-efficacy and engagement in learning. [13] Proceeded that a student never believe himself that he can be really good at dancing, there is a great chance that he will perform badly in dance. However, a student who are confident about his ability of learning to dance, there is a greater chance for him to dance well when compared to the former. And empirical research to date suggests that high levels of self-efficacy is related to positive learning outcomes such as setting learning goals, using different types of learning strategies, and achieving better academic performance. Thus, teachers have an important role in creating a learning environment for high self-efficacy teaching.

Academic self-efficacy also has an important effect on learning engagement. Students' engagement in learning is determined by their level of commitment and intention. Learning engagement can be divided into four components: interest in learning, curiosity, attention, and learning behavior. Moreover, academic interest and curiosity were found to be important factors influencing self-efficacy[14] Therefore, academic self-efficacy also has a profound effect on learning engagement. In this study, students' engagement was presented as learning engagement while students' intention to learn engagement was presented as self-efficacy. At the same time, the level of students' self-efficacy directly affects whether students are really engaged in learning or not. There is a direct link between the two[15].

Overall, the relationship between instructional effectiveness, learning engagement, and self-efficacy is complementary and influences each other. Students who learn more self-regulated learning strategies are prone to have higher levels of self-efficacy. In turn, higher levels of self-efficacy directly influence students' engagement in learning and promote active learning. This, coupled with the teacher's task of creating a high self-efficacy learning environment, in turn, can facilitate students learning more self-regulatory strategies. This ultimately leads to high efficiency and quality teaching and learning outcomes. Therefore, our choice of self-efficacy and engagement in learning as factors to measure teaching effectiveness for the study is meaningful and unique.

2. Research Design and Research Results

2.1. Research Design

2.1.1. Research questions

This study aims to investigate the following two questions:

Q1: What is the relationship between English learners' technology acceptance and learning engagement?

Q2: What is the relationship between English learners' technology acceptance and general self-efficacy?

2.1.2. Research subjects

The subjects of this study are English majors from Sanquan College of Xinxiang Medical University.

2.1.3. Research tools

In this study, technology acceptance is measured by the Integrated Technology Acceptance and Use Model Questionnaire adapted from Venkatesh et al. and Yang, J.; learning engagement is measured by the Learning Engagement Scale for College Students translated and revised by Fang, Laitan et al.; and general self-efficacy is measured by the General Self-Efficacy Scale compiled by Wang, Cai-Kang et al. Among them, the Integrated Technology Acceptance and Use Model Questionnaire is divided into four dimensions: performance expectancy, effort expectancy, social influence and facilitating conditions, with a total of 16 items, and scored on a five-point Likert scale, with “1-5” being “Strongly Disagree”, “Disagree”, “Undecided”, “Agree” and “Strongly Agree”. The Learning Engagement Scale for College Students is divided into three dimensions: vitality, dedication and concentration, with 17 items, while the General Self-Efficacy Scale has 10 items. Both scales are scored on a four-point Likert scale, with “1-4” being “Totally Disagree”, “Basically Disagree”, “Basically Agree”, “Totally Agree”.

The Cronbach's Alpha of the original Integrated Technology Acceptance and Use Model Questionnaire is 0.901, the KMO value is 0.834, and the significance of Bartlett's Test of Sphericity is 0.000. The cumulative variance explained by the six factors of the questionnaire is 77.164%. The Cronbach's Alpha and the KMO value of the Learning Engagement Scale for College Students are both 0.951, the Bartlett's Test of Sphericity value is 3219.67 ($p < 0.001$), and the cumulative variance explained by the three factors is 68.40%. In addition, the factor loadings for all measured items are greater than 0.4. The Cronbach's Alpha for the General Self-Efficacy Scale is 0.870, and the correlation between the 10 questions and the total scale score is above 0.60. The results of the exploratory factor analysis also prove that the questionnaire of this study contains only one major factor, which means that the questionnaire is single-dimensional.

Table 1. Reliability of Integrated Technology Acceptance and Use Model Questionnaire

	N	Cronbach α	Items
Integrated Technology Acceptance and Use Model Questionnaire	384	.958	16

Table 2. Validity of Integrated Technology Acceptance and Use Model Questionnaire

KMO		.954
Approx. Chi-Square		5383.002
Bartlett's Test of Sphericity	df	120
	Sig.	.000

In this study, the Cronbach's Alpha of the adapted Integrated Technology Acceptance and Use Model Questionnaire is 0.958 in Table1, which indicates that the questionnaire has high reliability. As shown in Table 2, the KMO value of the Integrated Technology Acceptance and Use Model Questionnaire is 0.954 and the significance of Bartlett's Test of Sphericity is 0.000, indicating that the questionnaire is suitable for factor analysis.

Table 3. Communalities

	Initial	Extraction
T1	1.000	.716
T2	1.000	.865
T3	1.000	.798
T4	1.000	.726
T5	1.000	.752
T6	1.000	.830
T7	1.000	.781
T8	1.000	.811
T9	1.000	.902
T10	1.000	.890
T11	1.000	.779
T12	1.000	.721
T13	1.000	.807
T14	1.000	.781
T15	1.000	.771
T16	1.000	.712

Extraction Method: Principal Component Analysis.

Table 4. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotations Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.036	62.726	62.726	10.036	62.726	62.726	3.669	22.928	22.928
2	1.089	6.803	69.529	1.089	6.803	69.529	3.574	22.339	45.268
3	.914	5.713	75.242	.914	5.713	75.242	3.410	21.310	66.577
4	.603	3.772	79.014	.603	3.772	79.014	1.990	12.437	79.014
5	.495	3.092	82.106						
6	.445	2.784	84.890						
7	.355	2.217	87.107						
8	.307	1.919	89.026						
9	.287	1.796	90.822						
10	.268	1.677	92.499						
11	.255	1.595	94.094						
12	.231	1.445	95.539						
13	.218	1.366	96.904						
14	.196	1.227	98.131						
15	.163	1.020	99.151						
16	.136	.849	100.000						

Extraction Method: Principal Component Analysis.

Table 5. Rotated Component Matrix^a

	Component			
	1	2	3	4
T6	.828	.213	.272	.159
T8	.806	.287	.176	.222
T7	.748	.328	.217	.260
T5	.629	.181	.499	.275
T12	.155	.754	.302	.193
T13	.377	.747	.235	.229
T14	.293	.691	.334	.327
T11	.270	.656	.310	.425
T15	.537	.604	.337	.071
T16	.518	.565	.275	.224
T2	.237	.265	.815	.271
T1	.213	.263	.774	.055
T3	.368	.281	.724	.244
T4	.192	.334	.696	.306
T9	.313	.353	.296	.769
T10	.357	.369	.326	.721

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation Converged in 6 iterations.

In factor analysis, eigenvalues are a common method for determining the number of factors. As seen in Table 4, the researchers select four components with eigenvalues greater than 0.60. The cumulative variance explained by the four factors is 79.014%, indicating that the variance of the whole scale can be well explained. And as shown in Tables 5, T1, T2, T3, and T4 are performance expectancy; T5, T6, T7, and T8 are effort expectancy; T9 and T10 are social influence; and T11, T12, T13, T14, T15, and T16 are facilitating conditions. In addition, as shown in Table 3, the extraction value of communalities are all greater than 0.70. Thus, the questionnaire has good structural validity.

2.2. Research result

2.2.1. General characteristics of technology acceptance, learning engagement, and general self-efficacy

Table 6. Descriptive Statistics

	N	Mean	Std. Deviation
Integrated Technology Acceptance and Use Model Questionnaire	384	65.56	9.629
Learning Engagement Scale for College Students	384	49.72	9.900
General Self-Efficacy Scale	384	29.40	6.031
Valid N (listwise)	384		

As shown in Tables 6, the mean value of the Integrated Technology Acceptance and Use Model questionnaire is 65.56 (>48); the mean value of the Learning Engagement Scale for College Students is 49.72 (>42.5); and the mean value of the General Self-Efficacy Scale is 29.40 (>25), which indicates that the mean values of the above questionnaires are all in the middle to upper range.

According to the Integrated Technology Acceptance and Use Model questionnaire, the subjects believe that information technology could enrich their learning content and enhance their learning ability by helping them to complete their learning tasks, thereby improving their learning efficiency. It is also suggested that “teachers’ information technology skills may influence students’ attitudes toward information technology”. Therefore, the subjects expect teachers to actively change their mindset, strengthen training and learning, and improve their own information technology teaching ability, while providing relevant information technology teaching courses and creating a good

information technology learning environment, so that students can have more opportunities and time to contact and master information technology, and then cultivate students' information technology literacy and improve their information technology ability to adapt to the development of the times and meet students' needs.

According to the Learning Engagement Scale for College Students, the subjects have a strong desire to learn. Not only are they energetic in the learning process, but they also do not give up easily when they encounter problems that are difficult to solve. However, after a long period of uninterrupted study, the subjects easily feel mentally fatigued and are unable to recover their energy and vitality quickly. The subjects have a strong dedication to learning. Not only do they agree with the idea that learning can inspire students, but they also take pride in what they have learned and are always enthusiastic about learning. Subjects have a high level of concentration during the learning process. The high level of concentration significantly reduces the sensitivity to the surrounding environment and things and allows the subject to concentrate on learning without distractions.

The General Self-Efficacy Scale shows that the subjects have a high level of confidence in mobilizing the skills they have to complete their studies. This is demonstrated by the fact that when facing with difficulties, the subjects have sufficient confidence to mobilize their own talents to cope with the unexpected. In addition, they believe that they can effectively solve problems through certain efforts. However, they believe that it is relatively difficult to uphold their ideals and achieve their goals.

2.2.2. The relationship between technology acceptance and learning engagement

(1) Correlation analysis between technology acceptance and learning engagement

Table 7. Correlations

	Integrated Technology Acceptance and Use Model Questionnaire	Learning Engagement Scale for College Students
Integrated Technology Acceptance and Use Model Questionnaire	1	
Learning Engagement Scale for College Students	.644**	1

** . Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 7, technology acceptance is significantly and positively correlated with learning engagement ($r = 0.644$, $p < 0.01$).

(2) Regression Analysis of Technology Acceptance and Learning Engagement

Table 8. Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.644a	.415	.414	7.580	1.826

a. Predictors: (Constant), Integrated Technology Acceptance and Use Model Questionnaire

b. Dependent Variable: Learning Engagement Scale for College Students

Table 9. Anova^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15590.112	1	15590.112	271.368	.000a
	Residual	21945.948	382	57.450		
	Total	37536.060	383			

a. Predictors: (Constant), Integrated Technology Acceptance and Use Model Questionnaire

b. Dependent Variable: Learning Engagement Scale for College Students

Table 10. Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.274	2.665		2.354	.019
	Integrated Technology Acceptance and Use Model Questionnaire	.663	.040	.644	16.473	.000

a. Dependent Variable: Learning Engagement Scale for College Students

As shown in Tables 8, the Adjusted R Square is 0.414, indicating that technology acceptance explains 41.4% of the learning engagement. In addition, the Durbin-Watson value is 1.826, which is in the range of 1.8-2.2, indicating that technology acceptance and learning engagement are independent of each other and meet the independence requirement of linear regression. As can be seen from Table 9, the regression model passes the F-test ($F = 271.368$, $p < 0.001$), indicating that technology acceptance has a significant effect on learning engagement. As seen in Table 10, the regression coefficient B value is 6.274 and $\text{Sig} < 0.05$, indicating a significant positive relationship between technology acceptance and learning engagement. Therefore, the formula of this regression model is: $\text{learning engagement} = 0.663 \times \text{technology acceptance} + 6.274$.

2.2.3. Relationship between technology acceptance and general self-efficacy

(1) Correlation analysis between technology acceptance and general self-efficacy

Table 11. Correlations

	Integrated Technology Acceptance and Use Model Questionnaire	General Self-Efficacy Scale
Integrated Technology Acceptance and Use Model Questionnaire	1	
General Self-Efficacy Scale	.596**	1

**. Correlation is significant at the 0.01 level (2-tailed).

As shown in Tables 11, technology acceptance is significantly and positively correlated with general self-efficacy ($r = 0.596$, $p < 0.01$).

2.2.4. Regression analysis of technology acceptance and general self-efficacy

Table 12. Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.596a	0.356	0.354	4.848	1.940

a. Predictors: (Constant), Integrated Technology Acceptance and Use Model Questionnaire

b. Dependent Variable: General Self-Efficacy Scale

Table 13. Anova^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4953.152	1	4953.152	210.775	.000a
	Residual	8976.887	382	23.500		
	Total	13930.039	383			

a. Predictors: (Constant), Integrated Technology Acceptance and Use Model Questionnaire

b. Dependent Variable: General Self-Efficacy Scale

Table 14. Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.912	1.705		2.881	0.004
	Integrated Technology Acceptance and Use Model Questionnaire	0.373	0.026	0.596	14.518	.000

a. Dependent Variable: General Self-Efficacy Scale

As shown in Tables 12, the Adjusted R Square is 0.354, indicating that technology acceptance explains 35.4% of the general self-efficacy. In addition, the Durbin-Watson value is 1.940, which is in the range of 1.8-2.2, indicating that technology acceptance and general self-efficacy are independent of each other and meet the independence requirement of linear regression. As can be seen from Table 13, the regression model passes the F-test ($F = 210.775$, $p < 0.001$), indicating that technology acceptance has a significant effect on general self-efficacy. As can be seen from Table 14, the regression coefficient B value is 4.912 and $\text{Sig} < 0.05$, indicating a significant positive relationship of technology acceptance on general self-efficacy. Therefore, the formula of this regression model is: general self-efficacy = $0.373 \times \text{technology acceptance} + 4.912$.

3. Conclusion

(1) Cronbach's α coefficient of the adapted integration technology acceptance and use model questionnaire was 0.958, indicating a high reliability of the questionnaire. The KMO value of the adapted integration technology acceptance and use model questionnaire was 0.954, and the significance of Bartlett sphericity test was 0.000. The questionnaire has good structural validity. (2) College students' integrated technology acceptance, learning engagement and general self-efficacy are above the medium level; (3) Technology acceptance can positively predict general self-efficacy and learning engagement. The regression models are as follows: general self-efficacy = $0.373 \times \text{technology acceptance} + 4.912$, learning engagement = $0.663 \times \text{technology acceptance} + 6.274$.

4. Suggestion

4.1. Strengthen theoretical study and research, and establish a correct concept of multimedia teaching

The development of educational technology has made multimedia teaching become a common concern in the education field. As a teaching tool, multimedia can not only effectively combine subject teaching and science and technology, but also provide teachers with scientific assistance to stimulate and strengthen students' interest in learning, and guide them to gradually transform their interests into stable learning motivation, making it possible for students to acquire knowledge in a natural environment. Therefore, strengthening the study and research of theories related to multimedia technology and establishing a correct concept of multimedia teaching are important prerequisites for the reasonable use of multimedia technology in English teaching. To break the teaching routine and change the teaching concept, we need to scientifically position the status and role of multimedia teaching. It is necessary to see the advantages of multimedia teaching: the vividness of the image, the efficiency of information transmission, and the convenience of crossing time and space have improved the effectiveness of English teaching. At the same time, we should also see the limitations of multimedia teaching. In order to ensure the organic unity of presupposition and generativity, multimedia teaching can only be used as an auxiliary means of teaching, and cannot replace traditional teaching. In addition, multimedia teaching is easily restricted by equipment.

Therefore, when using multimedia technology for English teaching, teachers should have the courage to get rid of the shackles of traditional teaching concepts, realize the complementary advantages of multimedia technology and traditional teaching, and give full play to the role of multimedia technology in promoting English teaching [16].

4.2. Committed to improving the quality of classroom teaching and promoting the deep integration of multimedia technology and English teaching

With the development of the times and the continuous progress of science and technology, the application of information technology in English teaching has become the mainstream direction of the current education reform. Therefore, it is necessary to be deeply aware of the important value of the deep integration of multimedia technology and English teaching, to consciously use multimedia technology in English teaching and to correctly handle the dialectical relationship between the two, and avoid bipolarity while meeting the two-way needs of teaching and learning. For example, teachers' pay too much attention to the presentation of multimedia, so that the teaching process is superficial and flashy. Or, teachers regard multimedia technology only as a display tool, and the content presented is completely copied from blackboard writing, weakening the ontological function of multimedia technology. Therefore, teachers should make full use of the advantages of multimedia technology and traditional teaching. On the basis of accurately grasp of teaching purpose and teaching content, dig deeper into the assistance of multimedia technology to English teaching, flexibly choose the presentation form and content of multimedia technology, and use it to optimize teaching ideas, deepen teaching content, regulate teaching progress and improve the teaching environment, so as to realize the organic combination of the two, improve the quality of English teaching [17].

4.3. Adhere to the concept of people-oriented education and scientifically build innovative English classrooms

As an important link between economic and cultural communication, language has developed into an indispensable part of human beings. With the increasing demand for language-oriented talents in our country, English education is facing new challenges and development opportunities. In addition, the report of the 20th National Congress of the Communist Party of China for the first time includes "promoting the digitalization of education" in the section of "Developing education that meets the people's expectations", and proposes "promoting the digitalization of education and building a society and country of learning where lifelong learning is pursued by all". Therefore, teachers should have the courage to break the limitations of traditional English teaching, adhere to the people-oriented educational philosophy, rely on multimedia technology to build high-quality, innovative English classrooms, and cultivate "listening, speaking, reading, writing" comprehensive development and flexible, adaptable and creative application-oriented talents. First of all, we insist on the principle of "being faithful to teaching materials and being proficient in them". Teachers should take teaching materials as the center, fully grasp the knowledge framework, theoretical system and important content of it, and reconstruct the texts according to teaching needs. In the meantime, teachers should also put stress on the role of emotional education. Secondly, teachers should strengthen the development and application of multimedia technology in the field of English curriculum, make full use of various English learning resources to assist English teaching, and provide more choices for students to acquire English knowledge. Finally, using the intelligence and convenience of multimedia technology, a diversified English curriculum evaluation system is constructed to realize the transformation from focusing on results to focusing on the whole process of students' learning, so as to evaluate students' comprehensive English literacy more objectively and accurately, and provide a basis for teaching adjustment [18].

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