Exploring Educator Insights: A Qualitative Investigation into the Perceptions and Challenges of Implementing Intelligent English Learning Environments in Chinese Universities

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Abstract

Aim: The purpose of this research was to identify the attitudes, concerns, and approaches of Chinese university English educators towards the adoption of intelligent learning technologies in their teaching and learning context of English.

Methodology: This research utilized a qualitative research approach and conducted semi-structured interviews with 10 English tutors from four Chinese universities. The participants were purposively chosen depending on their exposure to the use of intelligent learning technologies in teaching English. Thematic analysis was employed, and since it is reflexive, it enabled the researcher to observe patterns associated with educators' opinions and insights on the effective implementation of these technologies into English learning.

Findings: Thematic analysis revealed four major themes. First, it outlines the changes within the scope of responsibilities of educators from traditional teachers to guides and tutors in a smart learning context. Second, it depicts the benefits for students and language development caused by the creative and individual approach provoked by the usage of technology and artificial intelligence. Third, it reveals the threats and challenges that arise within this process such as technical problems, reluctance to innovate, and gaps in digital competence. Fourth, it emphasizes a gradual implementation strategy for smart technologies, with an enhanced focus on professional development and training. Concerning the sustainable application of intelligent learning technologies, participants stressed the aspect of stakeholders' technical support and cooperation. These approaches were considered as being highly advantageous in terms of fulfilling the needs for an individualized educational approach as well as enhancing students' performance in case of proper application.

Conclusion: In conclusion, despite the compelling possibilities that intelligent learning technologies reveal for English education, they require effective implementation, sufficient professional development, and sustained heartfelt care for instructors and learners.

Keywords: Intelligent learning technologies, English language teaching, Chinese universities, Educators' perceptions, Challenges and strategies

1. Introduction

1.1. Background

The integration of intelligent learning environments (ILEs) into the learning and teaching of English at Chinese universities is a shift in the approach to learning, which has been informed by technological developments and changing learning needs. Smart learning environment utilizes artificial intelligence (AI), the Internet of Things (IoT), and big data as components for making learning environments intelligent, unique, and responsive to the teaching and learning of English (Sun et al., 2020). They are supposed to foster and enable differentiation, enhance students' interest, and achieve more effective and efficient learning with the help of information technologies and media (Li & Zhao, 2020). The studies that have been conducted most recently focus on the effects of ILEs, particularly in the teaching of the English language. For example, the use of mobile learning platforms and intelligent teaching systems in English curricula has prompted engagement and enhanced the learning of the students (Chen, 2022). Another case of adopting the intelligent system, Moso Teach, in a Chinese university established that well-designed team-based activities in an intelligent platform positively impacted learning in the English courses (Zhu & Wang, 2023). Similarly, by using mobile technology to create a synthetic environment of English language practice similar to the real-life

context, the students have been easily able to practice practically their English both inside and outside their classroom (Abonales, 2016). However, there are certain problems with the implementation of ILEs in English education. Some of the challenges that educators experience include a lack of sufficient training as well as change resistance, as well as the constant need for technical support (Han, 2019). However, the integrated technologies' effectiveness in tackling different learning difficulties and minimizing distractions in the classroom is an issue of concern (Xu et al., 2021). These challenges highlight the need for solutions that can address the use of intelligent learning tools by educators in their practice.

Furthermore, the training and implementation of ILEs also have several benefits in teaching English. They deliver specific and personal instruction, enhance students' linguistic skills, and generate an engaging learning atmosphere using machine language instructors and multimedia devices (Yang et al., 2020). Besides, these technologies not only facilitate the learning process but also provide significant big data for the improvement of teaching processes and curriculums (Hu, 2022). Despite the above-discussed potentials, there are certain difficulties pointed out by educators. These include concerns that originate from the innovation of intelligent technologies that address traditional teaching-learning models, such as how to address large group provisions, or how to maintain student interest (Han, 2019). Mitigating these problems calls for solutions like teacher training, technical support, and designing content that would grab the interest of English language learners. Hence, despite the potential intelligent learning environments have for improving the delivery of English language learning in Chinese universities, it is only possible if multiple challenges are considered and the expertise of educators is incorporated systematically. By analyzing these issues, the integration of intelligent learning technologies can be maximized to improve the appropriateness and receptiveness of promoting English language teaching in Chinese higher learning institutions. From this backdrop, this study seeks to examine the Chinese English educators' attitude, challenge, and approach toward the creation of a highly intelligent English learning environment in higher learning institutions.

1.2. Research Aim and Questions

The purpose of this qualitative research is to investigate the attitudes, difficulties, and strategies of Chinese English educators toward the inception of highly intelligent English learning environments in higher learning institutions. In this regard, research questions are given below:

RQ1: What are the overall perceptions of English educators towards the implementation of intelligent learning technologies in their English language teaching environments at Chinese Universities?

RQ2: What specific advantages and challenges do English educators identify in the integration of

intelligent learning technologies into English language instruction at Chinese Universities?

RQ3: What strategies do English educators suggest to enhance the effectiveness and acceptance of intelligent learning technologies in English language teaching at Chinese Universities?

2. Literature Review

2.1. Intelligent Learning Technologies in Higher Education

Cognitive technologies which are also known as intelligent learning technologies (ILTs) have transformed the higher education space by integrating AI, IoT, and big data technologies to deliver personal and self-paced education solutions. They help to improve different aspects of education processes starting from communication between teachers and students and ending with administrative work, thus promoting the improvement of learning results. In the field of language, notably the English language, ILTs have been crucial. For example, the Rain Classroom Smart Teaching Platform integrates online and offline learning settings and greatly enhances the learning interest and academic performance of learners enrolled in English classes (Gong, 2022). The adoption of ILTs in higher learning systems depends on the country and region involved. In China, intelligent assistant is applied to personalize the learning paths as well as optimize the learning process and reduce cognitive load (Sajja et al., 2023). Similarly, in Russia, smart technologies such as Edmodo and Moodle inculcated in English language teaching enable student motivation and better learning achievement but had some setbacks in technology familiarization and implementation (Elsakova et al., 2019).

In critical analysis, the studies show that while the ILTs benefit the delivery of education, their effectiveness is primarily based on the proper utilization and training of the users. Research in Greece where AI chatbots were deployed to teach language and cultural practices show that ILTs can effectively enhance learning experience while posing the problem of user uptake (Mageira et al., 2022). In the context of higher education, intelligent tutoring systems (ITS) offer personalized feedback, but the effectiveness depends on AI algorithms (Tafazoli et al., 2019). Some of the more noticeable developments in ILTs include Computer Assisted Language Learning (CALL) to modern Artificial Intelligence based Learning Management Systems (LMS) that include self and collaborative learning. However, the actual implementation of these technologies presents complexities that lend a continuous need for research and development, especially in the area of application of artificial intelligence in education (Son et al.,2023). Hence, despite the possibilities offered by ILTs to revolutionize higher education, and in particular, language learning, they can only be optimized by way of proper integration and constant development based on practical experiences.

2.2. Advantages of Intelligent Learning Technologies in English Language Teaching

Intelligent learning technologies (ILTs) have transformed the teaching of the English language by helping students have their own learning environment, engagement, and effective learning of language competencies. In other parts of the world, the use of these technologies has enhanced educational practices in the classroom. In this regard, the application of Intelligent Language Tutoring Systems (ILTS) has been effective in teaching English grammar in the Moroccan context by increasing students' achievement and motivation by providing individualized instructions and feedback (Dahbi, 2023). In another study on creating an intelligent classroom for blended college English instruction, the researchers found that using modern tools like the whiteboard and intelligent feedback system reduced cognitive load and improved language learning from actual communication tools (Liu et al., 2023). This integration of the technologies enhances the delivery of language learning, making it more effective through the flexibility of the learning process. An AI-supported online English teaching system in India has shown a remarkable enhancement in learning efficiency as well as student participation (Sandu & Gide, 2019). This system employed deep learning algorithms for recommending appropriate learning paths and feedback which contributed to making a unique learning environment for each learner (Sun et al., 2020).

Furthermore, empirical research on the introduction of AI-formed intelligent tutoring systems in English language teaching and learning in higher learning institutions found that these technologies had additional benefits in enhancing language proficiency and the learning environment. When engaging natural language processing (NLP) and machine learning in the assessment and feedback processes, learning and teaching activities were reported to be improved (Ting et al., 2023). Moreover, in Russia the use of smart technologies in Bachelors language training enhanced foreign language proficiency and students' engagement. This concerned the utilization of numerous learning facilities and platforms, and social networks with communicative and highly appealing forms of language learning (Chen, 2022). Thus, applied paradigms of ILTs as tools in the English language teaching and learning process in different countries prove the high value of its impact on effective individualized learning, student interest, and language skills enhancement. All these technologies give new approaches to how the needs of the learners are met as they ensure that the process of learning is made more effective and enjoyable.

2.3. Challenges in Integrating Intelligent Learning Technologies in English Language Teaching

The implementation of intelligent learning technologies (ILT) to enhance English language education is a complex endeavor, reflecting technical, instructional, and organizational dimensions. Learners

and researchers revealed that, although technology has the potential to greatly improve language learning through multimedia facilities and platforms, issues like changing technologies, high costs, and the inability to provide the necessary facilities remain a concern (Rintaningrum, 2023). These factors impede the smooth implementation of ILTs in educational institutions. However, there are some challenges concerning the non-recognition of smart technologies in teaching and learning processes and the teachers' reluctance towards changes. Similarly, a recent study on smart technologies in language teaching indicated that while smart technology improves students' foreign language ability and engagement, optimal use requires teachers to improve their skills (Kalugina & Tarasevich, 2018). Likewise, a study of AI chatbots for Content and Language Integrated Learning (CLIL) in Greek schools revealed issues such as users' flexibility and the necessity for AI training processes that would allow teachers to use them appropriately (Mageira et al., 2022). Besides, other challenges such as high initial costs and the quest for constant technical support were other major hurdles (Nong et al., 2021). Further, researchers found that intelligent technologies in project-based learning in primary and secondary schools showed that while students' comprehensive application skills improved, teacher training and resource management issues still afflicted them (Xie et al., 2022). This research fills a gap in the literature by describing the challenges of implementing ILTs at Chinese universities based on the viewpoints of Chinese English professors at various universities.

2.4. Strategic Implementation and Pedagogical Enhancements

In incorporating intelligent learning technologies (ILTs) in teaching English, there are several best practices that should be employed, especially in regard to training, support, and curriculum. Studies stress the need to apply these approaches to achieve effective implementation of such technologies as ILTs. Professional development programs are critical to help educators build competencies on new technologies. For example, research indicates that teachers who receive structured teaching training are more competent in the adoption of good ILTs that enhance student success (Masters, 2019). Furthermore, there are scaffolding needs that refer to consistent follow-up in terms of technical advice and materials for educators. Therefore, such support assists in minimizing technical issues and ensures that ILTs are used continuously. For instance, a survey on integrating AI in education highlighted the importance of technical support to address the challenges of intelligent systems so that both teachers and learners could benefit from these technologies (Wang, 2022).

Another key factor for consideration is curriculum adaptation. Integrating ILTs within the context of the curriculum makes it easier to transform the curriculum and align the available technologies with the intended learning outcomes. According to Dahbi (2023), an investigation into intelligent tutoring systems for

grammar required the use of personalized learning paths and adaptive feedback to improve student performance and motivation, and curriculum integration while using technology. However, the use of blended learning models that incorporate both online and face-to-face learning contributes to the effective application of both modeling and functional methods of teaching and learning. Studies on intelligent classrooms found that combining live lectures with online discussions reduces cognitive load and improves language learning outcomes with AI-based feedback (Guo, 2021). In addition, the studies establish that the use of intelligent tutoring systems for language learning prepares a personalized method to enhance the achievement of students and their ability to speak a foreign language (Gómez María et al., 2019). Therefore, adaptive learning environments can play an important role in satisfying individual learner needs. Although, there is scarce evidence based on specific tactics for Chinese universities the general research findings can be transferred. The purpose of this research is to identify the problem and propose individualized solutions that can be useful for Chinese higher education in terms of using ILT to enhance English language learning.

2.5. Theoretical Framework

This is a research study employing the theoretical lens of the Technology Acceptance Model (TAM) supported by Change Management Theories to examine the adoption of intelligent environments for learning English in Chinese universities. TAM developed by Davis includes two crucial perceptions which include Perceived Usefulness (PU) and Perceived Ease of Use (PEU) that explain educators' attitude toward technology and their willingness to change (Davis, 1989). This model is employed to respond to the first and the second research questions that pertain to educators' experiences of holistic advantages and the advantages and disadvantages of integrating intelligent technologies in their practice. To enhance understanding of the measures taken and applied in the context of employing strategies, Change Management Theories like 'Kotter's 8-Step Change Model' and 'Lewin's Change Management Model' have been incorporated (Tang & Tang, 2019; Laig & Abocejo, 2021; Cummings et al., 2016). These theories provide a basis for dealing with the change processes of the educational institution to assist in the third research question which seeks to establish practical strategies used by educators to enhance the efficiency and acceptance of these technologies. This study extends acceptance behaviors in TAM and uses organizational change theories to examine external factors that may help or hinder higher education institutions' use of intelligent learning technologies.

3. Methodology

3.1. Research Design

This research employs a quantitative methodology and interviews educators for their understanding of intelligent English learning contexts in Chinese universities. This study requires a qualitative approach due to the desire to capture the participants' experiences and perceptions which are crucial in education research (Creswell & Poth, 2018). That is particularly relevant for looking into complex phenomena and can produce rich and contextualized data (Merriam & Tisdell, 2015). Thus, according to the research objectives, the qualitative approach is best for prescribing micro-level strategies suggested by educators to improve IT-aided learning for English teaching and explaining particular attitudes, challenges, and benefits of conventional learning.

3.2. Data Collection and Sampling

During the participant recruitment for this study, purposive sampling was used to recruit the participants from social media platforms. The advertisement was placed on prominent Chinese digital and social media and communication tools like WeChat, Weibo, QQ, Zhihu, Douyin, and Baidu Tieba because it is widely used by a majority of Chinese citizens, including university educators as noted by Zhu (2019). To foster interaction between the participants and the researcher, a Gmail account encompassing the research was included in the advertisement. Thus, in the present study, a purposive sampling technique was used and the participants included English tutors teaching in different Chinese universities who have experience in the use of intelligent learning technologies in teaching English. This method helped ensure the recruitment of participants with knowledge in the area of interest, which provided sufficient data for research (Rai & Thapa, 2015). Therefore, 10 English teachers were introduced for the purpose of identifying their attitudes, concerns, and approaches to intelligent English learning environments.

3.3. Research Participants

The participants in the study included 10 English tutors from 4 different universities in China. In this case, the participants were chosen purposively based on their experiences in the use of intelligent learning technologies for English teaching. All participants were of a working age, 6 of them female and 4 male, with an average age of 31 years. All participants have at least three years of teaching with Intelligent Learning Technologies so they can contribute to details of how intelligent English learning environments could be implemented and some challenges associated with it. This selective choice was to obtain specific and appropriate information on educators' attitudes and approaches.

Table 1: Sampling Profile

No	Age	Gender	Teaching Experience	Experience with Intelligent Learning Technologies	University

1	32	Female	5 years	3 years	University 1
2	38	Male	10 years	4 years	University 1
3	34	Female	6 years	3 years	University 2
4	40	Male	12 years	5 years	University 2
5	28	Female	3 years	3 years	University 2
6	36	Female	8 years	4 years	University 3
7	33	Male	7 years	4 years	University 3
8	37	Female	9 years	4 years	University 4
9	31	Female	4 years	3 years	University 4
10	35	Male	7 years	4 years	University 4

3.5. Research Instrument

In the context of the research, the interviews were planned and implemented through the interference of a secure online platform, which contributes to the participants' confidentiality and convenience. This virtual format seemed advantageous as it helped in the scheduling and attendance of people from different places, which enabled teachers from different universities to share their experiences despite not being physically present. The interviews were completed one on one and this was very crucial since it enabled the researcher to obtain detailed responses from all the participants without interference. This format also served the purpose of fostering friendly relations and trust between the participants and therefore they were more willing to share more information about their perceptions and experiences. The session lasted for approximately 45-50 minutes and all interviews with the ten participants were conducted within three weeks period. The first set of questions addressed in the interview were warm-up questions aimed at familiarizing the participants with the process. The following questions were formulated for rapport building and general small talk. After that, the discussion proceeded to the part with specific questions related to the educators' opinions on intelligent English learning environments, their advantages and disadvantages, and possible approaches to their successful application. Thus, this approach to organizing interviews guaranteed that they were conducted efficiently and according to the identified goals of research as well as ensured the effective examination of the integration of technologies in teaching English at universities. Interview questions have been developed in detail and presented at the end of this paper in Appendix A.

3.6. Data Analysis

Reflexive thematic analysis was employed to interpret the results of this investigation. Reflexive thematic analysis is an analytical method that entails iterative and reflexive cycles of coding, interpretation, and reflection on data (Braun & Clarke, 2019). This

thematic analysis has been conducted in six six-step processes. The initial step entailed becoming acquainted with the dataset. This phase entails the reading and re-reading of the data to become intimately familiar with its content and to take notes on initial analytic insights and information, both in relation to each specific information item (such as an interview transcript) and in connection to the entire dataset. Coding was executed during the subsequent phase. This phase entailed the creation of concise codes that effectively capture and evoke significant aspects of the data that may be pertinent to the research query. It entailed the coding of the entire dataset, which was completed in two or more cycles. Subsequently, all relevant data extracts and codes were compiled for subsequent analysis. Initial motifs were generated during the third phase. This phase entailed the examination of the codes and the compilation of data to initiate the development of significant broader patterns of meaning (potential themes). Afterward, it entails the collection of pertinent data for each candidate theme, enabling you to analyze the data and evaluate the feasibility of each theme. Themes were devised and reviewed during the fourth phase. During this phase, the candidate themes are compared to the classified data and the entire dataset to ensure that they provide a compelling narrative of the data and address the research question. Themes are further developed during this phase, which may involve their splitting, combining, or discarding. In the thematic analysis strategy, themes are characterized as patterns of shared meaning that are supported by a central concept or idea. Subsequently, themes were improved, defined, and named during the fifth phase. This phase entailed the development of a comprehensive analysis of each theme, the establishment of the breadth and scope of each theme, and the identification of the "story" of each theme. Additionally, it necessitated selecting an informative title for each theme. The entire report was composed during this concluding phase. The analysis was contextualized in relation to the existing literature, and the analytic narrative alongside information extracts was interwoven during this phase. The analysis is typically an iterative procedure, with movement

alternating between various phases, despite the fact that these phases are sequential and each phase builds on the previous one.

3.7. Ethical Consideration

In the course of the research, all participants were required to understand that the interviews would be recorded. To this effect, they were made to complete a consent form to indicate their understanding of this procedure and that they were willing participants in the study. The participants were also informed that they could withdraw from the research exercise at any given time with no repercussions. This ethical consideration helps maintain their autonomy and privacy and thus was implemented throughout the study. Therefore ethical consideration was able to maintain the research credibility and the confidentiality of the data provided by the participants.

4. Findings

4.1. Thematic Analysis

In this study, four themes were revealed, with each presenting various aspects of the integration of intelligent learning technologies in English learning among Chinese universities. Depending on the mentioned themes, several sub-topics were discussed, such as the effects on teaching positions, participation, and learning processes, the opportunities and issues with technology use, and tips on improving efficacy and adoption. Hence, overall, there were four themes and eight subthemes in the present systematic thematic analysis.

4.1.1. Theme 1: Perceptions on the implementation of intelligent learning technologies

Subtheme: Impact on Teaching Role

The incorporation of intelligent learning technologies into the teaching of English at Chinese universities has altered the conventional functions of instructors. With these innovations, the learning setting is gradually moving from a paradigm where the teacher is the dispenser of knowledge to one where the teacher is a designer of learning experiences. The orientation of this shift in styles of teaching presupposes that the educator shifts from the traditional approach of an instructor to being a guide and tutor, thus altering interaction with learners. In this case, Participant 1 highlights the evolving patterns within the classroom.

> "These technologies will shift educators' roles from content delivery to facilitators of personalized learning experiences and critical thinking development." (Participant 1)

This quotation signified a shift towards specialized interventions in the learning process that utilize technology as well as facilitate the development of critical thinking skills among the learners. Expanding on this transformation, Participant 5 elaborates on the new roles and tasks of educators moving beyond the classroom.

> "Educators' roles will evolve into facilitators and advisors, focusing more on critical thinking and personalized support rather than direct instruction." (Participant 5)

This quotation expresses the shift in the paradigm of delivery in educational systems in which teachers are not open merely as informancers, but more as designers of competencies and offering cogitative plans to the students. Additionally, Participant 7's contribution also adds a more personal feel to the discussion with the focus being on the notion of mentorship when it comes to these new roles.

> "These technologies will transform educators into facilitators of personalized learning. They will focus more on guiding and mentoring individual students." (Participant 7)

This perception illustrates the ways how advanced technologies make improving learning process and making it more effective both for students and educators who are willing to control the process of each learner. Hence, these ideas present a clear departure from the traditional teaching and learning models and towards a more comprehensive and student-centric model aided by intelligent learning technologies to redefine the role of teachers in creating an environment conducive to growth and learning.

Subtheme: Engagement and Learning

The deployment of intelligent learning technologies in English education emphasizes engagement and learning. These innovations are crucial in reshaping the pedagogy and moving from conventional methods of learning toward a more individualized approach. This shift not only increases student engagement but also improves learning achievement through the implementation of gamification and adaptive learning approaches.

> "Technologies can make learning interactive and adaptive, catering to individual needs and maintaining student interest through gamification." (Participant 4)

This adaptation is important when it comes to serving different needs within the educational system. Furthermore, Participant 6 also pointed out how these technologies are made to be highly engaging as they are meant to appeal to students' learning preferences which ensures, students' constant motivation.

> "Intelligent technologies offer interactive, immersive learning experiences. They cater to diverse learning styles, keeping students motivated and engaged." (Participant 6)

This quotation underlines the potential applicability of intelligent technologies in optimizing educational processes since they introduce differentiated approaches to meet learners' needs. Continuing with the idea of flexibility, another participant (Participant

9) noted that the tools provide real, timely, and responsive education.

> "These technologies can provide interactive, real-time learning experiences that adapt to students' needs, keeping them engaged and motivated." (Participant 9)

This flexibility is crucial in cultivating a learning culture that not only captures the interests of the learners but also accommodates the dynamism that characterizes learning. From this perspective, it is possible to understand how intelligent learning technologies have a positive and catalytic role in facilitating the engagement of students as well as in the creation of a genuinely personalized educational environment.

4.1.2. Theme 2: Advantages of Intelligent Technology Integration in English Learning Environments

Subtheme: Facilitated Interactive Learning

The application of intelligent technologies in teaching English in Chinese universities is greatly improving the learning process. These technologies are defined as new practices that transform traditional classroom behaviors into more engaging and individualized learning approaches. In this regard, Participant 4 stressed the change as the result of these tools.

> "These technologies shift the classroom dynamic, allowing for more interactive sessions that cater specifically to the needs of each student." (Participant 4)

This is important to cater to the diverse education needs and learning styles of the students. Likewise, Participant 7 described the flexibility of the AI-based tool which is designed with the capability to change the learning environment based on the learner's activity.

> "By using AI-driven tools, we can create a learning environment that adapts in real-time to the pace and preferences of students, making education more effective." (Participant 7)

This statement highlights the functions of intelligent technologies to adapt methods of delivering education hence making education more effective. In addition, looking at the benefits of learning through interaction platforms, Participant 10 explained how these elements contribute to the process of making learning more hands-on when it comes to learning the language.

> "Interactive platforms enable a hands-on approach to language learning, which helps in maintaining high levels of student involvement and interest." (Participant 10)

This approach not only maintains interest but also helps in the involvement of the students in the learning process which makes learning more effective. From these findings, one is able to understand that intelligent technologies play an essential role in creating an engaging, responsive, and student-oriented learning environment in English language learning.

Subtheme: Improved Learning Outcomes

The incorporation of intelligent technologies in English language learning in Chinese universities has significantly improved achievements. These advancements lead to higher student involvement and the tailoring of the learning process. In this regard, Participant 1 expressed that he noticed some changes.

> "I have observed increased student engagement, personalized feedback, and improved language proficiency and retention through adaptive learning tools." (Participant 1)

This testimony supports the notion that adaptive learning tools have played a crucial role in enhancing the quality of education through the IT delivery system, thus providing students with customized content and feedback. Likewise, Participant 2 expanded on the role and usefulness of these technologies more thoroughly.

> "Benefits include increased student motivation, individualized learning paths, and immediate feedback, which significantly improve learning outcomes." (Participant 2)

From this perspective, it becomes clear that intelligent technologies play a great role in creating motivation for students, as well as providing them with an education that is tailored to their learning rate and approach. To support the claims about positive effects, Participant 5 described increased participation and measures to improve the quality of instructions.

> "I've seen improved student motivation and engagement, more tailored instruction, and quicker, more effective feedback that enhances overall language proficiency." (Participant 5)

The above quotation gives the dynamism of the enhanced teaching and learning processes brought about by intelligent technologies that in turn enhance education outcomes and language development among the students.

4.1.3. Theme 3: Challenges of Intelligent Technology Integration in English Learning Environments

Sub-theme: Technical and Resource Barriers

Introducing intelligent technologies in teaching English at Chinese universities has had its own set of problems. Technical and resource constraints have been instrumental in creating huge challenges.

> "Challenges include limited technical infrastructure, resistance from traditionalists, and the steep learning curve associated with new technologies." (Participant 1)

This quotation reveals that some of the basic challenges include poor infrastructural support and the reluctance of some instructors to embrace change some of which hinder effective use of these tools. Furthermore, as commented by Participant 6, there are barriers that directly impact the educators themselves.

> "Key challenges include technical issues, lack of training for educators, and resistance from both students and faculty accustomed to traditional methods." (Participant 6)

This statement underscores the fact that such challenges are not only confined to the structures that make up the educational system but also the people who facilitate the delivery of education. Moreover, other challenges were also highlighted by Participant 9.

> "Challenges include ensuring all students have access to the necessary technology. There's also the need for adequate training to use these tools effectively." (Participant 9)

This quotation raises equity concerns with the distribution of technologies and the significance of extensive training to harness the full potential of smart technologies in learning institutions.

Sub-theme: Resistance and Adaptation Issues

Introducing and incorporating intelligent technologies for teaching English at Chinese universities has encountered substantial concern and integration issues.

> "I have encountered challenges such as technical issues, varying levels of digital literacy among students, and initial resistance to change." (Participant 2)

This statement not only points out the technical challenges but also the differences in students' digital literacy that make it difficult to adopt innovations smoothly. Using this previous concept, the following challenges were mentioned by Participant 3.

> "Challenges include limited resources and ensuring equitable access for all students. Additionally, there is often initial resistance from students and faculty." (Participant 3)

This relates to the issue of accessibility, a key consideration that needs to be met for technology to be of use in education. Moreover, Participant 8 also mentioned the fact that the digital divide poses a challenge in the process.

> "One major challenge is the digital divide, with some students lacking access to necessary technology. There's also a learning curve for both students and teachers." (Participant 8)

From this perspective, it focuses on the issue of equity in the distribution of technology and learning environments and the educational difficulties that stem from it, stressing the importance of systemic approaches to address these barriers for students and teachers.

4.1.4. Theme 4: Strategies for Enhancing Effectiveness and Acceptance of Intelligent Learning Technologies

Sub-theme: Integration and Training

English educators have noted integration and training as two core approaches with the potential to increase the endorsement and effectiveness of intelligent learning technology. Participant 4 underlined the significance of a proper procedure.

> "Gradual integration and comprehensive training are essential. Encouraging a collaborative learning environment and blending traditional methods with technology enhances effectiveness." (Participant 4)

This insight shows that there is a need to incorporate the new technologies in a way that achieves a balance with traditional practices within the systems to enhance a positive learning environment. Likewise, Participant 5 underscored the significance of professional learning and student engagement for the study.

> "To maximize effectiveness, I recommend continuous professional development, incorporating student feedback, and gradually integrating technologies into the curriculum." (Participant 5)

This approach stresses the significance of ongoing training and feedback processes for educators and students to minimize the negative effects of the incorporation of new technologies. In addition, Participant 6 described a need for specificity in relation to training and adaptation.

> "I recommend providing thorough training for both educators and students. Gradual integration of technology helps ease the transition." (Participant 6)

This recommendation highlights the need to ensure that there is adequate capacity development of all the participants in order to foster the acquisition of knowledge and skills that will facilitate the adoption of the new technologies hence enhancing their implementation in education.

Sub-theme: Professional Development Importance

The role of professional development in the implementation of intelligent learning technologies has been highly stressed by teachers. Regarding this, Participant 7 proposed a solution that can assist educators in improving their literacy regarding technology in the context of teaching practices.

> "Ongoing professional development must be tailored to specific technological tools to truly enhance educators' ability to deploy them effectively in diverse classroom settings." (Participant 7)

This approach recognizes that it is not enough to introduce educators to new technologies but to demonstrate that they are capable of applying these technologies in the right context to address various educational demands. Expanding on this requirement for contextual application, Participant 8 responded to the need for a pedagogical knowledge base within technology instruction.

> "Workshops and seminars on new technologies should also address the pedagogical shifts necessary to adapt these tools to current educational strategies." (Participant 8)

This perspective put emphasis on technology as well as the teaching approaches to increase the efficiency of the use of technology in education. In addition, Participant 9 underlined the need for the development of a progressive outlook among educators.

> "Training programs should focus not only on the how-to of technology but also on fostering an innovative mindset that embraces changes and challenges in digital education." (Participant 9)

From this insight, it can be inferred that while subject content knowledge is important, cultivating an innovation and adaptability mentality is imperative for educators to succeed in a progressively digitalized education environment.

5. Discussion

5.1. RQ1: Overall perceptions of English educators towards the implementation of intelligent learning technologies

The study found that the use of intelligent learning technologies in English education has changed the role of teachers, who are now course designers, critical thinking trainers, and content deliverers at Chinese universities. Furthermore, these technologies have improved the level of interaction, adaptability, and perspective, thus improving the student's learning experience. The same observation has been made in other similar research. For example, Wen (2022) described the benefits of intelligent technologies including the Rain Classroom Smart Teaching Platform where technology boosted student desire and achievement in learning English thus supporting the significance of the technologies in enhancing education. Furthermore, the authors of Sun et al. (2020) pointed out that AI has enhanced the efficiency of English teaching through the use of an AI-based system wherein the teaching practices submitted to the learner's profile which in turn enhanced the learning environment's quality. Moreover, Yu and Nazir (2021) also discussed how AI can make the learning English language more interesting and engaging and this finding is also in line with the study regarding the increased interest and motivation of students using intelligent technologies.

This change could be attributed to the need for customizing learning in a diversified world where mastery of the English language is paramount. For this reason, Xie et al. (2022) noted that the implementation of intelligent learning technologies makes it easier for educators to spend time with students in terms of challenging the students' thinking process and assisting learners. Further, the real-time feedback and adaptive learning that these technologies allow could benefit learning, thus potentially improving learning outcomes (Nong et al., 2021). Hence, the use of intelligent learning technologies in teaching and learning of English is redesigning the roles of teachers and improving students' participation.

5.2. RQ2: Advantages and Challenges of Intelligent Learning Technologies in English Language Instruction at Chinese Universities

The research findings shed more light on the benefits and difficulties of incorporating intelligent learning technologies into English as a foreign language teaching in Chinese universities. On the one hand, it is preferred that these technologies enhance the interaction of the learners, the individual elements of learning, and overall, contribute to increasing students' interest and achievement. However, the use of these technologies has not been without some difficulties, especially in matters pertaining to technology support, faculty integration, and student access for everyone. As with other similar investigations, such findings have also been reported. According to Dahbi (2023), the Intelligent tutoring systems in English grammar instruction improved learner achievement and motivation through the provision of learner-centered learning environment. This corresponds to the findings made on the advantages of adaptive learning tools in the current study whereby participants acknowledged enhanced language achievement as well as retention. Furthermore, Elsakova et al. (2019) described the relevance of smart technology applications in enhancing traditional modes of learning, which is conformity with the interaction and live adaptable elements described by the educators in the current study. However, these authors also reported difficulties that teachers experience, including the lack of a sufficient level of knowledge in the technologies used, which relates well to the technical and adaptation problems highlighted by participants in the present study. In addition to these findings, Liu (2023) presented the difficulties and evolution of using AI in the teaching of foreign languages, where the positive impacts were seen as beneficial for learning outcomes while the negative impacts include resistance and technical issues. Likewise, Guo (2021) pointed out that deep learning-aided systems might help to enhance learning processes and increase student interest, but he also mentioned technical and digital literacy limitations that might prevent the effective use of artificial technologies.

The possible explanations for the difficulties seen in the present study may be due to the following factors. Firstly, Nong et al. (2021) noted that the digital divide

problem and differences in the learners' and teachers' digital competencies are major challenges to the efficient incorporation of intelligent technologies. Furthermore, Wen (2022) also highlighted that the complex nature of such technologies in terms of learning increases the difficulties in adopting and efficiently applying such technologies. Furthermore, Wang (2021) pointed out that insufficient technical support and the lack of technical background for staff members can be a significant limitation to intelligent learning environments. Thus, intelligent learning technologies have a lot of advantages when it comes to improving the instruction of English as a foreign language; however, the implementation of these technologies is accompanied by issues that must be considered. These challenges mainly concern the technical issues, resistances, and training and material support requirements. It is important to address these issues in order to achieve the real potential of intelligent technologies in education.

5.3. RQ3: Strategies to Enhance Effectiveness and Acceptance of Intelligent Learning Technologies in English Language Teaching at Chinese Universities

The results of the current study also highlights the need for the integration strategy to be incremental and accompanied by adequate training in improving the efficacy and adoption of intelligent learning technologies in teaching English in Chinese universities. The participants also highlighted the desirability of professional continuing education and training to enable the proper adoption of technological innovations and the designed changes in the classroom. Similar research work has been carried out to corroborate the above findings. For example, Hu (2022) established that precision education in AI-supported smart learning environments enhanced the learning achievements of students when combined with professional development and teacher training efforts. Wang and Yu (2022) also stressed that, in smart educational learning strategies, it is crucial to focus on the quality of teacher-student communication and learning outcomes, as well as the need for training and the integration of technologies. In addition, Liu et al. (2022) highlighted the benefits of AI technology in teaching activities where educators are well-prepared and assisted. Similarly, Amin et al. (2023) stressed the positive impact of personalized e-learning systems on educational performance and stressed the importance of regular professional education and training.

The possible explanations for these findings are the dynamic and ongoing development of educational technologies that force teachers to learn new approaches and incorporate new instruments into teaching. Also, another reason is the necessity of using AI and smart technologies in education accompanied by the corresponding changes in the approach to teaching practices in class which requires professional development to be effective. Similar discoveries were made by Lin (2022), who also mentioned that the perceptions of educators play a crucial role in defining the efficiency of AI integration since the skills shall be

improved constantly. In addition, Wang et al. (2022) stress that the organization of an environment that prescribes cooperation and feedback is crucial for the implementation of smart technologies processes in the field of science. Thus, the integration of intelligent learning technologies in education depends on the step-by-step approach, detailed staff training, and continuous professional development of staff in terms of technologies as well as educational approaches.

6. Conclusion

6.1. Concluding Remarks

The analysis showed that the use of intelligent learning technologies in teaching English at Chinese universities drastically changed the traditional roles of professors and teachers becoming enablers instead of knowledge providers. Although these technologies boosted the level of student participation and learning achievements through interaction and adaptability, there were some difficulties in the integration of the above-mentioned technologies. Challenges including lack of IT support, resistance from teachers and students, as well as differences in technology literacy were major issues that educators faced while implementing these tools. To respond to these challenges, the study highlighted the need for detailed professional development as well as the progressive implementation approach, noting that merely integrating new technologies was insufficient. Further, to implement it in the right manner, it has been understood that a blend of expertise and mechanical methods is needed along with the flexibility required from teachers. By critically examining this model of intelligent learning technologies, it was postulated that this concept has enormous potential when implemented, but success is highly contingent on proper incorporation and continued follow-up and encouragement for the teachers and learners.

6.2. Limitation

The findings of this research which reveal perceptions and concerns about to use of intelligent learning technologies in English language teaching in Chinese universities are however subject to the following limitations. Firstly, the number of participants in the study was quite small, with only 10 participants from four universities, thus, the results of the study might not be generalizable to a larger population. Moreover, the interview data used may have some bias since participants' responses may be skewed in positivism or negativity. This study was designed only for educators, which means that some valuable insights from students, administrators, or policymakers were not included in the study. In addition, the research was carried out in a particular cultural and educational environment, the results of which may not be relevant to other countries or educational frameworks. Finally, the qualitative design limits generalizability, and the trends cannot be caused or quantified, however mixed methods or larger quantitative research might offset these constraints.

6.3. Recommendation

Based on a number of limitations associated with this study, some suggestions for further research are suggested in order to extend the present study's outcomes and fill the set gaps. First, increasing the number of participants including students, administrators, and policymakers would give a broader picture of the use of intelligent learning technologies. Perhaps it may also facilitate in deciphering further concerns and actions that are feasible with major and minor stakeholders. Furthermore, future research could incorporate survey and interview results with conventional data to support the conclusions and enhance the certainty of the research regarding the efficacy and utility of these technologies in English language education. It would also be useful to compare and contrast the educational settings, either in China or other countries, to find out the cultural and contextual factors that contribute to the diffusion and effectiveness of intelligent learning technologies. Furthermore, cross-sectional research approaches could be used to identify the long-term implications of the technologies under consideration on outcomes of teaching and learning, as well as to investigate changes in educators' roles in the course of time.

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Appendices

Appendix A: Interview Questions

Background and Experience:

1. Can you tell me a little about your background and how you got into teaching English at the university level?

2. What do you enjoy most about teaching English to university students?

RQ1: Perceptions of Implementation

1. What are your initial thoughts when you hear about "intelligent English learning environments"?

2. How familiar are you with the different types of intelligent learning technologies available for English language instruction?

3. How do you think intelligent learning technologies will change the role of English educators?

RQ2: Specific advantages and challenges identified by educators

4. What specific benefits have you observed from integrating intelligent learning technologies into your English language instruction?

5. How do you think these technologies can improve student engagement and learning in English?

6. What challenges have you faced in implementing intelligent learning technologies in your classroom for English language instruction?

RQ3: Strategies suggested by educators to enhance effectiveness and acceptance

7. What strategies do you use or recommend to maximize the effectiveness of intelligent learning technologies in English language teaching?

8. How important do you think professional development and training are in fostering a positive attitude of English educators towards these technologies?

9. How do you envision the future of English language teaching with the continued advancement of intelligent learning technologies?

Appendix B: Thematic Analysis based on RQ1

RQ	Theme Name	Subtheme Name	Quotations	Participants
What are the overall perceptions of English educators towards the implementation of	Perceptions on the implementation of intelligent learning technologies	Impact on Teaching Role	"These technologies will shift educators' roles from content delivery to facilitators of personalized learning experiences and	Participant 1

			critical thinking development."	
intelligent learning technologies?			"Educators' roles will evolve into facilitators and advisors, focusing more on critical thinking and personalized support rather than direct instruction."	Participant 5
			"These technologies will transform educators into facilitators of personalized learning. They will focus more on guiding and mentoring individual students."	Participant 7
		Engagement and Learning	"Technologies can make learning interactive and adaptive, catering to individual needs and maintaining student interest through gamification."	Participant 4
			"Intelligent technologies offer interactive, immersive learning experiences. They cater to diverse learning styles, keeping students motivated and engaged."	Participant 6
			"These technologies can provide interactive, real-time learning experiences that adapt to students' needs, keeping them engaged and motivated."	Participant 9

Appendix C: Thematic Analysis Based on RQ2

RQ	Theme Name	Subtheme Name	Quotations	Participants
What specific advantages and challenges do English educators identify in the integration of intelligent learning technologies?	Advantages of Intelligent Technology Integration in English Learning Environments	Facilitated Interactive Learning	"These technologies shift the classroom dynamic, allowing for more interactive sessions that cater specifically to the needs of each student."	Participant 4
			"By using AI-driven tools, we can create a learning environment that adapts in real-time to the pace and preferences of students, making education more effective."	Participant 7
			"Interactive platforms enable a hands-on approach to language learning, which helps in maintaining high	Participant 10

			levels of student involvement and interest."	
		Improved Learning Outcomes	"I have observed increased student engagement, personalized feedback, and improved language proficiency and retention through adaptive learning tools."	Participant 1
			"Benefits include increased student motivation, individualized learning paths, and immediate feedback, which significantly improve learning outcomes."	Participant 2
			"I've seen improved student motivation and engagement, more tailored instruction, and quicker, more effective feedback that enhances overall language proficiency."	Participant 5
	Challenges of Intelligent Technology Integration in English Learning Environments	Technical and Resource Barriers	"Challenges include limited technical infrastructure, resistance from traditionalists, and the steep learning curve associated with new technologies."	Participant 1
			"Key challenges include technical issues, lack of training for educators, and resistance from both students and faculty accustomed to traditional methods."	Participant 6
			"Challenges include ensuring all students have access to the necessary technology. There's also the need for adequate training to use these tools effectively."	Participant 9
		Resistance and Adaptation Issues	"I have encountered challenges such as technical issues, varying levels of digital literacy among students, and initial resistance to change."	Participant 2
			"Challenges include limited resources and ensuring equitable access for all students. Additionally, there is often initial resistance from students and faculty."	Participant 3
			"One major challenge is the digital divide, with some students lacking access to	Participant 8

			necessary technology. There's also a learning curve for both students and teachers."	

Appendix D: Thematic analysis based on RQ3

RQ	Theme Name	Subtheme Name	Quotations	Participants
What strategies do English educators suggest to enhance the effectiveness and acceptance of intelligent learning technologies?	Strategies for Enhancing Effectiveness and Acceptance of Intelligent Learning Technologies	Integration and Training	"Gradual integration and comprehensive training are essential. Encouraging a collaborative learning environment and blending traditional methods with technology enhances effectiveness."	Participant 4
			"To maximize effectiveness, I recommend continuous professional development, incorporating student feedback, and gradually integrating technologies into the curriculum."	Participant 5
			"I recommend providing thorough training for both educators and students. Gradual integration of technology helps ease the transition."	Participant 6
		Professional Development Importance	"Ongoing professional development must be tailored to specific technological tools to truly enhance educators' ability to deploy them effectively in diverse classroom settings."	Participant 7
			"Workshops and seminars on new technologies should also address the pedagogical shifts necessary to adapt these tools to current educational strategies."	Participant 8
			"Training programs should focus not only on the how-to of technology but also on fostering an innovative mindset that embraces changes and challenges in digital education."	Participant 9