

Empowering the Construction of English Ecological Classrooms with Smartphones

Haige Shi

School of Fundamental Education, Beijing Polytechnic, China

shihaige@sina.com

Abstract: The advent of digitalization has catalyzed a paradigm shift within the educational landscape, necessitating the development of English ecological classrooms that are congruent with the smartphone era. This scholarly inquiry posits the conceptualization of a sunflower model for smartphone-facilitated English ecological classrooms, which is grounded in an ecological educational framework. The model is designed to optimize the smartphone's multifaceted roles as a pre-class learning condition analyzer, content disseminator, interactive question-and-answer mediator, tailored difficulty adjuster, learner interest cultivator, and post-class assessment and guidance facilitator. The overarching objective is to foster an English learning environment characterized by synergy, engagement, individualization, and enthusiasm. Empirical evidence from pedagogical trials employing this model has indicated substantial pedagogical efficacy. The establishment of such English ecological classrooms necessitates a pioneering vision, stratified administration, and a multifaceted approach to governance, thereby fostering the emergence of innovative educational paradigms in the digital education epoch.

Keywords: Smartphone; Ecological Classroom; English Education

1. Introduction

The digital revolution in education during the 21st century has garnered widespread recognition as a transformative force. This digital wave, akin to a silent yet potent tide, is silently yet significantly augmenting traditional educational practices, heralding the advent of novel educational paradigms. The 20th National Congress of the Communist Party of China has underscored the imperative to expedite the digitalization of education and to cultivate a nation predicated on a learning ethos.[1] The progression of digital education and the concomitant enhancement of educational digitalization represent the zeitgeist, developmental imperatives, and the vanguard of educational reform.

Data, albeit incomplete, indicates that the national primary and secondary school smart education platform in China has garnered 100 million registered users, amassing nearly 360 billion page views. Chinese Massive Open Online Courses (MOOCs) have introduced over 76,800 courses, facilitating 1.277 billion learning sessions, thereby establishing the largest application scale globally. In 2023, the vocational education smart education platform expanded its offerings with the addition of 28,000 virtual simulations, high-quality online courses, and professional teaching resource libraries, accumulating an impressive repository of over 7.27 million educational resources.

By the year 2020, China's smartphone user base had reached 560 million. By the close of 2021, this figure had surged to 1.856 billion, positioning China as the nation with the most extensive smartphone user community in the world. Given the pervasive adoption and continuous technological advancements of smartphones, it is anticipated that the prevalence of smartphones in China will persist in its upward trajectory. This burgeoning digital landscape presents an unparalleled opportunity for the integration and enhancement of educational practices through the strategic deployment of smartphone technology.

1.1 The Concept of Smartphones in the Educational Context

The advent of the 21st century has witnessed smartphones becoming an indispensable fixture in contemporary life, transcending their initial role as mere tools for leisure and communication to become pivotal instruments in students' digital learning endeavors. A smartphone, defined as a

handheld device equipped with an independent operating system akin to a personal computer, enables users to install a plethora of third-party applications, thereby extending the device's functionality. The progenitor of smartphones, the IBM Simon series, emerged in 1993, marking the beginning of a technological evolution that has since integrated capabilities such as photography, videography, internet browsing, financial transactions, navigation, email communication, and real-time interaction. Smartphones have evolved to support social media platforms and a myriad of applications, facilitating instant communication and transforming them into versatile companions in both personal and professional spheres.

1.2 Smartphones and Society: Ubiquity and Integration

The inherent advantages of smartphones have facilitated their rapid assimilation into daily life, symbolizing a significant milestone in human societal progress. These devices, unbound by temporal and spatial constraints, enable seamless communication, thereby reducing the latency of information exchange and enhancing overall efficiency. The pervasive presence of smartphones in daily life has led to the notion that "with one device in hand, the world is at one's command," effectively shrinking the globe into a digital village. The proliferation of e-commerce platforms, entertainment content, and interactive gaming applications has further solidified smartphones as indispensable tools for communication, lifestyle and entertainment. As smartphones have evolved from simple communication devices to comprehensive life and learning tools, their role has shifted from mere communication aids to integral life partners, catering to the multifaceted needs of users for communication, information acquisition, entertainment and self-existence.

1.3 Smartphones and Education: Responsiveness and Synergy

The integration of smartphones into formal education and classroom instruction can be broadly categorized into three dimensions: firstly, the development of novel autonomous learning models facilitated by smartphones, as evidenced by the works of Zhu Rongping (2018), Wan Xin (2017), and Lang Xiao'an (2015) [2] [3] [4]; secondly, spatial transformation, where the omnipresence, sharing, and intelligence of school information spaces foster personalized and intelligent education, with four primary directions for school space transformation being security, ecology, openness, and intelligence, as posited by Liu Houping (2019) [5]; and thirdly, alterations in organizational relationships, as Liu Pei (2019) suggests, mobile social interactions have reshaped the dynamics of dormitory relationships and the networked living environment, proposing a path to enhance emotional connections through mobile social media [6].

Despite their widespread adoption among students, smartphones have also introduced challenges, such as the disruption of traditional learning patterns. Experts contend that smartphones have led to a decline in student focus, with some students succumbing to distractions like gaming, novel reading, and video watching, which not only consume valuable time and impact vision but also expose them to content that can unsettle their minds, detracting from academic pursuits. Additionally, an overreliance on smartphones and immersion in virtual worlds have been linked to diminished real-world communication, resulting in a lack of familial closeness, distant friendships, and a decline in social interaction skills.

To mitigate the negative impact of smartphones on student learning and social interaction, various strategies have been proposed, including "guidance approach" to enhance self-discipline and promote the judicious use of smartphones[7], "restriction approach" to strengthen mobile phone management, and "comprehensive approach" that combine both blocking and guiding approaches. The author posits that while "restriction approach" offer a temporary solution, they are not sustainable in the long term. "guidance approach" have limited efficacy, as self-discipline is not easily cultivated overnight. The "comprehensive approach" represents a more advanced approach, providing a novel direction for educators.

In light of the irreversible trend of smartphone usage, Yu Shengquan and colleagues advocate for leveraging this trend to serve educational purposes. They propose that university education should

be integrated with the information environment to create an "educational information ecology." Within this ecosystem, information individuals, educational practices, and technological environments form a self-organizing, self-evolving system. Information individuals and technological environments are interconnected through educational practice activities and are propelled by information technology, facilitating the flow, exchange, feedback, and circulation of information resources. This dynamic system aims to optimize system value and promote the holistic development of educators and students. [8] Since smartphones have become an indispensable part of the social fabric in the 21st century, why not harness them to empower educational activities? Are there any possibilities for smartphones to empower ecological classrooms? Thereby, building an ecological classroom based on smartphones is a future development trend.

1.4 The Ecological Classroom: Conceptual Framework and Distinctive Features

The concept of the "ecological classroom" was initially introduced by American educator Waller in his seminal work "The Sociology of Education." This paradigm shifts the educational discourse from a traditional perspective to one grounded in ecological principles, wherein the educational space is likened to a symbiotic micro-ecosystem, with the goal of achieving a dynamic equilibrium among teachers, students, and the educational milieu. The ecological classroom is characterized by the intricate web of processes and events that influence the educational setting. This pedagogical approach aspires to return to the core of education, underscoring the "ecological niche" of learners and reinstating their "subject position." It positions teachers, students, and the environment as integral ecological components, with a focus on dynamism, harmony, and equilibrium. The model is centered on student development, advocating for mutual engagement, collaborative inquiry, and a participatory learning environment that fosters a classroom ethos of co-evolution, perpetual growth, and harmonious progression. Teachers are envisioned as architects of a natural and conducive learning environment, nurturing students' individuality, autonomy, and creativity, while serving as "guardians of life".[9]

In the realm of pedagogical practice, the ecological classroom is distinguished by its naturalness, dynamism, and symbiotic nature. The principle of naturalness entails the cultivation of an authentic ecological setting that respects the intrinsic value of life, invigorates the educational ecosystem, and prioritizes the creation of an environment that catalyzes joy and enthusiasm for learning among students. Dynamism underscores the interactive and fluid nature of the ecological classroom, striving for a classroom atmosphere that is orderly, emotionally resonant, effective, and engaging, thereby addressing students' psychological needs such as curiosity, the pursuit of knowledge, and a sense of active participation. Symbiosis, the third characteristic, encapsulates the harmonious unity of all participants within the classroom as ecological entities, each independent yet interdependent, fostering a symbiotic relationship that is both complementary and indispensable.

2. Construction of Smartphone-Assisted English Ecological Classrooms

2.1 Reality: Non-Ecological English Classrooms

In the realm of educational ecology, it is posited that the various elements of a classroom should exist in a harmonious and equitable relationship. This implies that in an ideal English ecological classroom, both the soft environment (teachers and students) and the hard environment (facilities and classroom decor) should be integrated into a system of balance and equality. [10] However, traditional English classrooms often exhibit a discordant dynamic, with a teacher-centric approach overshadowing student engagement, thereby impeding active student participation (Wang Duqin, 2002).[11] The crux of this issue stems from an overemphasis on the teacher's authority and a pedagogical focus on language knowledge dissemination, which inadvertently marginalizes students' communicative needs. This paradigm positions students as passive recipients of information, thereby disrupting the ecological equilibrium of classroom instruction. Consequently, student engagement in conventional university English classrooms is markedly low, resulting in

minimal teacher-student interaction. When interaction does occur, it is predominantly through rudimentary questioning, which occupies a mere 20% to 40% of instructional time. [12]

2.2 Ideal vision: English Ecological Classrooms

In contrast, English ecological classrooms are designed to foster human potential within a natural and conducive learning milieu. Drawing upon Gardner's theory of multiple intelligences, the development of linguistic competencies is envisioned to progress through four distinct stages: perception, communication, transmission, and comprehensive application. The pedagogical approach is centered on student-led activities, emphasizing the learning process itself, where students emerge as active and inquisitive participants rather than mere recipients of knowledge. The teacher's role is thus redefined as a facilitator of independent inquiry, rather than a purveyor of prefabricated information.

The ideal English ecological classroom should embody four key attributes: First, harmony, which is essential for cultivating a conducive learning environment that encourages constructive engagement. Without such an atmosphere, discussions of learning activities become fanciful abstractions. Second, interactivity, as education is fundamentally a dynamic process of intellectual exchange and knowledge sharing among individuals. A one-way instructional model lacks the appeal necessary for effective learning. Third, engagement, as empirical data indicate that over 50% of students resort to smartphone usage during class, primarily due to boredom, engaging in activities such as online chatting, video consumption, and gaming. To counteract this trend, enhancing classroom engagement and capturing students' attention is a pivotal aspect of pedagogical reform. English ecological classrooms must be designed to be captivating, participatory, and stimulating. Fourth, personalization, as a classroom that caters to individual learning styles and preferences is a potent catalyst for engaging teaching practices.

2.3 The construction of English ecological classrooms facilitated by smartphones.

Lu Xin, President of the China Vocational and Technical Education Association and former Deputy Minister of Education, China, has underscored the imperative to capitalize on the strengths of digital technology to facilitate the collaborative development and dissemination of digital educational resources. In an era where smartphones are ubiquitous, it is incumbent upon educators to harness this technological trend to enhance English language acquisition and to cultivate the emergence of English ecological classrooms. Building upon extensive teaching experience, the author has formulated the Sunflower Model for Smartphone-Assisted English Ecological Classrooms (refer to Figure 1). This model accentuates the pedagogical utility of smartphones, employing smartphone applications as instrumental teaching aids, and is designed to foster an English ecological classroom that embodies the quintessential characteristics of ecological pedagogy: harmony, interactivity, personalization, and engagement. The model is complemented by strategic pre-class preparation and post-class reinforcement. Smartphones are integral to the comprehensive development of the ecological classroom, assuming diverse roles at various stages of the educational process: as pre-class learning condition analyzers, purveyors of learning content, mediators of question-and-answer sessions, targeted guidance pushers, explorers of learning interests and facilitators of post-class assessment and guidance.

In the context of English language teaching practice, smartphones play a pivotal role as pre-class learners' profile collectors, where educators utilize WeChat mini-programs like Shimo Document or learning platforms such as Xuexitong app to have students complete surveys or quizzes on topics such as learning foundations, interests, and vocabulary. Teachers collect and analyze this data to understand students' English proficiency and interests. As providers of learning content, educators disseminate teaching videos, listening materials, or English songs through college English learning WeChat groups or utilize digital resources accompanying textbooks, such as the U Campus student app, to download corresponding listening materials, text lectures, and explanations of key points for learning on their mobile devices.

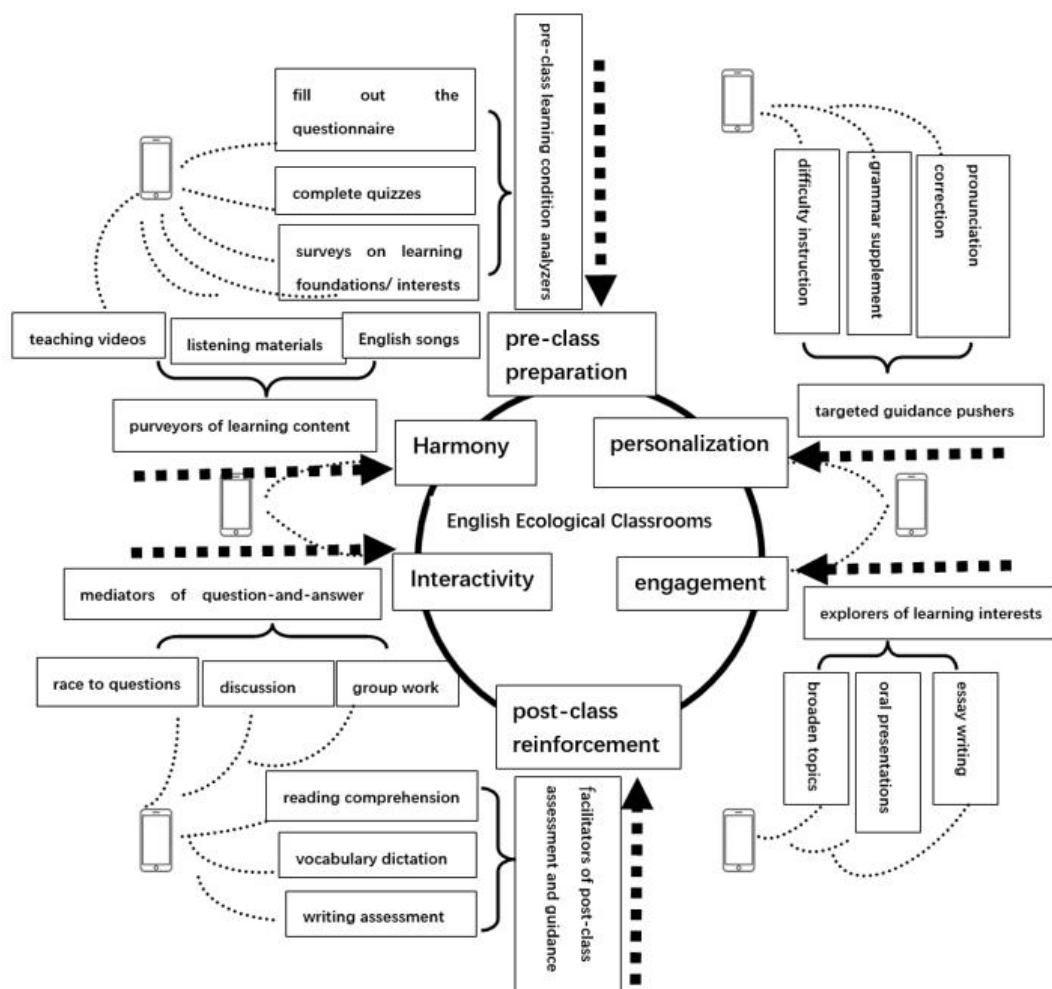


Figure 1. Sunflower Model for Smartphone-Assisted English Ecological Classrooms

In classrooms that emphasize interactivity, smartphones act as facilitators of question-and-answer sessions, using WeChat mini-programs like Tencent Docs to create open-ended questions or discussions based on lesson content or textbook topics. This supports collaborative editing, allowing students to contribute their opinions in designated sections of the document, with viewing permissions opened at a set time, enabling students to see and comment on each other's responses. Additionally, educators can leverage online discussion platforms such as Moodle or Canvas to foster real-time discussions, creating course topics and discussion forums where students can express their views, deepening the teacher's understanding of the students and promoting peer communication.

As explorers of learning interests, educators guide students in delving deeper and broadening their perspectives on relevant topics, engaging in essay writing and oral presentations. In terms of personalizing the ecological classroom, smartphones excel as targeted guidance pushers, addressing individual, non-universal issues through one-on-one targeted guidance via Shimo Docs, WeChat, or learning platform chat areas, providing detailed explanations, grammar supplementation, and pronunciation corrections for English vocabulary.

In the role of post-class homework checker and guide, smartphones can deploy learning software to administer unit tests, reading comprehension assessments, vocabulary dictation checks, and writing evaluations. Tools like iWrite (AiXie in Chinese) offer instant grading, content evaluation,

error identification, and correction, allowing students to upload their English essays for photo-based submissions, thereby enhancing their writing skills.

3. Ecological Classroom Teaching Implementation

3.1 Description of the Experimental Process

Employing the constructed Sunflower Model for smartphone-assisted English ecological classrooms, the author conducted a semester-long teaching practice at a vocational college in Beijing. Taking the College English course as an example, 89 students from the New Energy Vehicle major in the Automotive Engineering College were selected as the control group, while 92 students from the Computer Science major in the Electronic Information College were chosen as the experimental group. The students in both the experimental and control groups had comparable English proficiency levels upon entry. The textbook used was "New Era Vocational English: General English 1" (published by Foreign Language Teaching and Research Press, authored by Lu Xin and Gao Xiaojiao). The control group was taught using traditional methods, while the experimental group's teaching content for each unit was conducted using the Sunflower Model for smartphone-assisted English ecological classrooms as depicted in Table 1.

The following presents the specific teaching process using the Sunflower Model for the eighth unit, Unit 8 Volunteering, as an example of the teaching implementation. The detailed operational flow is shown in Table 1. It should be noted that the smartphone applications presented in Table 1 are merely one example of implementation; there are certainly various other implementation paths, which due to space constraints, are not listed in detail here.

3.2 Actual Teaching Operational Process

Teaching Unit: Unit 8 Volunteering Teaching Content: Reading Passages

Table 1. An example of the teaching implementation using the Sunflower Model

English Ecological Classrooms /Roles of smartphone	Teaching process	Application of smartphone	Students' activity	Operation in details	Aim of design
Pre-class preparation <i>Pre-class learners' profile collectors</i>	Conduct a survey on volunteering experience	WeChat mini-program- Shimo Document	Fill in a questionnaire on volunteering experience	What did and Why/When//Where/With whom has worked as a volunteer	Get to know each student's real experience
	Introduce topic of volunteering	Xuexitong app-activity-reading	Read three posters	Answer questions related to volunteering work	Topic warm-up
	Get to know vocabulary on volunteering	Shanbei Words/ Kingsoft PowerWord	Learn vocabulary on volunteering	Check, read, memorize new words	Vocabulary warm-up
	Watch videos	WeChat learning group	Learning text content	Obtain text information	Learn English text

Harmony	Do the listening	Waiyanshuishenxue APP	Practice English listening	Broadcast teaching resources	Improve listening ability
	<i>Providers of learning content</i>	Listen to English songs	Kugou music App	Listen to the song Fill the world with love	Play a song Set the mood of filling the world with love
Interactivity	Race to questions	Xuexitong app-activity-race to questions	questions and answers	Recreate the key points of the text	Check text understanding
	Participate in discussion	Tencent Document	Multiple people coordinate answers in real time. After completion unified open to view.	Answer open-ended questions: What would a society be like if everyone volunteered?	Cultivate innovative thinking and Integrate ideological and political education into curriculum
	<i>Facilitators of question-and-answer sessions</i>	Team work	Tiangong AI	Create a volunteer recruitment English poster	Graphic and text design and division of labor and cooperation Development of Teamwork Abilities
Engagement	Expand topic	Baidu/google search engine	Search the college students' experiences of volunteering	Choose at least 5 college volunteer and tell their deeds to partners	Gain power from models
	Do oral presentation	Play the videos	Search the videos of volunteering	Watch the videos and tell the content of volunteering to partners	Enhance the speaking ability
	<i>Learning interests arousers</i>	Write essay	iWrite/Pigai.org	Write down volunteer stories and comment on them	Note down and comment on volunteer experiences and feelings based on selected college volunteers Improve the writing ability
Personalization	Instruct difficult point	WeChat Document/voicing	Targeted to key phrases and complex sentences	Deepen the comprehension of key expressions	Fully understand the meanings of key phrases and complex sentences.
	Provide grammar supplement	Xuexitong app-activity-grammar	Seek the difficult grammar points	Rethink the grammatical points of object clauses and the past perfect tense in the context of recounting past experiences	Master the grammar points
	<i>Targeted guidance pushers</i>	Correct pronunciation	English Fun Dubbing /FiF Spoken English Training	Focus on pronunciation of long and difficult words	Read aloud words and correct the pronunciation Make sure pronunciation is correct

Post-class reinforcement	Do reading test	Xuexitong app-activity-reading	Self-check reading comprehension	Read and do the corresponding questions, then check answers	Strengthen the understanding of the main content of the text
	Do vocabulary dictation	WeChat mini-program- Shimo Document	Review the key words and expressions	Listen and write down the newly-learned words and expressions	Enhance the understanding of the theme
Facilitators of post-class assessment and guidance	Assess writing	www.pigai.org	Write down the gains from learning about the volunteer theme content	Recall and note down volunteer activities such as being a waste sorting flyer distributor, animal rescuer, giant panda conservation volunteer, earthquake fundraiser, and rural teacher for volunteer teaching and comments on volunteer behaviors	Consolidate writing skills. Stimulate students' enthusiasm for public welfare and motivate them to actively participate in volunteer activities

3.3 Results Analysis and Discussion

After a semester of teaching experimentation, the classroom engagement of students in the experimental group was significantly higher than that of the control group. In the end-of-semester survey, the vast majority of students expressed high satisfaction with the College English course (86% indicated they "liked it a lot," 4% "disliked it," and 10% "liked it"). When asked to choose three words to describe their impression of the course, nearly 80% of the students selected "relaxed and enjoyable learning atmosphere," "interesting learning content," and "flexible learning methods." The average final exam score of the experimental group was 17.9 points higher than that of the control group (control group average score: 71.8, experimental group average score: 89.7).

4. Conclusion and Reflection

In the contemporary educational landscape, the integration of digital technologies and the pursuit of pedagogical innovation have become imperative for cultivating a dynamic and effective learning environment. This paper posits that the construction of an English ecological classroom, characterized by a harmonious blend of philosophical underpinnings, stratified management, and diversified governance, is pivotal for fostering a new educational paradigm. This paradigm is not only conducive to enhancing linguistic proficiency but also to nurturing critical thinking, innovation, and a lifelong commitment to learning.

4.1 Leading with Philosophy

English teachers and educators should establish educational ecology, integrate information technology into education and stick to the student-centered teaching philosophy. Firstly, educators and educational administrators need to deeply understand the core concept of educational ecology, which views education as a dynamic, open, and multifaceted interactive system. In this system, students, teachers, teaching content, teaching methods, and technological tools are all interrelated components. Educational ecology emphasizes holism and systemic thinking, striving for a harmonious symbiosis between the educational environment and student development. Secondly, integrating information technology into education shall be emphasized. In the digital age, mobile

devices like smartphones have become an integral part of students' daily lives. Teachers need to recognize the potential of these devices in education, viewing them as auxiliary tools for teaching rather than distractions. Through smartphones, personalized learning, instant feedback, and resource sharing can be better facilitated. Last but not least, student-centered teaching philosophy shall be strengthened. Building an English ecological classroom requires placing students at the center of teaching, focusing on their needs and interests, and encouraging active participation and exploration. The role of the teacher shifts from a traditional knowledge disseminator to a guide and facilitator, helping students learn through exploration and grow through learning.

4.2 Stratified Management

Educators are encouraged to embrace the philosophy of stratified management, which necessitates the implementation of tailored approaches to student management. This entails the stratification of educational content to cater to the diverse needs of learners and the employment of a multiplicity of pedagogical strategies to enhance the learning experience.

Initially, in the perspective of differentiated student management, each student has a unique learning background, interests, and abilities. Teachers need to categorize students' learning situations and provide appropriate learning resources and tasks for different levels. For example, students with weaker foundations can be given more basic vocabulary and grammar exercises, while those at a higher level can be provided with more advanced reading materials and writing tasks. Subsequently, in terms of stratified curriculum design, educational content must be meticulously structured in a tiered fashion, aligning with the diverse cognitive abilities and developmental stages of students. This stratification ensures that the curriculum is both challenging and supportive, fostering an environment conducive to individual academic growth. Moreover, the curriculum should be contextualized to incorporate students' real-world experiences and personal interests, thereby enhancing the relevance and engagement of the learning process. Ultimately, as for methodological pluralism, within the framework of an ecological English classroom, pedagogical strategies should be diversified to accommodate the spectrum of student learning preferences. Techniques such as project-based instruction, collaborative learning, and the flipped classroom model should be strategically implemented to stimulate student engagement and augment the efficacy of teaching practices.

4.3 Diversified Educational Governance

In the initial phase, resource integration and optimization: In the context of establishing an English ecological classroom, educators are tasked with the strategic amalgamation and enhancement of a diverse array of educational resources. This includes the judicious use of traditional curricular materials, digital assets, and mobile learning applications. By implementing a multifaceted approach to resource integration, students are afforded a more comprehensive and adaptable learning ecosystem. Subsequently, dynamic Adaptation of Instructional Strategies. The pedagogical process within an English ecological classroom necessitates a responsive and adaptive approach to teaching methodologies. Educators must be attuned to the evolving needs of their students, making timely adjustments to lesson plans and instructional techniques. This may involve supplementing challenging concepts with additional exercises or delving deeper into topics that pique students' curiosity, thereby facilitating a more nuanced understanding. Ultimately, triangular collaboration. The educational ecosystem extends beyond the classroom, encompassing the home, school, and broader community as integral components of a student's developmental milieu. Fostering a collaborative network among these entities is paramount in cultivating an English ecological classroom. Parents can be actively involved in their children's educational journey, while schools can partner with community organizations to offer practical and enriching experiences, collectively contributing to a holistic learning environment.

By prioritizing a philosophical foundation, implementing stratified management, and embracing diversified governance, the establishment of a cohesive, interactive, and individualized English

ecological classroom is achievable. This pedagogical environment is designed to nurture the evolution of novel educational paradigms in the digital era. It is anticipated that this approach will not only enhance students' linguistic competence but also foster the development of critical thinking, innovative capacity, and a proclivity for lifelong learning.

References

- [1] Ministry of Education, China. Digitalization Leads the New Trend in Educational Reform[EB/OL].[2024-01-27]
http://www.moe.gov.cn/jyb_xwfb/s5147/202401/t20240129_1113155.html?authkey=boxdr3
- [2] Zhu Rongping, Creating a New Type of Autonomous Classroom Teaching Model for College English Learning with Smartphones, *Research on Modern Education*, 2018(12):330-332.
- [3] Wan Xin, Exploration of Smartphone Participation in College English Teaching Models *Research on Modern Education*, 2017(05):151-152,165.
- [4] Lang Xiao'an, Li Xin, Mobile Learning Based on Smartphones-A New Path for Autonomous Learning. *Research on Modern Education*, 2015(01):77-81.
- [5] Liu Houping, *Research on the Transformation of School Spaces in Primary and Secondary Schools* [D],2019:84
- [6] Zhang Pei, Tian Feiyan, Research on the Construction of Interpersonal Relationships in University Dormitories under Mobile Social Environment. *Research on Modern Education*, 2019(11):242-244,263.
- [7] Xu Yafeng, Gao Hongying, Research on the Transformation of Learning Spaces in the Era of Artificial Intelligence. *Distance Education Magazine*, 2018(01):48-60
- [8] Yu Shengquan, Chen Li. Constructing a Harmonious "Information Ecology" to Break Through the Dilemma of Educational Informatization[J].*China Distance Education*, 2006(05S):19-24.
- [9] Guo Kaiying, The Impact of Mobile Devices on University Classrooms in the Information Age-Taking Smartphones as an Example. *Research on Modern Education*, 2016 (08): 4-6.
- [10] Fan Guorui. *Ecological Education* [M]. Beijing: People's Education Press, 2000:187
- [11] Wang Duqin. *On English Teaching Strategies* [M]. Beijing: Foreign Language Teaching and Research Press, 2002:141
- [12] Zhao Liang. The Construction of Ecological Interactive English Classrooms in Universities [J]. *Theory and Practice of Contemporary Education*,2015(07): 118-120.