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Innovation of English language teaching mode in basic education under the integration of information technology

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Abstract: With the continuous development of information technology, English language teaching in basic education faces new opportunities and challenges. It is challenging to satisfy the demands of individualized learning and interactive communication with the current English teaching model, which has the issue of a gap between conventional instructional techniques and student requirements. To this end, this paper introduces the integration of information technology and education and teaching to explore innovative English language teaching models. By using multimedia, the Internet, and artificial intelligence technologies, a student-centered and highly interactive teaching platform is constructed to stimulate students' learning interest and improve learning outcomes. This paper specifically analyzes the application of information technology in English language teaching and proposes an innovative model based on intelligent auxiliary teaching, network resource sharing, data analysis, and feedback. The results show that the average class time of students in the experimental group is 16.2 hours, while the average class time of students in the control group is only 12.0 hours. After the integration of information technology, students' language application ability and autonomous learning ability have been significantly improved, classroom interactivity and learning outcomes have been effectively enhanced, and teachers' teaching quality and efficiency have also been improved.

Keywords: *Basic education, English language Teaching, Information technology, Teaching model.*

1. Introduction

Virtual reality (VR) and augmented reality (AR) technologies have demonstrated significant promise in the field of education, particularly in English language teaching (ELT), which has garnered a lot of interest due to the quick growth of the computer industry. AR improves the interactivity and immersion of learning by superimposing virtual information in the real environment; VR creates an immersive learning experience by building a virtual learning environment. These emerging technologies can not only increase pupils' commitment for learning and pique their fascination in it. but also improve the problems of low participation and limited learning effect in traditional teaching models to a certain extent. However, existing research still has certain bottlenecks in application practice, technology popularization and teacher cognition, which need further in-depth discussion and optimization. Based on this, this paper will conduct a comprehensive analysis of the application status, advantages and challenges of AR and VR in English teaching, in order to provide theoretical support and practical reference for future teaching reform and technology integration.

This paper first reviews the relevant research on the application of emerging technologies such as gamification, artificial intelligence (AI), augmented reality (AR) and virtual reality (VR) in the field of English teaching (ELT) at home and abroad, and analyzes the impact of different technologies on learning motivation, participation and learning outcomes. Subsequently, by designing a comparative experiment, the data of students in terms of learning initiative, thinking depth, cooperative participation, teacher feedback and teaching quality are collected and analyzed to verify the actual effect

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of new technologies in English teaching practice. Then, the experimental results are discussed in detail, and combined with existing research results, the advantages and challenges of technology application are further explored. Finally, the research conclusions are summarized, the limitations of the current research are pointed out, and possible directions for future research are proposed.

2. Related Work

With the continuous development of educational technology,an increasing number of studies have begun to focus on the application of emerging tools such as gamification, artificial intelligence, and augmented reality in English Language Teaching (ELT) and their impact. The following summarizes the representative research results in related fields. Wulantari, et al. [1] explored the application of gamification in English Language Teaching (ELT) and its impact on learning motivation, participation, and learning outcomes. The study found that game elements such as points, leaderboards, and rewards can enhance students' intrinsic motivation and active participation, promote the improvement of language skills such as vocabulary and grammar, and enhance collaboration and interaction Wulantari, et al. [1]. Hockly [2] discussed the application of Artificial Intelligence (AI) in ELT after the epidemic and the opportunities and challenges it brings. At present, AI is mainly "weak AI" that can play a role in specific tasks, but in the future it will develop into a stronger intelligence [2]. In their systematic review of 42 papers on the use of AI in education and instruction of English, Crompton, et al. [3] analyzed the benefits of AI in speaking, writing, reading, teaching strategies, and self-regulation while also highlighting drawbacks like language standardized practices, fear, functional restrictions, and technical problems Crompton, et al. [3]. Husaini and Prasetiyowati [4] explored teachers' beliefs about language learning and their impact on teaching strategies and students' understanding level. The results showed that different teachers had different teaching beliefs due to differences in educational background and teaching content, which would affect their teaching methods and thus affect students' understanding and academic performance [4]. The opinions of 17 EFL instructors at a Thai institution regarding ChatGPT as a language teaching tool were examined by Ulla, et al. [5] the results showed that teachers generally held a positive attitude and recognized its application value in lesson preparation and activity design but also pointed out its limitations in terms of reliability, credibility and the possibility of causing students to become overly dependent Ulla, et al. [5]. Annamalai, et al. [6] interviewed 23 Malaysian high school English teachers and explored their views on AR (Augmented Reality) and VR (Virtual Reality) in English teaching. The results showed that teachers believed that it could help improve learning outcomes, stimulate student participation, promote BYOD (bringing your own device) and active learning, but there were also concerns about time consumption and health Annamalai, et al. [6]. Bekou, et al. [7] studied the application of ChatGPT in English teaching in Morocco, using questionnaires and interviews to collect opinions from 62 teachers. The results showed that ChatGPT helps personalized learning, instant feedback, teacher professional development and access to authentic language resources, but also faces challenges such as accuracy, cultural adaptability and technology dependence Bekou, et al. [7]. Tarrayo, et al. [8] investigated 38 university English teachers in the Philippines on their views on flexible teaching (FL) during the pandemic through questionnaires and interviews. The results showed that the main problems were difficulty in student understanding, low participation and poor network connectivity, but flexible teaching also brought convenience and improved teaching Tarrayo, et al. [8]. Mambu [9] used an Indonesian university English teacher as a case study to explore how he incorporated the United Nations Sustainable Development Goals into English teaching to cultivate students' critical thinking. By analyzing the texts, questions and student responses selected by the teacher, it was found that students were able to identify and discuss global issues at the vocabulary, sentence and discourse levels, showing a multi-level critical consciousness Mambu [9]. Tarrayo and Anudin [10] interviewed eight university English teachers in the Philippines to explore their views on teaching material development in a Flexible Learning (FL) environment. The results showed that teachers' teaching material development methods in FL included following school guidelines, exercising creativity and resource integration, and promoting student

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collaboration Tarrayo and Anudin [10]. Murray, et al. [11] explored the constraints on innovative teaching of English teachers in some "inland" regions of southwest China. The study found that time pressure, competing priorities, suspicion of new ideas, insufficient resource investment, the supremacy of teaching materials, and lack of student language proficiency and professional development opportunities were the main obstacles [11]. Although existing studies have confirmed the positive role of emerging technologies in English teaching, there are still obvious challenges in terms of technology stability, teacher professional development, student dependence, and sustainability of teaching results.

3. Method

3.1. Course Resource Construction and Utilization

The creation and application of English course resources plays an important role in English teaching in the basic education stage, and is also one of the core contents of English curriculum reform. Given how quickly educational technology is developing, the types and usage of English course resources have become more diversified. From teaching materials to interactive platforms, from textbooks to cultural materials, the development and rational use of various resources play a vital role in improving teaching quality.

In the process of building English curriculum resources, we should not only focus on the development of material, conditional and source resources but also pay attention to the implicit resources in terms of ideology and culture. Implicit resources include teaching methods, teacher experience, students' learning experience, and deeper values and ideas. The effective development and utilization of these resources can promote the all-round development of students. The subjects involved in the construction of English curriculum resources at the basic education stage include government education departments, educational institutions, educators, students, parents and social organizations. Due to the wide variety of curriculum resources, it is impossible to fully develop them. Therefore, in the process of resource construction, it is necessary to reasonably divide the work, clarify the responsibilities, and focus on the key points. Teachers and educators should choose to develop the most valuable and meaningful curriculum resources according to the actual needs of basic education English teaching, and make long-term plans for resource development and utilization to ensure the sustained effect of curriculum resource construction.

At the same time, teachers should have certain information technology application capabilities and combine modern information technology with the creation and application of educational materials. For example, with the help of Internet platforms, digital teaching materials and intelligent teaching aids, teachers can more effectively combine traditional teaching materials with modern resources, provide richer learning materials and interactive experiences, and enhance students' learning interest and learning effects. By making full use of information technology, teachers can create a richer learning environment and diversified learning resources for students, and further promote the reform of English teaching in basic education.

3.2. Information Literacy and Teachers' Technical Skills

Information literacy is a core quality that citizens of modern society must have, and it is one of the key abilities that students should develop during basic education. Information literacy not only includes students' ability to acquire, evaluate, identify, and use information but also includes students' ability to actively adapt to social development trends in an information society, digital survival skills, and network ethics and information security awareness. In the field of English education, the cultivation of information literacy requires not only students to have relevant abilities, but teachers themselves must also have certain information technology capabilities in order to provide students with more effective teaching guidance.

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3.2.1. English Teachers Should Have Good Information Acquisition Capabilities

In the modern educational environment, teachers can make full use of the Internet and modern information dissemination tools to obtain the latest information related to English teaching, such as visiting foreign websites and using language databases. Through these means, teachers can ensure that the teaching content and information provided to students keep pace with the times and are close to the actual needs of English teaching.

3.2.2. Teachers Need to Have the Ability to Identify and Filter Information

In the vast amount of online information, teachers must have critical thinking and be able to filter out information that is valuable to students' learning. Teachers also need to filter and adapt the selected information according to the students' physical and mental development characteristics to ensure that the transmission of information meets the students' cognitive needs.

3.2.3. Teachers Should Also Have the Ability to Process and Express Information

Information processing ability refers to the teacher's ability to effectively organize and process information, edit it using information technology tools, and display it through appropriate platforms. Teachers should use multimedia teaching tools and different forms of information resources to present English teaching content and stimulate students' learning interest and creative thinking.

3.2.4. Teachers Should Also Have the Ability to Integrate Information and Teach

Information integration ability means that teachers can use systematic methods to combine different information resources with teaching content and optimize teaching design and teaching strategies through information technology. Teachers should be able to use appropriate teaching methods in teaching, combine students' learning needs, maximize the benefits of information technology and raise the caliber and effectiveness of instruction.

3.3. Construction of the Concept of Multi-objective English Education

In the current English education system, we cannot just take language communication as the only goal of English teaching, but should focus on the cultivation of students' comprehensive literacy and thinking ability. The goal of English education should cover the cultivation of language ability, the shaping of character literacy, and the improvement of thinking ability. Especially in the basic education stage, English teaching should focus on the cultivation of students' character and the training of critical thinking.

First of all, the goal of language communication is not only to learn "survival English", that is, language communication in daily life. It is more about cultivating students' ability to communicate ideas, emotions and knowledge. Language is not only a tool but also a carrier of thinking and expression. Through language, students can collide with each other, convey emotions and exchange knowledge. Therefore, English education should focus on realizing the communication of students' thoughts and thinking through language, and through this communication, promote the shaping of students' character and thinking mode. This process not only helps the development of students' personality but also helps to cultivate their cross-cultural communication ability.

Secondly, in terms of cultural education, it is necessary to modify the idea of interaction between cultures. The conventional understanding of intercultural communication overemphasizes the culture and lifestyle of English-speaking countries. This teaching method that focuses on the culture of English-speaking countries does not meet the actual needs of English education in China. In China, English teaching should pay more attention to the diversity and fluidity of culture, and help students understand and respect the values and behavioral norms in different cultural backgrounds. Teachers should guide students to pay attention to the common ethics and behavioral norms in international exchanges, rather than just limiting themselves to the cultural education of English-speaking countries.

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In addition, the knowledge and ability in English education also need to be re-examined. In addition to language knowledge, English education should also cover social and cultural knowledge, cognitive thinking knowledge and other aspects. English teaching should not be limited to the teaching of grammar and vocabulary, but should be extended to the cultivation of thinking style, cultural cognition and social understanding. In teaching, teachers should avoid using "native English" as the only standard, but should focus on cultivating students' ability to communicate effectively in order to achieve cross-cultural mutual understanding.

3.4. Innovative English Teaching Methods

Based on the core literacy perspective, the path of reform and innovation of English education in China should be explored from the following aspects:

It is necessary to clarify the essence of English teaching: English teaching is not only the imparting of subject knowledge but also an important way to educate all people. English education should focus on cultivating students' comprehensive literacy and promoting students' multi-dimensional development. English teaching in the basic education stage should no longer be limited to exam-oriented education, but should focus on improving students' thinking ability, innovation ability and emotional literacy.

Innovative English teaching methods: The application of modern information technology provides new opportunities for English teaching. Teachers can rely on the "online + offline" teaching model, use multimedia teaching tools, create flipped classrooms and diversified classroom environments, cultivate students' fundamental language abilities, including speaking, listening, reading, writing, and translating, and at the same time improve their ability to transmit information, understand meaning, and express opinions.

Secondly, enriching the content of English teaching. Based on the unified textbooks compiled by the Ministry of Education, teachers can appropriately introduce social, humanistic and interesting course content in combination with students' age characteristics and interests. For example, in primary school, basic content such as interpersonal communication and time management can be designed; in middle school, more in-depth content such as current affairs and major selection can be added to help students pay attention to social hot spots and understand global changes.

Build a high-quality English teaching team: In addition to requiring teachers to have solid English professional knowledge, we should also focus on their interdisciplinary thinking ability and social and cultural knowledge reserves. By cultivating a diversified teaching team, we can provide a richer and more comprehensive English teaching environment, thereby better realizing the innovation and development of English teaching.

In short, the integration of information technology has brought great opportunities and challenges to English teaching in the basic education stage. Teachers should actively adapt to this change, constantly improve their information technology capabilities, and implement diversified educational concepts in teaching, providing students with a richer and more efficient learning experience, thereby promoting the continuous innovation and development of English teaching.

4. Results and Discussion

4.1. Experimental Subject

Experimental group: Selecting first-year junior high school students from two middle schools in a certain city, dividing into 2 classes, and implementing English teaching with information technology integration in 2 different classes.

Control group: Selecting first-year junior high school students from two middle schools similar to the experimental group, and conducting English language teaching in the traditional classroom teaching mode.

Participants: A total of about 5 students, with a balanced ratio of males and females, aged about 12 to 14 years old.

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4.2. Experimental Conditions and Variables

Independent variable: teaching mode

Experimental group: English teaching integrated with information technology (multimedia teaching, flipped classroom, online + offline teaching mode, etc.).

Control group: traditional teaching mode (mainly teacher lectures, using paper teaching materials and classroom exercises).

4.2.1. Dependent Variables

Improvement of students' English language ability (test scores of four skills: listening, speaking, reading and writing).

Changes in students' comprehensive literacy (measurement of critical thinking, cross-cultural communication ability, etc.).

4.2.2. Experimental Design

4.2.2.1. Pre-Test

All students undergo a basic English competency test before to the experiment, which covers writing, comprehension of material, spoken language, and listening awareness.

Through questionnaires, students' comprehensive literacy, such as information literacy, cultural awareness, and critical thinking, is assessed.

Teaching implementation:

Experimental group: During the 10-week teaching period, the teaching mode of information technology integration is adopted. Specific methods include:

4.2.3. English Proficiency Test Data

The progress in English proficiency among pupils in the experimental cohort and the untreated group is compared by examining the distinction in scores during the pre-test and the post-test. The effect of the teaching modality on students' language proficiency is examined using statistical techniques like an independent sample t-test as well as the matching sample t-test.

Comprehensive literacy questionnaire data:

Compare the results of the two questionnaire surveys to evaluate the changes in students' comprehensive literacy such as critical thinking and cultural awareness. To examine how the participants in the experiment and the counterpart control group differ in these areas, descriptive analysis of variance and the paired t- test are employed.

4.2.4. Classroom Performance and Feedback

Through teacher observation records and student feedback questionnaires, the impact of information technology integrated teaching on students' classroom participation, interactivity and learning interest is evaluated.

4.3. Experimental Evaluation

This experiment compares and analyzes the effects of the information technology integrated teaching model in improving English proficiency, student participation, teacher feedback, etc. through multiple indicators.

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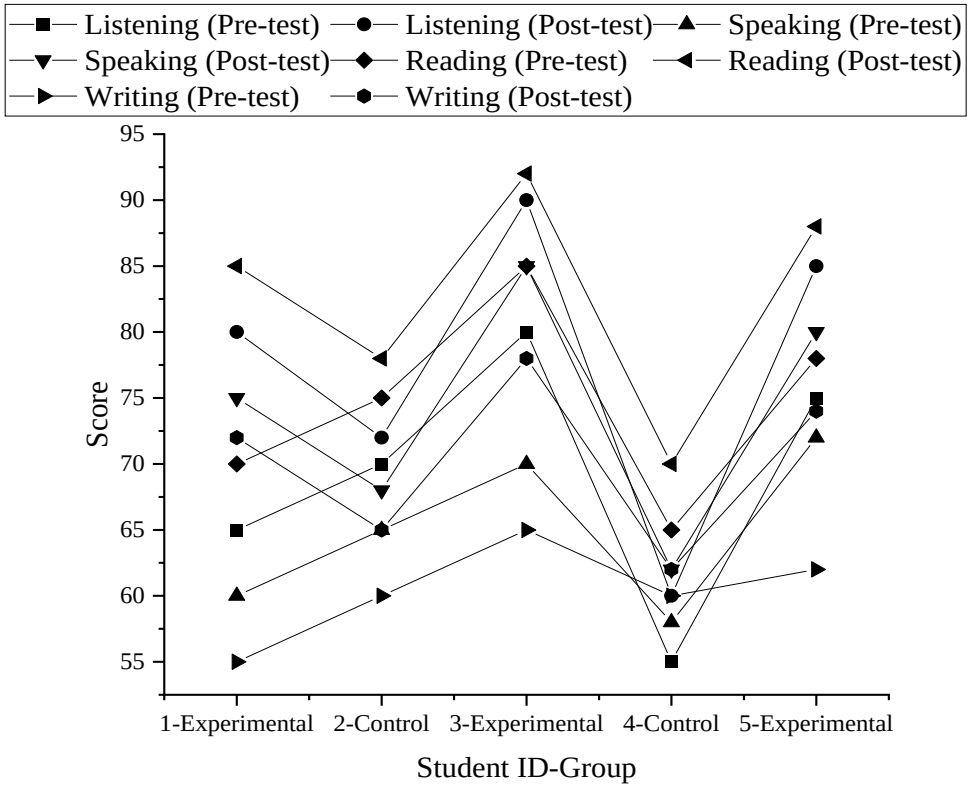

Figure 1.
English proficiency pre-test and post-test data.

According to the experimental data in Figure 1, The experimental team's and the unaffected group's results before and after the test in various English proficiency tests are significantly different. First, in terms of English listening scores, The average result of the control the group is 66.25 throughout the the initial test and 70.5 in the post-test, an improvement of just 4.25 points, whereas the testing group's standard deviation is 71.25 in the the preliminary test and 84.25 in the following the exam, an increment of 13 points. The improvement of the experimental group in English listening is significantly better than that of the control group, showing the positive role of the information technology integrated teaching model in listening training. In terms of oral English scores, the experimental group's average score is 71.25 in the pre-test and 83.75 in the post-test, an increase of 12.5 points; the control group's average score is 66.25 in the pre-test and 68.75 in the post-test, an increase of 2.5 points. The experimental group also makes better progress in oral expression than the control group, indicating that information technology and interactive teaching have a major impact on raising pupils' speech proficiency.

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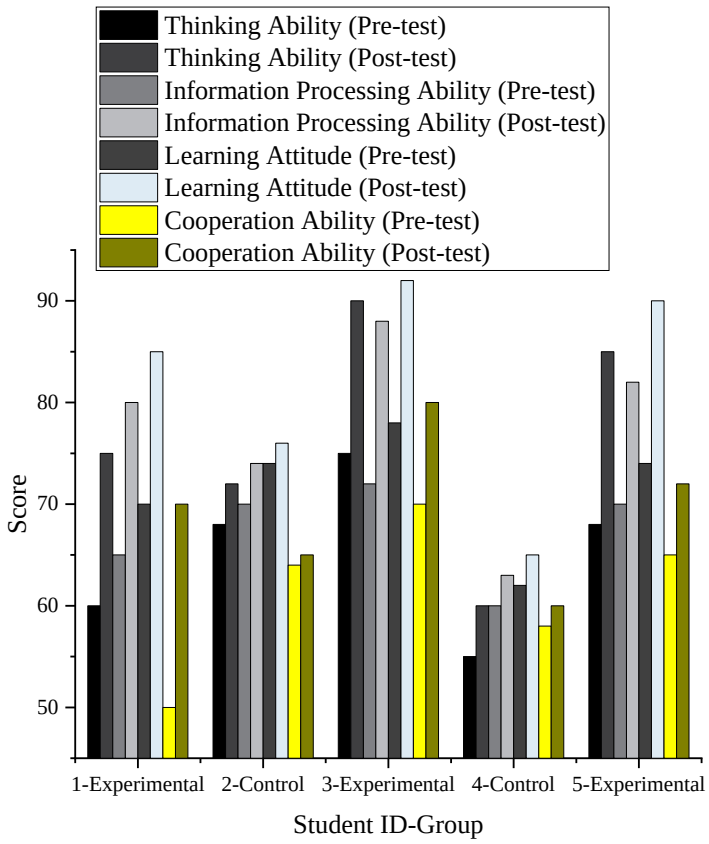

Figure 2.
Pre-test and post-test data of comprehensive English literacy.

In terms of thinking capacity, information processing ability, learning attitude, and collaboration ability, the participants in the experiment's scores prior to and after the test differed considerably more than those of the members of the control group. The average score of the experimental group's thinking ability pre-test is 69.5, and the post-test score is 83.5; while the pre-test score of the control group is 66.5, and the post-test score is 70.25, with an increase of 3.75 points. The data in Figure 2 shows the positive role of the information technology integration teaching model in promoting the development of students' thinking ability. Looking at the overall data in Figure 2, it can be concluded that the scores of the experimental group in all measurement dimensions have been significantly improved, and the increase has greatly exceeded that of the control group, indicating that the information technology integration teaching model has a significant effect on improving students' thinking ability, information processing ability, learning attitude and cooperation ability. The experimental results support information technology as an important tool to improve students' comprehensive abilities.

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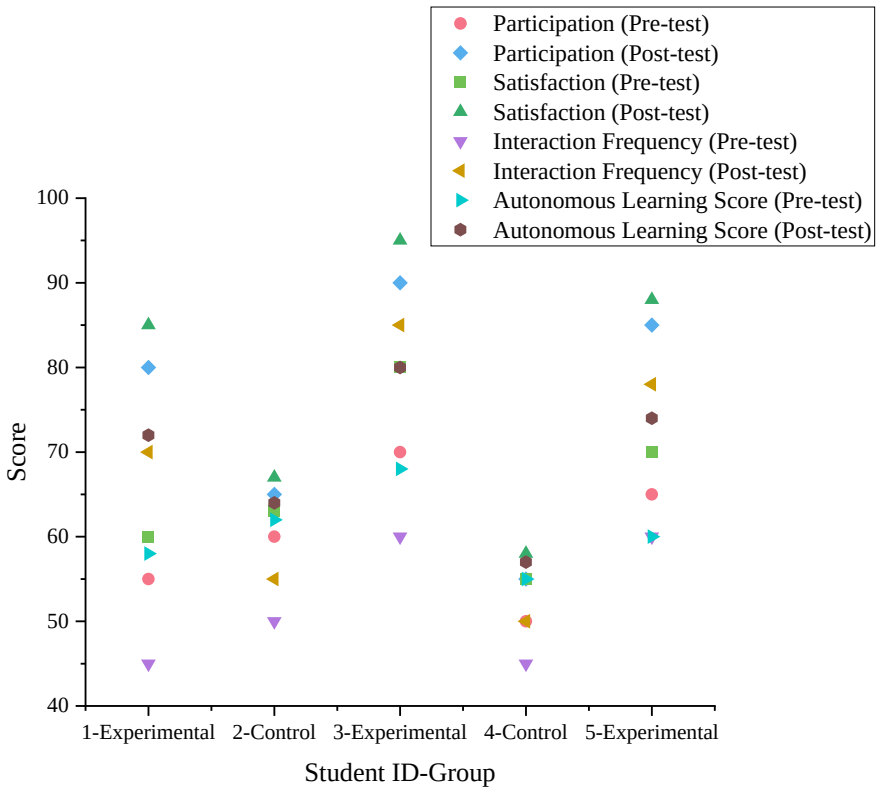

Figure 3.
Student engagement and satisfaction data.

The group performing the experiment outperformed the control group by 22 points, with an average participating score of 63.33 in the prior test and 85.33 in the following test. The experimental cohort's increased participation is significantly greater than the uncontrolled group's, showing that the information technology integrated teaching model can significantly improve students' enthusiasm for classroom participation. Simultaneously, the treatment group's pre-test score was 58.33 and post-test score was 77.67, representing a 19.33-point raise in the communication likelihood. The control group's interaction frequency increases by only 2.5 points. The interaction frequency of the experimental group increases significantly, which may be closely related to the function of information technology in promoting interaction between teachers and students and between students in the classroom, as shown in Figure 3.

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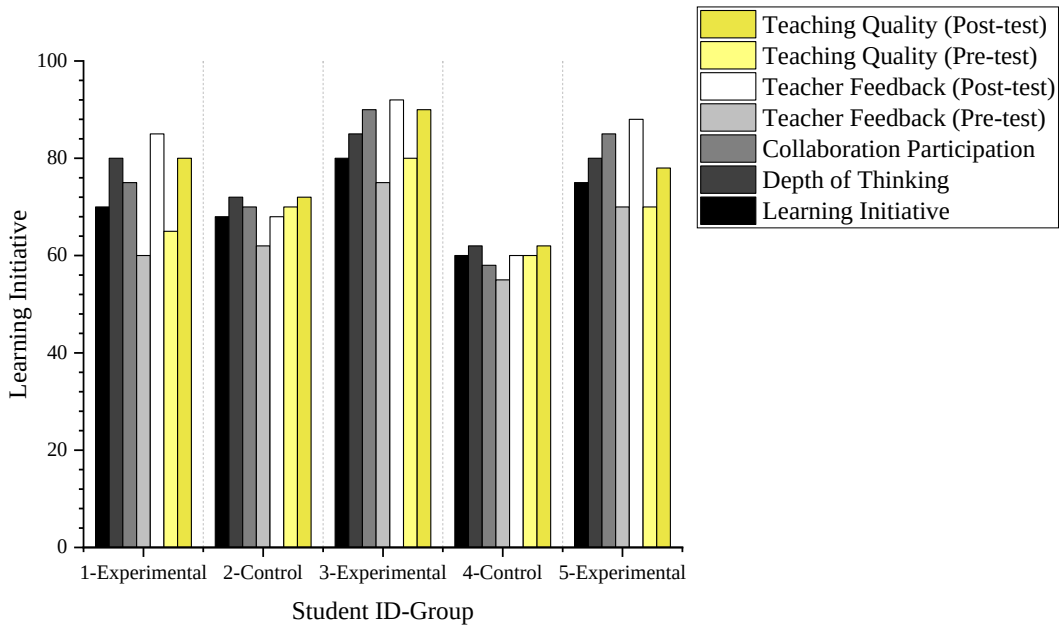

Figure 4.
Teacher feedback and observation data.

The scores from the pre- and post-tests of the group performing the experiment and the counterpart control group differ significantly in terms of learning initiative, depth of thought, cooperation involvement, instructor feedback, and teaching quality, as shown by the experimental information analysis in Figure 4.

In reference to learning creativity, the experimental population's standard deviation increased by 5 points from 75 points in the pre-test to 80 points in the post-test, whereas the control particular group's score increased by 2 points from 68 points in the pre-test to 70 percentage points from the post-test. The experimental group's improvement with regard to educational initiative was noticeably higher than the control particular group's, suggesting that incorporating information technology into classroom instruction can more effectively pique students' interest in and initiative for learning. The experimental group's depth of thought scores increased by 5 points, from 80 on the pre-test to 85 on the post-test.

Table 1.
Student learning behavior analysis data.

Student ID-Group	Class Time Investment (hours)	Self-study Time (hours)	Online Platform Usage Frequency (times/week)	Task Completion Rate (%)	Homework Submission Timeliness (%)	Feedback Response Time (hours)
1-Experimental	15	10	5	90	95	12
2-Control	12	8	4	85	88	14
3-Experimental	18	12	6	92	97	10
4-Control	10	7	3	80	83	16
5-Experimental	16	11	5	88	92	13

As can be seen from Table 1, there are significant differences between the experimental group and the control group in terms of class time investment, self-study time, frequency of use of online learning platforms, completion of learning tasks, timely submission of homework, and response time of learning feedback. Better results are obtained by the experimental group. Students in the control group only spend an average of 12.0 hours in school, whereas those in the group doing the experiment spend an

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average of 16.2 hours. The experimental group's commitment in class time was far greater than that of those in the control group, suggesting that the information technology-supported teaching approach may have encouraged students to engage more fully in the learning process. The average self-study time of the experimental group is 10.8 hours, while the average self-study time of the control group is 7.3 hours.

5. Conclusion

This study systematically explores the application of augmented reality (AR) and virtual reality (VR) technologies in English teaching (ELT). Through literature review and experimental data analysis, it reveals the important role of gamification elements, artificial intelligence-assisted teaching, and changes in teachers' beliefs in improving students' learning motivation, participation, and learning outcomes. The experimental part further verifies the positive promotion effect of emerging technologies in English teaching by comparing the changes in learning initiative, thinking depth, cooperative participation, teacher feedback, and teaching quality between the experimental group and the control group. Although this study has achieved certain results, there are still some limitations, such as small sample size, limited experimental period, and insufficient control of some variables. Future research can be further deepened in terms of expanding the sample size, extending the observation period, and refining the application scenarios of technology, so as to more comprehensively reveal the potential and challenges of AR, VR and artificial intelligence technologies in English teaching innovation.

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Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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