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Rediscovering the Meaning of Man and the World——Reading McDowell's *Mind and World*

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Abstract: *Mind and World* was compiled based on McDowell's lectures and divided into six chapters. Each chapter is independent of each other. This article assumes that McDowell wants to explain this core theme in these six chapters. Breaking the original isolation between people and the world (mind and world) through "meaning," allowing the two to reconnect in "meaning." This "meaning" originates from human subjective consciousness, but its carrier is the world object. Therefore, the world's objectivity constitutes the carrier and content of the formality of meaning, and human subjective consciousness adds the meaningful form of will to the world's objects. Because of the existence of "meaning," the relationship between people and the world is no longer divided into "subject-object" and "form-content" but is spliced into one through the thread of "meaning." This article attempts to summarize the logical thread of McDowell's entire book around how McDowell returns "meaning" by overcoming methodological dualities.

Keywords: McDowell; Meaning; Mind; World search

1. Background introduction

Mind and World was compiled by McDowell based on lectures and divided into six chapters. Each chapter is independent, but it can be assumed that McDowell wants to explain the theme through these six seemingly independent chapters. This core theme is to break the original isolation between people and the world (mind and world) through "meaning" so that the two can reconnect in "meaning." This "meaning" originates from human subjective consciousness, but its carrier is the world object. Therefore, the world's objectivity constitutes the carrier and content of the formality of meaning, and human subjective consciousness adds the meaningful form of will to the world's objects. Because of the existence of "meaning," the relationship between people and the world is no longer divided into "subject-object" and "form-content" but is spliced into one through the thread of "meaning." Therefore, the first thing McDowell must do is open-up "meaning" and then find a stable place for "meaning" in people and the world.

2. Research process

2.1. McDowell's philosophical "worries"

In the introduction, McDowell clarifies his question. He said that his "purpose is to explain, in a diagnostic spirit, some of the typical (translated as "descriptive") anxieties of modern philosophy" [1]. This anxiety exists in the dichotomy between thinking and experience. Under this dichotomous thinking, modern philosophy either classifies experience into the realm of norms, making the realm of norms our only "tribunal of judgment," or it allows experience to become the "court of judgment" of thinking, causing people to fall into the "myth of what is given." McDowell believes that philosophical anxiety arises from the re-perception of the threat of this dichotomy. We are trapped in a way of thinking that prevents the mind from contacting with the rest of reality [1]. The following sentence sums up McDowell's theme well [1]: "If we acquiesce in the disenchantment of nature, if we have allowed meaning to be driven out of what I have been calling 'merely natural matters,' then we certainly need to work on bringing meaning back into the picture (intelligibility, the author added) among the images." This article attempts to summarize the logical context of McDowell's book around how McDowell returns "meaning" by overcoming the duality of methodology.

McDowell "believes that modern philosophy sees itself as having received such a call: to bridge the dualistic gap between subject and object, thought and world, and for meaning, it attempts to bridge the binary opposition between norms and nature. This is a deeper binary opposition, which is the root of all the binary oppositions people are familiar with in modern philosophy" [1].

2.2. Concepts and intuition: traditional solutions to "worry"

McDowell first emphasized that previous philosophies had proposed solutions to the "worries" of modern philosophy, among which Kant was the representative. Therefore, he proposes at the beginning: "Kant should still occupy a central position in our discussion of how thought and reality relate" [1]. This conclusion ultimately affirms the status of the "final court" in the normative field of man. McDowell believes that human response to nature reflects human freedom, but at the same time, human freedom is restricted by experience, that is, human freedom must have a base (experience). If concepts are indispensable for man's understanding of the world, but "concepts must be at least partly constituted by the fact that the judgments in which they appear are grounded in the given, those associated conceptual faculties must be obtained from an encounter with the appropriate given judgment" [1]. We should not understand what Kant calls 'intuition' (empirical reception) as the naked acquisition of a given outside of a concept. However, it should be understood as a process or state with conceptual content [1]. Therefore, McDowell treats concepts and intuitions as "initiated" by concepts or intuitions, and the latter interact. The "flowing" process of action and coordination overcomes the split between the two that traditional Kant could still cause.

3. The unboundedness of conceptual matters: removing the barriers between the mind and the world

Firstly, McDowell wants to criticize some "opinions" that everyone agrees are plausible. Some think that we should understand thinking and judgment as ultimately related to a reality outside of thought so that we seem never to be able to do without it. A reasonable limit can be created from external reality. McDowell believes this idea leads to a "myth of the given." This myth holds [1]: "The fact that something is such-and-such is an empirical, conceptual content, the same thing that something is such-and-such is also a perceptible fact, an aspect of the perceptible world."

In order to avoid the "myth of the given" and to prevent falling into idealism, McDowell tried to propose

a solution: "The fact that experience is passive, an operating receptive event, should assure us." The following point is made: "We have all external limits to what we can reasonably desire, such limits come from outside thinking, but not from what can be thought outside. The final matter we arrive at when we retroactively justify it is still a thinkable content, rather than something more ultimate than this, a naked reference to a given fragment." Thus, McDowell regards experience as both passivity and receptivity [1]. In his view, if experience were not passive, there would not be an open world, but experience must be added to concepts to become intelligible. Such a conceptual network belonging to the subject has its own foundation in experience. Any perceptual report with no concept in the judgment of experience has the intervention of concepts in advance.

By viewing concepts and experience as a process of reasonable interaction, McDowell integrates conceptual abilities into the network of concepts, and the world and concepts appear as seamless connections between phenomena and meanings. From this, the world becomes more important to people and thinkable, which achieves the consideration of conceptual spontaneity within the passivity of experience. Without external experience, "internal experience" will become questionable. At the same time, without the intervention of concepts, any external experience will be unthinkable.

In McDowell's view, people must communicate through concepts that rely on experience. However, this concept is not pure, nor is it a definition of the thing itself, but a concept that people must rely on when communicating and sharing conceptual power about experience.

4. Non-conceptual content: limiting the mind

McDowell believes the coherence theory and the "myth given" are traps. In order to prevent these two traps, we must return to Kant's thinking. He believes "the way to end the swing between these two traps is to combine them like Kant did." Empirical knowledge is conceived as a collaboration between sensibility and understanding [1]. However, McDowell differs from Kant in the way experience and understanding cooperate. He believes that "this cooperation must be conceived extraordinarily, that is, we must insist that understanding is already inseparably involved in sensibility within the release itself." Experience is the receptive product of the world's impressions on our senses, but those impressions already have conceptual content [1].

"Could McDowell's approach beyond the Kantian tradition happen, and how did it happen?" The question is something that scholars, including Evans, need to be more skeptical about. McDowell believes [1]: "The concept of experience has a restricted use, governed by a connection with the idea of spontaneity. We need to admit that there is an external limit to the exercise of spontaneity in empirical thinking." Moreover, this limitation is the world of experience itself, the object of experience itself that we perceive. We understand the world through concepts. Concepts represent the spontaneous ability and freedom of the human mind, but this spontaneous ability and freedom cannot exist independently of the content they are intended to represent. The initiation of receptivity always accompanies the initiation of spontaneous activity. In other words, the activation of human conceptual ability, which is the ability to understand the world, must be accompanied by the simultaneous activation and penetration of non-conceptual content, the receptivity of the empirical world.

Concepts give us the ability to understand the world, but if we want to make the world understandable, more is needed to rely on concepts. When a concept is activated, the non-conceptual content it points to is activated at the same time, and the non-conceptual content delimits the concept. It can point to the boundaries of intelligibility. The non-conceptual content of concepts delimits the boundaries of our minds and simultaneously allows the mind and the world to contact and integrate, making the world understandable.

5. Reason and nature: raising the issue of "meaning"

Although Kant partially overcame the dichotomy between sensibility and intelligence in terms of methodology through innate structure, in terms of epistemology, Kant made us face the threat of this dichotomy again when he emphasized human rational ability. In Kant, we actively reflect on empirical judgment and knowledge spontaneously. Although he emphasized human freedom and rationality, according to McDowell, it may "make us lose our empirical thinking and independent reality." There is a specific connection between them, spontaneity is an idea of freedom, and this puts the danger of what should be empirical thought degenerating in our images into frictionless rotations in the void [1].

In this section, McDowell restates his methodological thinking and unique approach to solving the worry of being separated from the mind and the world. He maintains: "We must conceive experience as a state or occurrence in which faculties belonging to spontaneity play a role in the actualization of receptivity. Experiences have their content because conceptual faculties play a role in them. Moreover, this means that faculties that belong to the understanding insofar as they are what they are, they can be actively and potentially self-critical. The fact that these faculties are utilized in the mind of this is itself sensibility in its operation, rather than an intellect constructed on some pre-conceptual release of sensibility, which allows us both to admit freedom of spontaneity without constraints and without falling into inconsistencies. Therefore, we can exorcise the specter of frictionless rotation [1].

McDowell believes the renewed methodological split between reason and nature stems from the modern scientific view of nature. Kant, Davidson, and Evans have all accepted the modern scientific view of the West since the Enlightenment. Accepting the modern scientific view means denying or abandoning the meaning of man and nature or recognizing the meaninglessness of the mind and the world, which is the real worry of modern philosophy. In Aristotle, before modernity, the discussion of knowledge emerged from a specific ontology and was, first of all, a reflection on the ontology. Therefore, modern worries did not exist in Aristotle or the Middle Ages. As McDowell puts it [1]: "In ordinary medieval ideas, what we now regard as the subject matter of natural science was conceived as full of meaning, as if the whole of nature constituted a book of lessons for us." McDowell seems to have absorbed this classical injunction, as he puts it [1]: "If we acquiesce in the disenchantment of nature, if we allow meaning to be expelled from what I have been calling 'merely natural matters,' then when we start thinking about interactions between members of the human race, we need to be working on bringing meaning back to this image of (comprehensibility, the author added)."

6. Conclusion: action, meaning, and self – the return of meaning and subject issues

McDowell seems to have absorbed the precepts about "meaning" in classical thought. However, he wants to use something other than classical sources to solve the worries of modern philosophy but to consider modern philosophy within it. A big problem in modern philosophy is human action and its meaninglessness. This action chapter, meaning and self, attempts to find a way to reconcile the self in action with nature through the return of meaning. Let nature not be the perceptual existence of experience but become the meaningful existence of some subjectivity. To achieve this reconciliation, McDowell introduced "second nature." He said [1]: "Most of our nature is second nature, and our second nature is in the state it is in not only because of the potential we are born with, but also because of our upbringing. This is the re-enchantment of parts of nature that I was talking about. Our upbringing actualizes some of the potentialities with which we are born, even though the structure of reason space cannot be reconstructed from the facts about our involvement in the realm of laws, but it can be the framework within which meaning comes into view only because our eyes can be opened to it through education. Furthermore, education is an element of the normal maturation process for the kind of animals we

are. Meaning is not some mysterious gift from outside nature."

Here, McDowell wants to combine the enchantment of meaning on people with the advancement of methodology. Perceptual experience and intellectual concepts are blended through second nature, which results from education. As an existence wrapped in meaning, this result is a gift from nature about the soul and human meaning. As a result, the issue of human meaning is not only re-raised through the resolution of methodological tension but also becomes the core issue of human beings and why the human soul can be called soul. Human actions are not natural but existences that present meaning in second nature through education. The meaning of action makes human actions understandable. At the same time, these meanings penetrate concepts through second nature, adding content from nature but different from natural reactions to concepts. As self-subjects, through this shareable meaning, obtained a "self" that can communicate with each other but be different from each other. In this way, people are normatively regulated by shared meanings in their freedom.

McDowell "believes that modern philosophy sees itself as having received such a call: to bridge the dualistic gap between subject and object, thought and world, and for meaning, it attempts to bridge the binary opposition between norms and nature. This is a deeper binary opposition, which is the source of all the binary oppositions in modern philosophy that people are familiar with" [1]. Meaning ensures life's integrity, the mind's coherence, and the way of natural existence. McDowell regards the rediscovery of meaning and its role as an effective solution to the worries of modern philosophy. He says with great certainty [1]: "Human life, our natural way of being, has been shaped by meaning." Then McDowell returned to the examination of Kant's methodology. He believed that Kant's understanding of the field of laws made it a matter external to concepts due to the lack of attention to meaning. However, "the realm of laws is not only the realm of acts of meaning, but also is not external to conceptual matters" [1].

Lastly, McDowell emphasizes the importance of human subjectivity and its meaning framework by contrasting rational animals and other animals. "Only with full-fledged subjectivity the awareness of the external world can obtain an appropriate position" [1]. Acquiring this "position" is not a simple response to the environment like an animal but a meaningful world construction. Therefore, the methodology and approach to the enchantment of meaning have become McDowell's key to solving the worries of modern philosophy.

Disclosure statement

The author declares no conflict of interest.

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A Study on Strategies for Improving English Application Ability of Chinese College Students

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Abstract: With the deepening of exchanges between China and other countries around the world, high English application ability, namely the comprehensive development of listening, speaking, reading, and writing skills has increasingly become an inevitable requirement for talents by the country and society. This article first analyzes the current situation of Chinese college students' English application ability, and then examines the importance of improving Chinese college students' English application ability. Furthermore, it proposes strategies for improving Chinese college students' English application ability, with the aim of providing some inspiration and assistance for education authorities, university decision-makers, and English teachers in cultivating Chinese college students' English application ability.

Keywords: English application ability; China's college English; English improvement strategies; Chinese college students

1. Introduction

　　With the progressive development of globalization, the country and society are increasingly in need of talents with excellent English application ability, thus improving the English application ability of Chinese college students is becoming increasingly crucial. This article first explores the current situation of Chinese college students' English application ability, then discusses the importance of improving Chinese college students' English application ability, and proposes strategies to improve Chinese college students' English application ability, hoping that these strategies can provide some inspiration to education authorities, university decision-makers, and English teachers, so that they can work together to improve the English application ability of Chinese college students.

2. Current situation of English application ability of Chinese college students

The current situation of English application ability of Chinese college students is as follows.
　　(1) Good reading and writing skills, poor listening and speaking skills
　　China has always adopted the traditional English teaching method of cramming due to the influence

of exam-oriented education. This teaching method mainly aims to cultivate students' reading and writing skills. Students using their English knowledge to consult literature and take exams often achieve good results because they have strong reading and writing skills. However, many students are unable to answer teachers' questions and conduct interviews in English when they are required to do so. Moreover, students have concerns and fears when they communicate with foreigners. Students are afraid that they do not understand the foreigners and do not know how to speak English, so they usually tell the foreigners that they do not know English or that their English is very poor. The possible reason for this result is that China's English education does not emphasize the cultivation of listening and speaking skills, or directly neglects the cultivation of students' listening and speaking skills. It is extremely obvious that students' weaknesses are listening and speaking. Most college students in China do not dare to speak English due to shyness and they generally have poor listening skills nowadays [1]. Students generally do not have strong oral expression skills [2]. College students generally have poor oral communication skills, and they are unwilling to speak English because they are afraid of being laughed at by others [3]. The teacher did not allocate enough time for the practice of students' listening and oral expression skills, thus most students could not achieve proficiency in using English [4]. In English classes, the teacher mainly teaches the basic knowledge of English. The teacher especially focuses on explaining grammar and vocabulary, while students take notes silently. The traditional teaching method involves teachers explaining words, grammar, sentence patterns, and articles in detail, and students accepting knowledge in a passive way and do not participate in many learning activities [5]. Overall, English classes in China mostly concentrate on cultivating students' reading and writing skills, without cultivating their listening and speaking skills. Therefore, the reading and writing skills of Chinese college students are relatively good, while their listening and speaking skills are relatively poor.

(2) Small and narrow application range of English

For most of Chinese college students, the main purpose of learning English is to pass various exams and achieve the goal of finding a good job. Apart from applying English knowledge in the classroom and exams, students have almost no other places to use English, which leads to a lack of awareness of the importance of English and its application ability among students, and the belief that English has no other practical application. Mandarin is the official language of China. Both inside and outside the campus are the world of Mandarin, and English is not used on or off campus. Most students can live and work smoothly without using English from primary school to work. For most students, there is almost no application scope for English after graduation. In students' learning and daily life, their normal activities do not involve the application of English, and most students learn English for the sake of exams [6].

3. Importance of improving the English application ability of Chinese college students

English is an international language and the working language of the United Nations, and having a good proficiency of English plays an important role for both individuals and countries [7]. A good English proficiency refers to students comprehensively develop their four skills of listening, speaking, reading, and writing, that is, they have good English application ability. The importance of English application ability is self-evident. From a personal perspective, Chinese college students with good English application ability can successfully complete their studies, get a decent job, and perform their duties excellently. More and more job recruiters are using

English application ability as a recruitment indicator. Only by comprehensively developing the four basic skills can students meet the current demand for applied talents in society.

From the national level, Chinese college students having good English application ability is significant for building and protecting the country. Chinese college students are the hope for China's future, and they will enter various fields to work after graduation. If Chinese college students cannot understand or speak the international common language which is English, consequently China can only be looked down upon and bullied by other countries in international exchanges, China's legitimate rights and interests cannot be defended, and economic and national security cannot be guaranteed. At the same time, in the face of the complex and ever-changing international situation, if China wants to win the respect, recognition, and acceptance of other countries, and have a place in the world and international discourse power, it is necessary to use English to promote and protect China. Chinese college students are a powerful force, if they possess a high level of English application ability, they can establish a good international image for China, defend China's legitimate rights and territorial sovereignty, maintain China's image as a responsible major country, and enhance China's influence and competitiveness.

From an international perspective, Chinese college students having good English application ability is essential for maintaining regional and even global peace, development, and stability. As a responsible major country, China is a builder of world peace, a contributor to global development, and a maintainer of the international order. Building world peace, contributing to global development, and maintaining international order all require talents with good English application ability. Specifically, excellent English application talents are indispensable for national diplomacy, international peacekeeping missions, international medical aid, the Belt and Road construction, international trade, international cultural exchanges, etc.

English learning and good English application ability are important for Chinese college students, but many students do not fully recognize the importance of English learning and English application ability. Many students do not have a correct view of English learning and only see it as a process or procedure that requires passing exams in order to successfully obtain relevant certificates upon graduation, without scientifically and reasonably considering the true purpose and long-term planning of English learning [8]. There is still a shortage of talents with good English application ability, China needs more college students with excellent English application ability.

4. Strategies for improving English application ability of Chinese college students

The strategies for improving English application ability of Chinese college students are as follows.

(1) Emphasizing the cultivation of students' listening and speaking skills, and adding the assessment of listening and speaking in exams

Cultivating students' English application ability is the ultimate goal of college English teaching [9]. Many Chinese college students can read and write English, but their listening and speaking skills are relatively weak. Under the influence of exam-oriented education, the current English teaching mainly cultivates students' reading and writing skills to ensure that they can pass different kinds of exams. The final English exam is usually a written exam, and the main assessment content is reading and writing. The final exam of English course mainly assesses students' mastery of vocabulary, grammar, reading, and writing, without involving listening and speaking contents. National English exams such as College English Test Band 4/6 (CET 4/6), Practical English Test for Colleges Band A/B (PRETCO A/B), and Test for English Majors Band 4/8 (TEM 4/8) include the listening section. Each school has different

requirements for the scores of these national exams, and students only need to achieve a certain total score to graduate, with no specific requirements for the grades of each section. Therefore, English listening has not received sufficient attention, teachers rarely cultivate students' listening skills in the classroom, and there is even no listening content in the classroom. The final English exam and national English exams mentioned above do not include assessment of the oral part. Listening section is hardly seen in textbooks and the opportunity to communicate with each other in English is not available for students [10]. Only students majoring in English have oral classes and exams, but their oral proficiency is not satisfactory due to insufficient training in oral English. However, English listening and speaking skills are also the fundamental application abilities for students, and schools should focus on cultivating students' English listening and speaking skills. Schools should incorporate the cultivation of listening and speaking skills into cultivation scheme. English teachers should ensure that a certain amount of teaching time is allocated to teaching English listening and speaking, striving to improve students' English listening and speaking skills. Listening and speaking should be particularly incorporated into teaching plans by English teachers, and the proportion of listening and speaking teaching should be specially increased [11].

The form of assessment and evaluation has a guiding effect on the content and methods of teaching and learning [12]. The direction and indicator of college English learning is assessment, and a comprehensive assessment and evaluation system mainly based on listening and speaking skills should be actively established by the education and management department [13]. The assessment content determines the educational content. If there are assessments for listening and speaking, and certain requirements are made for the grades of listening, speaking, reading, and writing, English teachers will purposefully increase the teaching of listening and speaking during the English teaching process, and students will also strive to learn listening and speaking in their daily studies. 76% of students hoped that the course's assessment was the "written test + oral test", and one of the effective methods to strengthen students' listening and speaking skills training is to increase listening and speaking assessment [14]. In future English teaching plans, schools should increase the teaching of listening and speaking, include the assessment of listening and speaking in exams, and make certain requirements for the grades of each part.

(2) Developing students' cross-cultural communication skills

Students' cross-cultural communication skills are important to their English application ability. To improve students' cross-cultural communication skills and avoid communication failures, teachers can use teaching content that is close to foreign life in class, integrate cultural knowledge of languages of different countries into the classroom, and enable students to learn cross-cultural communication skills while learning English. The cultural background and habits of language should be explained and analyzed by teachers, so that the students' interest in English learning can be stimulated and their practical English application ability can be improved [15].

Lack of cross-cultural communication skills may lead to communication failure or other negative outcomes. Lack of understanding of other cultures and failure to avoid taboo topics in conversations with foreigners may make foreigners feel disrespected or insulted, hence causing misunderstandings. If it happens in the workplace, it may lead to cooperation failure or even worse situations.

(3) Creating English learning environments for students

The English learning environment is crucial for students to learn English. In China, it can be said that the only English learning environment is the English classroom. However, English classroom is

far from sufficient to cultivate students' English application ability. Students have been exposed to the Chinese language environment for a long time and lack English language environments, making it relatively difficult for them to improve their English application ability [16]. As a language, main function of English is communication and exchange. There are very few opportunities for students to speak in English classrooms in China. Students generally use dialects or Chinese in their family, campus, and social interactions, without communication with foreigners or other English environments. In daily life, it is difficult for students to have an opportunity to communicate with foreigners in English. Even if there is a chance to communicate with foreigners, students often miss out on the communication opportunity due to fear of making mistakes or not knowing how to speak English. Therefore, students' listening and speaking are restricted without development. In addition, the teacher's constant emphasis on the importance of grammar makes students even more afraid to speak English. Students are afraid of making mistakes when speaking English, as it may cause criticism from teachers and ridicule from classmates.

There is a lack of English language environment for students to practise and apply English in the Chinese context. However, higher education institutions do have numerous opportunities to provide students with English learning environments. Colleges and universities should be good at utilizing their own resources to provide English language environments for students' English practice and application. There are several types of English learning environments that can be created by the schools. If schools and teachers can fully utilize these resources, it will help to improve students' English listening and speaking skills, thereby achieving comprehensive development of students' English listening, speaking, reading, and writing skills. Conditions and opportunities should be created by schools to encourage students to participate more in international exchanges and academic research, so that the goal of being able to understand and speak English, and communicate with foreigners in English can be achieved [17]. To improve students' English application ability, a rich English learning environment should be created by teachers, students should be encouraged to speak English boldly and fully participate in various forms of teaching activities [18]. Teachers should create more real-life English practice opportunities to stimulate students' interest and learning motivation, and to establish students' self-awareness and confidence [19].

Visiting foreign institutions is a great opportunity to create English practice environments for Chinese college students. Schools should make full use of this opportunity and encourage more teachers and students to participate in the reception of foreign visitors. Many tasks such as invitations writing, email communication, accommodation arrangements, airport pickup, meeting arrangements, and catering arrangements, etc., require a large number of working personnel. The school can arrange students to participate in these reception tasks. Students can practise their English skills, especially their English listening and speaking, during the reception of foreign visiting groups. At the same time, the school can also arrange lectures and symposiums, allowing as many students as possible to be the participants, so that students have the opportunities to communicate with foreign people in English. Through contact and conversation with members of foreign visiting groups, students can enhance their English listening and speaking skills. The reception of foreign visiting groups is usually serious, tense, and compact. Participating in the reception not only improves students' English application ability, but also helps to cultivate their reception ability, accumulate practical experience, and lay a foundation for students to receive foreign guests in their work in the future.

Visiting foreign institutions is also an opportunity for schools to create English learning environments for students. The members of the delegation should be changed from time to time. At the

same time, schools can consider allowing one or two students to go with the visiting group. There are many benefits for students to follow the visiting group. The first benefit is that students can practise their English and improve their English application ability. The second benefit is that students can broaden their international perspective and gain a firsthand understanding of the cultures and customs of other countries. The third benefit is that students can understand the international cooperation and exchange situation of the school, this enhances students' sense of ownership and their love for their own school. Even if students do not have the opportunity to go with delegation sometimes, allowing different teachers to visit foreign institutions is also beneficial for improving students' English application ability. After returning, teachers can educate and guide students to learn English with their personal experience.

Studying abroad as an exchange student is an excellent opportunity and environment for many students to practise English. The exchange program is conducive to motivate students to work hard in learning English before, during, and after going abroad, and improve their English application ability. Exchange program can create a short-term or long-term English learning environment for students. Chinese colleges and universities should make every effort to promote cooperation with foreign universities, and regularly select 30 students with excellent English application ability to go abroad for exchange twice a year, with 15 students each time. When students go abroad, they need to switch their language mode to communicate with others. In continuous communication, students' oral and listening skills will undergo a qualitative improvement. Moreover, the exchange program itself is an attraction for students. After all, going abroad and studying abroad are many people's dreams. In order to obtain the opportunity to study abroad, students will actively and consciously improve their English application ability in order to stand out in the interview of exchange program.

Foreign teachers are the key figures for schools to create stable English learning environments for students. Colleges and universities can hire foreign teachers to teach English. English courses in college are mostly taught by Chinese English teachers. Schools may recruit foreign teachers to take oral classes for students of English major. Chinese students from other majors have almost no opportunity to have access to foreign teachers. In order to improve students' English application ability, colleges and universities should arrange at least two English classes taught by the foreign teacher for non-English major students per semester. In the English class taught by the foreign teacher, students can personally listen to the pure English pronunciation of the foreign teacher, and can also speak English directly with the foreign teacher, thereby cultivating students' English application ability and confidence in talking with the foreigners. Schools can also invite foreign teachers to participate in large-scale activities on campus, so that students can have more opportunities and environments to communicate and exchange ideas with foreign teachers.

More and more colleges and universities are obtaining the qualifications to recruit international students, and international students can play a significant role in schools creating English learning environments for Chinese students. Schools with international students can create numerous opportunities and environments for Chinese college students to communicate with international students by organizing a series of international cultural exchange activities. English cultural lectures, international food festivals, English song competitions, English corners, English speech competitions, English dubbing competitions, etc. are good international cultural exchange activities and excellent opportunities for students to practise English and improve their English application ability. It is necessary to create environments for students to have the opportunity to practise their language

skills in their extracurricular time [20]. Through the activities such as English corners, English Top 10 Singers Competition, and English salons, students' interest in English learning will be developed, their enthusiasm and initiative in learning will be enhanced, the learning atmosphere will be activated, and learning outcomes will be optimized [21]. These activities not only provide opportunities for Chinese students to apply English, but also enable international students to integrate into China's living and learning environment. International students can also be invited as assessors to participate in the final English speaking exam, which helps Chinese students to actively prepare for the exam, overcome the nervousness of speaking English to foreigners, and continuously improve their oral and listening skills. The above English learning environments provide students with the opportunities to communicate with foreigners, which are beneficial for enhancing students' English application ability and confidence in talking to foreigners. When students have enough experience of communicating with foreigners, they will no longer be afraid or hesitant when communicating with foreigners or other English speakers in the future, but will boldly and confidently communicate with them.

(4) Reforming the curriculum of college English, providing English courses for specific purpose instead of basic English courses

Chinese college students have already learned and mastered the basic knowledge of English in middle and high schools, but basic English courses are still offered in colleges and universities. Most students may feel that there is no need to take basic English courses again in university. Students might view basic English courses as a burden, and they do not have the interest or motivation to learn the basic English knowledge again. Students think that their English knowledge is enough to pass the exams and qualify for graduation, and they should spend more time on learning the knowledge of their major. Therefore, many students hold their major's textbooks to learn in English class, while English teacher teaches the basic knowledge of English on the platform, which happens a lot. Many vocational school students learn English passively, they only focus on their major courses without interest in learning English, and they believe that it is useless to learn English [22]. To increase students' interest in learning English, teachers should teach students some other English knowledge, that is, English for Specific Purpose. English for Specific Purpose refers to the English related to a student's major, which corresponds to the English related to the industry in which the major belongs. Students can learn both major's knowledge and English in the courses of English for Specific Purpose. This course is an effective combination of English teaching and professional English teaching, thus students' professional needs can be met and a large number of versatile professionals can be cultivated for society by learning the course of English for Specific Purpose [23]. College students' comprehensive English application ability will be effectively cultivated and improved by learning courses of English for Specific Purpose, because these courses follow the laws of college English language teaching [24].

Colleges and universities should adapt to the times, take the initiative to change, actively reform the curriculum of college English, and offer courses of English for Specific Purpose instead of basic English courses so as to improve students' interest and motivation in learning English and their English application ability, and meet students' professional needs and the needs of society and the country for application-oriented talents.

5. Conclusion

Chinese college students have relatively high English reading and writing skills, while their listening and

speaking skills are relatively weak. The overall English application ability of Chinese college students is significant for students, society, and country. China still has a long way to go in improving the English application ability of Chinese college students. However, as long as targeted training is carried out to cultivate students' English listening and speaking skills and cross-cultural communication skills, adequate English learning environments are created for students, and basic English courses is changed into courses of English for Specific Purpose, it is believed that the English application ability of Chinese college students can be gradually improved in the future.

Disclosure statement

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Dilemma and Solution of Equity Setting in the Shareholding of Rural Collective Assets

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Abstract: Since ancient times, China has been a major agricultural country, and rural collective property rights are an essential component of the sustained, stable, and healthy development of the rural economy. They have a certain positive significance in promoting the development of the national economy and accelerating the process of social modernization construction. Therefore, in combination with the new needs of rural economic construction and development in the new era, deepening the reform of rural collective asset shareholding and equity setting management can effectively safeguard the core interests of farmers, and it is significant for solving various equity setting problems in the reform of rural collective asset shareholding. Based on this, this article analyzes the equity setting dilemma and its solutions in the shareholding of rural collective assets, in order to provide guidelines for relevant personnel.

Keywords: Shareholding of rural collective assets; Dilemma of equity setting; Solution

1. Introduction

The main purpose of the rural collective asset shareholding reform is to provide an effective path for the core interests of farmers, and it is also a key measure to enhance farmers' enthusiasm for production and labor [1]. Therefore, local government agencies and administrative agencies should consider the needs of rural economic development in the new era, strengthen the depth and breadth of rural collective asset shareholding reform, follow the interests and demands of farmers, and perform well in equity setting, in order to maximize the effectiveness of rural collective asset shareholding reform and assist in innovative development of rural economy.

2. Dilemma of equity setting in the shareholding of rural collective assets

2.1. Imperfect legal protection system for equity management in the shareholding of rural collective assets

Analyzing the various legal systems and management norms related to the shareholding reform of rural collective assets currently implemented in China, it can be found that only the legal management framework

shows completeness. There are omissions and delays in the relevant management content, legal regulations, and supplementary regulations, ultimately leading to the inability to smoothly carry out the shareholding reform and equity setting of collective assets in some rural areas. Specifically, local government agencies and administrative agencies are unable to promote the shareholding reform of rural collective assets in accordance with the law, nor are they able to formulate scientific and reasonable equity setting plans. They lack timeliness in handling some detailed issues, ultimately leading to the delayed workflow and formality of the shareholding reform of rural collective assets. From the perspective of current economic law, the reform of rural collective asset shareholding does not fall within the scope of agricultural equity resource allocation, listed company equity regulation, etc. The reform of rural collective asset shareholding has certain particularity. Therefore, there are currently few legal regulations applicable to the shareholding reform of rural collective assets, which leads to many unreasonable issues in the equity setting.

2.2. Unclear division of equity management responsibilities in the shareholding reform of rural collective assets

In the process of promoting the shareholding reform of rural collective assets, local government agencies and administrative agencies need to further clarify the management responsibilities and powers of multiple participating entities, and combine them with the needs of the shareholding reform of rural collective assets to perform well in equity setting [2]. However, in most areas of China, farmers have not yet formed a correct understanding of the rural collective asset shareholding reform, equity, etc., thus they are unable to carry out self-supervision and direct intervention work. In the process of participating in the rural collective asset shareholding reform, most farmers only provide opinions and suggestions based on their own interests and needs, and they have no real authority over the establishment of equity and the improvement of relevant management systems.

2.3. Many controversies over the distribution of equity interests in the reform of rural collective asset shareholding

Promoting the shareholding reform of rural collective assets is an important means of rational allocation and utilization of rural collective assets. However, in some rural areas, the hope of balancing the interests of farmers is pinned on the shareholding reform of rural collective assets, hoping to further improve the balance and effectiveness of the shareholding reform of rural collective assets. However, based on the analysis of the current situation of rural collective asset shareholding reform in various regions, there are many unreasonable issues in the equity setting [3]. For example, the equity structure is not reasonable, and although farmers and rural areas occupy a dominant position in equity management, rural government agencies and administrative agencies are the executing entities of management functions. Based on this, in the case of uneven distribution of multiple benefits, it is relatively easy to cause adversity such as unreasonable equity settings and interest disputes.

3. Solution to the dilemma of equity setting in the shareholding of rural collective assets

3.1. Granting corresponding legal status to collective economic cooperatives

Local governments and administrative departments need to combine the actual level of local economic development and various new development needs generated in the process of modernization construction, continue to promote the rural collective asset shareholding reform with "three parts and three reforms" as the core, further improve the rationality of equity setting, and focus on addressing the issue of unclear legal status

of rural collective economic cooperatives, in order to lay a solid foundation for the long-term development of rural collective economic organizations. Local governments can actively learn from the development models of Wuzhong District, Suzhou, and Shenzhen that allow rural collective economic cooperatives to register at the industrial and commercial management departments in the process of optimizing the equity setting in rural collective asset shareholding, further clarify the market subject status of rural collective economic organizations, and provide legal protection for effectively solving the difficulties in equity setting in rural collective asset shareholding. Specifically, local governments and administrative departments should take the "three parts and three reforms" as the core of their work, separate non-land collective assets and land collective assets, guide and support farmers to establish land cooperatives, set the future development direction of the cooperatives as stock economic cooperation organizations to strengthen the market subject position of rural land cooperatives, and provide effective legal protection for the development of rural collective asset shareholding and reasonable allocation of equity [4].

3.2. Clarifying the responsibilities of equity management in the context of rural collective asset shareholding reform

In the process of deepening the shareholding reform of rural collective assets, local governments and administrative departments should also clarify the responsibilities of equity management, provide solid management guarantees for equity setting, prevent the problem of incomplete rural collective asset property rights reform, and improve the rationality and pertinence of equity setting. In the actual process of rural collective asset shareholding reform, it is necessary to clarify the responsibilities of equity management. Relevant departments need to fully respect the basic wishes of farmers and implement the responsibility management system to ensure that the equity setting always follows the basic principle of greater rights and responsibilities, and then borrow a multi-level management planning system to improve the effectiveness of rural collective asset shareholding reform and the rationality of equity setting. In this process, government agencies, administrative agencies, etc. need to promptly intervene in administrative matters, and carry out equity management and regulation on the basis of not affecting the vital interests and core rights of farmers, in order to maintain the balance of equity settings in rural collective asset securitization. In addition, the functional scope of equity management should be appropriately expanded based on the actual situation to ensure the orderly progress of the rural collective asset shareholding reform. However, it is worth noting that the management intervention of local governments and administrative departments needs to focus on protecting the legitimate rights and interests of farmers, in order to avoid the problem of excessive management intervention by government agencies and behavioral institutions, and lay the foundation for the smooth implementation of equity management work in the rural collective asset shareholding reform.

3.3. Optimizing the rural collective equity and individual equity system

The application of the rural collective asset shareholding management system in rural equity setting has drawbacks that far exceed the application benefits. Although individual equity can protect the core interests of farmers to some extent, it cannot have a positive effect on equity appreciation and it is difficult to enhance the economic benefits of farmers in a short period of time. Based on this, local governments and administrative departments should consider the needs of rural collective asset shareholding reform to reform and innovate the collective equity, individual equity, and operational mechanisms in rural areas, integrate the advantages and problems of collective equity and individual equity systems, carry out multi-level equity structure adjustment work, and effectively solve the problem of collective equity application on the basis of leveraging the advantages of collective equity appreciation [5]. This can prevent the adverse effects caused by the application

of a single equity management and distribution system. In addition, local governments and administrative departments need to formulate flexible equity setting strategies based on changes in local capital markets and rural economic structures, strengthen the sense of acquisition and happiness of farmers in the rural collective asset shareholding reform, and create favorable conditions for safeguarding the core interests of farmers and driving the level of economic development in rural areas [6].

3.4. Strengthening farmers' equity rights and capabilities from the perspective of rural collective asset shareholding reform

Further strengthening the equity rights of farmers is the basic content of the current rural collective asset shareholding reform and reasonable equity setting, and it is also an effective path to improve the economic benefits of farmers. Based on this, local governments and administrative departments need to optimize equity rights by strengthening farmers' rights to know, participate, express, and supervise. Firstly, in order to optimize the right of farmers to know, local governments and administrative departments need to clarify the flow and use of rural assets, and timely disclose information to ensure that farmers can understand relevant consultations. Secondly, in order to optimize the participation rights of farmers, local governments and administrative departments need to decentralize the decision-making power of equity management based on the adjustment of equity structure, and conduct risk assessment of management decision-making to provide a platform for farmers to participate in equity setting and management [7]. Thirdly, in response to the strengthening of farmers' expression rights, local governments and administrative departments need to establish channels for farmers to express equity management suggestions, and analyze them to ensure that farmers can effectively express their interests and demands. Lastly, in response to the strengthening of farmers' supervision and management, government agencies and administrative agencies should establish equity audit committees with farmers as the core, thus ensuring that farmers can play their regulatory role in equity management work and provide assistance for the rural collective asset equity reform.

4. Conclusion

In summary, in the process of deepening the reform of rural collective asset shareholding, it is necessary and crucial to grasp and analyze the current difficulties in equity setting, and take diversified and targeted measures to break through these difficulties. Based on this, local government agencies and administrative agencies should respect and protect the core interests of farmers from the overall perspective of rural economic development. On the premise of respecting the basic wishes of farmers, we will effectively promote the shareholding reform of rural collective assets, improve the development balance of rural equity settings, and allocate economic benefits to farmers, thereby creating favorable conditions for the economic construction and overall social development of rural areas.

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Integration of Huizhou Style Culture into Product Intention Expression in the Artificial Intelligence Era——Take the Four Treasures of the Study as an Example

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Abstract: When it comes to Huizhou culture, many people first think of Huizhou style architecture and Huizhou merchants. In fact, the Four Treasures of the Study is also a representative branch of Huizhou culture. Since the Northern and Southern dynasties, the Four Treasures of the Study has become an indispensable carrier of Chinese cultural inheritance. However, with the development of the times, especially the progress of the internet economy, people's lives and studies have begun to emphasize the word "cloud." Writing can be done directly on mobile phones or computer screens using an electronic pen. Traditional study tools such as paper, ink, pen, and inkstone have gradually faded out of the sight of ordinary people. However, in recent years, with the close integration of traditional Chinese culture and the Internet, industries bearing the imprint of traditional Chinese culture have gradually revived, with Hanfu culture being the most representative. Many cities in China have held Hanfu cultural festivals with the popularity of Hanfu, increasing the call for the revival of traditional Chinese culture. This paper mainly analyzes the inheritance status of the Four Treasures of the Study, one of the representatives of Huizhou culture, by combining artificial intelligence (AI) technology, the driving force of Internet technology, and proposes three strategies on revitalizing the Four Treasures of the Study in the AI era, hoping to assist in the cause of rejuvenating Chinese traditional culture.

Keywords: Internet economy; AI era; Huizhou style culture; Four treasures of the study; Industry innovation

1. Introduction

The Four Treasures of the Study is a very representative branch of the Huizhou culture. The prosperity of the Four Treasures of the Study in ancient China is a manifestation of the high development of Chinese culture. Looking back on the prosperous Tang Dynasty, the poetry immortals and sages dipped the Xuan pen into high-quality Huizhou ink on the ground until the pen was full and round, with a clear edge. They freely sprinkled it on the spread-out Xuan paper, expressing their admiration for the prosperous Tang Dynasty and their desire

to achieve their own value. The cultural and artistic treasures of ancient China have been inherited to this day, thanks to the popularity of the Four Treasures of the Study. Even children studying in private schools can have writing tools like the Four Treasures of the Study. However, with the development of the new era, the Four Treasures of the Study has gradually become a cultural product of the minority in China, and it even started to develop in the direction of collection, which is not only unconducive to the development of the Four Treasures of the Study, but it is also a loss of Huizhou culture. Therefore, we should take measures to change the current situation, to achieve the prosperity of the Four Treasures of the Study again, and pass on the essence of Huizhou culture [1].

2. Analysis of the inheritance of the Four Treasures of the Study of Huizhou culture

2.1. The style of the Four Treasures of the Study tends to be popular and gradually breaks away from the characteristics of Huizhou culture

With the progress of the Internet and the rise of the market economy, the traditional Four Treasures of the Study industry has been severely hit. The development of China's e-commerce economy has greatly compressed the path between consumers and producers. More and more imitated Four Treasures of the Study products have been introduced to consumers by businesses operating e-commerce, while those truly handcrafted Four Treasures of the Study competing products have been ignored since they can't capture traffic.

Without customers, it is impossible to survive. Therefore, some authentic Four Treasures of the Study manufacturers have to give up the traditional style of Four Treasures of the Study and manufacture the products in accordance with the style of Skeuomorph in order to maintain their foundation. They hope that they can make a living in the fierce market competition by virtue of excellent workmanship and continue the life of the traditional Four Treasures of the Study industry. However, this change separated the Four Treasures of the Study from the core of the original Huizhou culture. The increasingly popular style has seriously affected the status of the Four Treasures of the Study in the hearts of Chinese people [2].

2.2. Traditional craftsmanship leads to higher prices, while modern craftsmanship lacks the delicacy of Huizhou culture

The manufacturing process of traditional Four Treasures of the Study products are very sophisticated. Taking rice paper as an example, the raw materials are only green sandalwood bark and straw. In addition, Yang Tengtao juice is used as a separating agent. According to different processes, rice paper can be divided into raw rice paper, cooked rice paper, and semi-cooked rice paper. The technical requirements for craftsmen are very high. It can also be seen on some short internet videos today that the traditional process of making rice paper requires good cooperation from several workers to produce rice paper with ideal quality, thus the production cost is very high.

However, with the rise of the internet economy, many businesses have started using modern techniques to make rice paper in order to save costs and reduce the price of rice paper. The rice paper produced on the assembly line can only achieve consistency in color or thickness with traditional rice paper, but it is completely incomparable to traditional craft rice paper in terms of ink diffusion effect and paper water absorption. Therefore, the Four Treasures of the Study made with traditional techniques are expensive, while the Four Treasures of the Study made with modern techniques lack the delicacy of Huizhou culture [3].

2.3. Lack of Huizhou style cultural elements in publicity and promotion

At present, the Four Treasures of the Study products in China are increasingly weakening the cultural elements of Huizhou in the publicity and promotion, and beginning to emphasize the functionality of cultural products, which is actually a thankless transformation direction.

First of all, in terms of the functionality of cultural products, modern stationery has greater convenience than the traditional Four Treasures of the Study, thus the Four Treasures of the Study does not have a strong advantage in functionality.

Secondly, the Four Treasures of the Study represents the essence of Chinese cultural inheritance. People use rice paper for meticulous painting, which is a feature that other types of paper do not have. Meticulous painting is still one of the mainstream arts in China at present, but meticulous painting can only be done on rice paper. Hence, if rice paper can be combined with traditional Chinese meticulous painting art in promotion, it is a perfect combination of Chinese Huizhou culture and art [4].

However, at present, none of the domestic manufacturers of the Four Treasures of the Study has ever carried out cross-border cooperation in the cultural field and promoted the name of Huizhou style culture. Instead, they are emphasizing the price and advantages of their own materials, which is undoubtedly a disastrous publicity for the Four Treasures of the Study.

3. Analysis of relevant concepts

3.1. Huizhou style culture

Huizhou culture refers to the sum of the material civilization and spiritual civilization of one prefecture and six counties in ancient Huizhou, which is not equal to Anhui culture (Anhui culture consists of four Kulturkreis of Huizhou culture, Huaihe culture, Wanjiang culture, and Luzhou culture). The main contents include Huizhou land system, Huizhou merchants, Huizhou clans, Huizhou historical celebrities, Huizhou education, Huizhou science and technology, Xin'an science and technology, Xin'an medicine, Huizhou plain learning, Huizhou opera, Xin'an painting school, Huizhou seal cutting, Huizhou prints, Huizhou crafts, Huizhou inscriptions, Huizhou documents, Huizhou style architecture, Huizhou villages, Huizhou folk customs, Huizhou dialect, Huizhou cuisine, Huizhou religion, Huizhou geography, Huizhou animal and plant resources, etc.

Huizhou culture involves various disciplines such as Huizhou economy, society, education, academia, literature, art, crafts, architecture, medicine, etc. In terms of the progress of Huizhou social history, we usually summarize it as "the sum of material civilization and spiritual civilization" [5].

3.2. Artificial intelligence (AI) technology

Artificial intelligence, abbreviated as AI, is a new technological science that studies and develops theories, methods, technologies, and application systems for simulating, extending, and expanding human intelligence.

Artificial intelligence is a branch of computer science. It attempts to understand the essence of intelligence and produce a new kind of intelligent machine that can respond in a similar way to human intelligence. The research in this field includes robots, language recognition, image recognition, natural language processing, and expert systems. Since its inception, artificial intelligence has become increasingly mature in theory and technology, and its application fields have also expanded. It can be imagined that the technological products brought by artificial intelligence in the future will be the "container" of human intelligence. Artificial intelligence can simulate the information process of human consciousness and thinking. Artificial intelligence is not human intelligence, but it can think like humans and may surpass human intelligence.

4. Development opportunities of cultural products brought by the AI era

4.1. Artificial intelligence provides technological feasibility for product innovation, thereby reintegrating Huizhou culture into product styles

Taking the production of rice paper as an example, the 18 production processes are indeed too complicated for modern craftsmen, but now people's demand for rice paper is the highest among the Four Treasures of the Study, thus we can consider introducing AI technology to replace those production steps that do not need patent protection. The technical support provided by artificial intelligence for product innovation is continuous, and may require significant investment in the initial stage. However, as large-scale production progresses and the profits increase, the initial investment will become insignificant.

4.2. The introduction of intelligent technology reduces manufacturing difficulty and provides a price that is acceptable to the general public, while retaining Huizhou characteristics

The biggest opportunity brought by the introduction of AI technology to traditional cultural products is the reduction of production and manufacturing costs. In recent years, the gradual increase of China's intangible cultural heritage reflects the country's active remedy and protection of traditional culture, but on the other hand, the reduction of traditional craftsmen has not greatly improved the status of intangible cultural heritage. The inheritance of the Four Treasures of the Study in China is closely related to those craftsmen who can stand loneliness. If these craftsmen give up and turn to other industries, the manufacturing of the traditional Four Treasures of the Study will also be in jeopardy.

Therefore, it is possible to consider designing and manufacturing AI robots in advance to replace traditional craftsmen in some basic production work, thus giving craftsmen more time and energy to optimize the quality of core sections. This not only reduces the burden on craftsmen, but also reduces labor costs, thereby making the price of products more affordable and truly accessible to the public.

4.3. Combining with the Internet for promotion, emphasizing the elements of Huizhou style, and quickly achieving a surge in popularity

Big data is a common manifestation of the AI era on the Internet. All publicity and promotion began to be labeled with big data, thus the accuracy of promotion is getting higher and higher. Taking Huizhou style cultural products as an example, as long as the information tags that have searched for Huizhou style culture, purchased Four Treasures of the Study products, or belong to fine brushwork enthusiasts are checked, the product information can be directed to these users when promoting. Compared to traditional advertising, this method is more accurate in targeting the audience and saves more on promotion costs. Traditional television advertisements or print advertisements may only have one target audience when they are exposed to 1000 people. However, the accuracy rate of exposure to 1000 people can even reach 90% and the conversion rate will also be improved by using the Internet promotion in the era of AI big data.

5. Specific strategies of integrating Huizhou culture into the Four Treasures of the Study in the AI era

5.1. The Four Treasures of the Study embody AI technology in product functions, such as a brush that can prompt the text track

Embodying AI technology in Four Treasures of the Study products can greatly increase the innovation and convenience of products, so that they can enter national life again through novelty. For example, adding

intelligent voice prompts for text trajectory guidance to the most familiar brush among ordinary people can allow children to listen to the voice guidance while practising calligraphy. This can effectively solve the problem of parents not having the time to accompany their children in practising calligraphy, and also provide more professional guidance for children. It can even be designed for different audiences in terms of voice style, similar to voice prompts on map navigation. For children, Doraemon's voice prompts can be used. For adults, Guo Degang's voice prompts can be used, which can greatly increase the fun of writing [6].

5.2. Introducing intelligent robots in producing to replace traditional handicrafts, achieving efficient production and preserving the cultural characteristics of Huizhou style

AI intelligent robots have increased in recent years, such as Tmall Genie, or Xiaoai, and other independent intelligent devices, but the application of only devices in the production process has been popularized in many factories several years ago. As the quintessence of the national traditional culture, the manufacturer of Four Treasures of the Study can apply to the country to seek the top AI intelligent robot manufacturer in China to customize some intelligent robotic arm and other intelligent robot tools for the production of Four Treasures of the Study, thus greatly improving the production efficiency and ensuring the standard and inheritance of traditional processes. In addition, intelligent robots can also add various elements of Huizhou culture according to computer instructions during production, which can continue to popularize Huizhou culture.

5.3. Using big data to label Huizhou culture when using new media channels for promotion

In the promotion of Four Treasures of the Study products, AI technology can also be used to achieve more efficient Internet promotion. For example, the familiar crawler technology can be used to target more target users of Four Treasures of the Study products, so as to help users to save search costs and directly promote Four Treasures of the Study products to them. At the same time, after users have purchased the Four Treasures of the Study products, manufacturers can also use their own Internet accounts, such as Tiktok account, WeChat official account, Weibo Blue V account, or Taobao live broadcast platform account, to regularly teach users about the use and maintenance methods of the traditional Four Treasures of the Study products, encourage users to adhere to the use, and carry forward the traditional Chinese culture.

6. Conclusion

In general, as the most representative branch of Chinese traditional Huizhou culture, the Four Treasures of the Study has a broad mass base in China. AI technology can be used to produce more high-quality Four Treasures of the Study products that meet the use experience of modern people, and the Internet can be used to promote high-quality products to more users. Technology is the primary productive force, and it is no exception in the inheritance of culture. We hope that various traditional cultural schools in China, such as Huizhou culture, can make good use of the latest technology to achieve the smooth inheritance and development of Chinese traditional culture.

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Research on Development Strategies for Rural Tourism in the Context of Rural Revitalization

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Abstract: In the context of rural revitalization, rural tourism plays a crucial role in driving rural economic development, boosting farmers' income, and enhancing the overall rural environment. In this paper, the background and current situation of rural tourism development are analyzed through literature review and field surveys, and corresponding development strategies are proposed. The findings of this study offer valuable insights for steering the growth of rural tourism, aiming to offer support and guidance for the ongoing progress of rural tourism development and the effective implementation of strategies for rural revitalization.

Keywords: Rural revitalization; Rural tourism; Resource utilization

1. Introduction

The rural revitalization strategy is an important national strategy proposed by the Chinese government to promote rural development, improve farmers' living standards, and achieve coordinated economic and social development between urban and rural areas. This strategy was initiated in response to the problems and challenges faced in China's rural development.

As urbanization accelerates, rural areas in China are confronted with a range of challenges, starting with population decline and labor shortages. Many young people are leaving rural areas and migrating to cities to seek better opportunities, resulting in serious rural aging and labor shortage. Furthermore, the agricultural industry's structure is imbalanced, leading to low income levels for farmers. The conventional small-scale farming management model is under strain and faces multiple challenges. Land use is also inefficient, marked by significant land fragmentation and poor agricultural production efficiency. These issues collectively render the traditional agricultural development model inadequate for the demands of the modern era, necessitating the adoption of a novel development trajectory.

Farmers are the main target of rural revitalization, and improving their living standards is an important goal of rural revitalization [1]. Over an extended period, farmers have faced challenges such as low income and limited social welfare benefits. Infrastructure development, educational and medical facilities, and rural social

security systems have lagged behind. Farmers' overall well-being and satisfaction require enhancement. In light of this, the investigation of rural revitalization strategies should focus on methods to raise farmers' earnings, enhance education and healthcare facilities, and establish comprehensive social security measures to elevate living standards in rural areas.

For a long time, there has been a clear gap between the development urban and rural areas in China [2,3]. The economy of urban areas are better developed, with relatively better infrastructure and social services, while it is the opposite for rural areas. The unbalanced development of urban and rural areas leads to the concentration of resources to cities, and rural areas are facing increasing pressure. Therefore, this study aims to promote the coordinated development of urban and rural economy and society, narrow the gap between urban and rural areas, and achieve comprehensive modernization.

Rural areas are rich in natural, cultural, and agricultural resources, which is an important basis for China's rural revitalization [4]. Therefore, it is crucial to utilize these resources to promote the development and transformation of rural economy. For instance, the advancement of rural tourism can leverage the inherent natural beauty and cultural heritage of rural regions, drawing in more tourists and subsequently boosting farmers' earnings. Additionally, the growth of the agricultural product processing industry can tap into the ample agricultural resources within rural locales, enhancing product value and overall competitiveness. Rural areas are an important part of China's ecological environment, and protecting the rural ecological environment is crucial to achieving sustainable development. Traditional agriculture and rural life style often destroy and pollute the ecological environment. Therefore, the research on rural revitalization strategies aims to promote the development of rural ecological balance. This involves adopting eco-friendly agricultural practices and improving the management of rural environments to create a harmonious connection between the rural economy and nature [5].

In short, the background of rural revitalization strategy research originates from a series of problems and challenges in China's rural development. By addressing rural issues, improving living conditions for farmers, reducing urban-rural gaps, utilizing rural resources effectively, and promoting environmental sustainability, the rural revitalization strategy aims to foster well-rounded rural development. This contributes significantly to achieving the broader goal of China's national rejuvenation.

2. Research contents and methods

2.1. Research contents

This study investigates the utilization of natural and human resources for tourism development through data consulting, field investigation, case study, data analysis, and statistics. It focuses on summarizing scholars' research findings regarding concepts, development processes, influencing factors, resource utilization modes, strategies, and more. Additionally, the study establishes a theoretical foundation for sustainable development, industrial integration, and the experience economy based on collected data and existing research results.

2.2. Research methods

2.2.1. Data access method

By referring to relevant academic journals, dissertations, national policies, and other documents, the theoretical basis, policy background, and implementation plan of the rural revitalization strategy were understood. Academic search engines were used for literature search, and literature related to the research topic was selected for reading and review. Rural revitalization strategy documents, planning schemes, and policy documents issued by the state and local governments were read to understand the government's policy orientation and target

requirements. Additionally, relevant statistical data, such as the number of rural populations, agricultural output value, and rural infrastructure construction, were collected to support the research and analysis.

2.2.2. Field research and case study method

We personally visited, observed, and investigated the areas where the research subjects were located to understand the actual situation, problems, and challenges of rural revitalization. In-depth interviews and exchanges were conducted with local farmers, village cadres, officials from relevant departments, and rural entrepreneurs to listen to their views, experiences, and suggestions on the rural revitalization strategy. The natural environment, farmland, infrastructure construction, industrial development in rural areas, etc., were carefully observed to obtain intuitive data and information. We also participated in local activities related to rural revitalization, such as agricultural exhibitions, rural tourism experience activities, farmer cooperative meetings to personally experience the local development dynamics and atmosphere.

2.2.3. Data analysis and statistical methods

Utilizing big data analysis and statistical methods, relevant data was collected and compiled, and quantitative analysis was conducted to evaluate the current status of rural economy, society, and environment. This process provided a scientific basis for the formulation of policies.

3. Results

Rural revitalization strategy has a positive impact on the development of rural tourism, mainly in the following aspects:

(i) Providing development opportunities

The rural revitalization strategy regards rural tourism as one of the important ways to promote rural economic growth, and provides more policy and financial support. This provides a good opportunity and promotes the rapid development of rural tourism.

(ii) Enriching tourism resources

The rural revitalization strategy focuses on exploring and protecting the natural landscape, cultural history and characteristic industries of the countryside, which are the core attraction of rural tourism. The implementation of the rural revitalization strategy has provided more high-quality resources for rural tourism and enriched tourism products and experiences.

(iii) Promoting infrastructure construction

The rural revitalization strategy emphasizes the strengthening of infrastructure construction, including transportation, communications, accommodation, catering and other aspects. The improvement of these infrastructure not only facilitates the visit and residence of tourists, but also improves the quality and service level of rural tourism.

(iv) Promoting the integrated development of industries

The rural revitalization strategy encourages the integrated development of agriculture, tourism, cultural and creative industries and other industries, promoting the diversified development of rural tourism. Farmers can participate in the rural tourism industry in the form of farm fun, agricultural product sales, farm experience, etc., to increase income sources.

(v) Increasing farmers' income

The rural revitalization strategy focuses on solving the problem of farmers' income, and rural tourism, as one of the important economic growth points, provides farmers with income generation

opportunities. Farmers can increase their income and improve their quality of life by developing rural tourism projects and providing tourism services.

4. Discussion

The rural revitalization strategy, being a significant strategic initiative in China's rural progress, has garnered extensive research and discourse. Scholars have engaged in discussions regarding the strategy's essence, objectives, pathways, and hurdles from diverse perspectives.

First of all, the connotation of the rural revitalization strategy has been widely discussed. Some scholars believe that rural revitalization should be centered on agricultural modernization, rural industry development, rural environmental protection, and rural civilization [6]. However, some scholars stressed that the core of rural revitalization is the people, in which the farmers' interests, the improvement of their quality and their participation in the strategy should be prioritized.

Secondly, there are different views on the goals of the rural revitalization. Some scholars argue that rural revitalization should be aimed at increasing farmers' incomes, improving rural infrastructure and public services, and promoting all-round economic and social development in rural areas [7.8]. However, some scholars emphasize pursuing rural modernization, breaking the imbalances between urban and rural areas, and realizing the integration of urban and rural development

Third, scholars have put forward a variety of views on the path and implementation of the rural revitalization strategy. On one hand, some scholars emphasize the leading role of the government and advocate that through policy support, capital investment and legal and regulatory guarantees, market resources should be tilted to the countryside and rural revitalization should be promoted. On the other hand, some scholars advocate giving play to the role of the market, stimulating the vitality of rural development through the market mechanism, cultivating rural industries and innovation and entrepreneurship. At the same time, some scholars have put forward specific paths such as strengthening rural land transfer, developing cooperatives and promoting rural e-commerce to promote the development of rural revitalization.

Fourthly, the rural revitalization strategy confronts a range of challenges [9]. Notably, resource limitations, population decline, agricultural structural adjustments, and urban-rural disparities are pivotal issues within rural revitalization [10,11]. Effectively addressing these challenges and achieving sustainable rural development is a pressing concern. Furthermore, scholars have expressed apprehensions about reconciling traditional and modern concepts, policy implementation issues, and insufficient social engagement, all of which influence the course of rural revitalization [11].

Finally, to advance the execution of the rural revitalization strategy, the academic community has proposed several recommendations and strategies. These encompass enhancing policy research and overarching planning, bolstering policy coherence and consistency, and reinforcing rural governance system establishment. Measures to enhance farmer organization and mobilization, along with bolstering rural talent education and training, have been widely advocated. Additionally, some scholars advocate land system reforms, enhancing agricultural support structures, and promoting novel rural financial systems to facilitate the seamless advancement of rural revitalization [12].

5. Conclusions

The implementation of the rural revitalization strategy requires the joint efforts of various parties, including the active participation of the government and the public. Through comprehensive efforts in rural revitalization,

sustainable development in rural areas can be achieved, leading to a reduction in the urban-rural gap, the creation of picturesque and habitable rural landscapes, and the ultimate realization of a prosperous society.

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A Case of Schizophrenia in a Young Female Following Unsuccessful Civil Service Exam: The Influence of Environmental Factors and Public Awareness on Patient's Progress

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Abstract: Schizophrenia is a severe mental disorder affecting patients' cognition, perception, emotion, linguistics, behavior, and sense of self. Both early detection and interventions are crucial for treatment outcomes. Furthermore, the causes of schizophrenia remain uncertain, with identified links to hereditary, brain chemistry, and physiological factors. This article presents a case study of a young Chinese woman diagnosed with schizophrenia, highlighting the potential influence of environmental exposures as an additional factor. The article also examines the impact of public knowledge on perpetuating stigma around psychosis and its effects on treatment efficacy.

Keywords: Schizophrenia; Environmental exposure; Psychotic stigma

1. Introduction

Schizophrenia is a chronic and severe psychological disorder that affects cognition, perception, emotion, linguistics, behavior, and sense of self aberrations, thus affecting the patients' daily life [1]. The classic expressions of schizophrenia could include hallucination, delusion, disorganized speech, or behavior for positive symptoms while also experiencing some negative symptoms for behavioral deficits [2,3].

Since schizophrenia is characterized as a chronic disease that affects patients' lives, the forward discoveries and interventions for mental disorder patients at an early age are fundamental. Meanwhile, the stigma against mental disorders could be one attribute influencing treatment outcomes. Specifically, public belief, acceptance, and relevant information can affect a patient's diagnosis and treatment efficiency [4]. Correspondingly, social and family environments could affect the mental health of youth and adolescents or their attitude towards treatment.

Public environments can not only affect the efficacy of a treatment, but it also might be a potential cause schizophrenia. The causes of schizophrenia are complex and not fully understood, arising from a combination of factors and interactions across different stages of life [5]. These correlations include heredity,

brain chemistry, and physiology [6-10]. Besides the above three components, environmental factors could also cause schizophrenia, especially for younger generations. For instance, urbanization, trauma, and social injustice are common environmental factorsAt the same time, certain social stimuli can impact an individual's mental health, especially among youth who may have limited tolerance for depression [11]. According to a demographic publication by the World Health Organization on schizophrenia, it has been noted that around 0.45% of patients are typically found among adults, with a higher risk observed between their twenties and late adolescence [1]. Consequently, there is value in assessing the impact of environmental exposures on the experiences of individuals with schizophrenia.

This paper aims to explore how environmental factors and public awareness can influence the experiences of individuals dealing with schizophrenia. This will be done through a detailed case study of a young Chinese woman who developed schizophrenia under the weight of family expectations to excel in civil servants' exams. The discussion will then delve into how environmental factors and public knowledge, along with the associated stigma surrounding mental health, play a role in this case.

2. Case presentation

A female adult in China who had been suffering from schizophrenia was presented to the hospital for in 2023. The factors contributing to her mental disorder revolve around her societal pressures and family dynamics. In China, pursuing a career as a civil servant is highly valued, driven by the stable income, social benefits, and elevated status it offers. In her case, the compulsive demands from her parents to succeed in this path played a significant role in her mental health struggles. The popularity of this job causes a high failure rate for civil servant tests due to countless competitors for limited spots. She stated that stressful situations could aggravate her symptoms, which was prominent after she failed the civil servant test five times.

The patient started preparing for the civil examination after graduating university in 2018 under her parents instructions. She was not allowed to explore other career options. As a result, she failed the examination 5 times. According to her account, her five years were dominated by relentless and high-pressure studying, devoid of any social activities or entertainment. This monotonous routine led to mounting frustration due to consistent exam failures, coupled with incessant criticism from her parents. These factors culminated in emotional changes in 2022. Specifically, she exhibited early signs of schizophrenia, including isolation and heightened depressions. For instance, she consistently isolated herself in her bedroom, refusing to engage in social interactions or spontaneous activities.

Initially, her parents overlooked her psychological symptoms, leading to a lack of treatment and a worsening of her mental health. A year later, her condition deteriorated further, with the patient exhibiting heightened nervousness and irrational reactions during conversations with her parents. This was accompanied by frequent episodes of mumbling and unconscious dancing. Furthermore, she exhibited positive symptoms such as delusions, which were prominent in her behavior. For example, she repeatedly presented herself as a genius and the director of a bureau in public settings, showcasing classic examples of grandiose behavior. She was then sent to the hospital, where she got diagnosed with schizophrenia. It was an unexpected result for the parents and they felt ashamed about it. The patient was admitted to the hospital one year after the initial signs of schizophrenia appeared. She underwent a treatment regimen that primarily included drug therapy and psychotherapy. This approach aimed to manage her symptoms more effectively and achieve better control and outcomes.

3. Discussions

This case reflects the potential impact of environmental factors on the development of schizophrenia. It indicates that environmental factors can modify the outcome of schizophrenic patients, even in the presence of genetic predisposition, highlighting the role of environmental interventions in influencing the occurrence of schizophrenia [8]. In this case, the initial trigger was the failure of the civil servants' examination, which led the parents to force their daughter into retaking the test many times. The challenging reality of a low pass rate among a large number of participants competing for a limited number of positions led young adults to shift their career paths, opting instead to explore other job opportunities in a highly competitive job market. Likewise, the patient's persistent frustration resulting from five consecutive test failures, coupled with the intense academic pressure and limited opportunities for leisure and socializing, could have contributed to the development of schizophrenia. The excessive anxiety and depression triggered by these external stressors, especially considering the challenges of managing stress at a young age may have played a significant role in the emergence of prominent schizophrenia symptoms [12].

Additionally, family environmental factors could also have played a role in the outcomes. For instance, in this case, the parental insistence on dictating their child's career path may have contributed to the gradual development of the patient's schizophrenic symptoms. The patient's parents forced her to participate in the fierce competition of civil examination as soon as she graduated, with great persistence. However, when she failed the test, it severely impacted her confidence, and she was scrutinized by her parents, which affected her bond with them. Based on Freud's theories of defense mechanisms and energy systems, the suppressed emotions unconsciously stored within her as undischarged energy, shielding her from the hurtful remarks by her family. This repressed emotion then emerged as a defense mechanism, safeguarding her for five years. This process is evident in her early signs of schizophrenia, manifested as depression and isolation in 2022 [13]. Therefore, this shows that an unhealthy family environment could also interfere with the outcome of a schizophrenic patient.

Besides, public opinion and knowledge towards mental diseases could also affect the outcome of schizophrenic patients. In this case, the patient exhibited atypical emotions and behaviors, including isolation and depression, which often go unnoticed but align with early signs of schizophrenia [14]. However, the lack of awareness from her parents exacerbated her symptoms. Her condition escalated, leading to the emergence of delusions after delayed treatment. It was only a year later when she began displaying frequent irrational behaviors, such as delusions of grandeur, that her parents recognized her unusual behavior and sought medical attention. This ultimately led to the diagnosis of schizophrenia. However, upon receiving the diagnosis, the patient's parents exhibited low acceptance and shame, reflecting a broader issue of limited public understanding and stigma surrounding mental illnesses [4]. This lack of acceptance and stigma can result in insufficient community support for patients who are denied medical treatment [15]. Meanwhile, early detection and intervention are vital for schizophrenia due to its chronic and recurrent nature, allowing for symptom management and an improved quality of life for patients [4,15]. Hence, it is crucial to raise public awareness about mental health acceptance and accurate knowledge to foster an inclusive social environment that facilitates better treatment outcomes.

4. Conclusion

This case underscores the significant impact of environmental factors on the onset of mental disorders and highlights the need to address the lack of public awareness and social-cultural attitudes that can affect the well-being of individuals with such disorders. This includes reducing stigma to ensure effective treatment. Therefore, it is important to initiate public discussions about appropriate family responses when dealing with changing

social contexts, as illustrated by the findings in this case. Moreover, society should give more attention to recognizing the mental health journey of young adults and fostering a basic understanding of early signs, which can contribute to timely interventions in potential cases.

Disclosure statement

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Research on Urban Poster Design Methods in China—Take Taizhou Poster Design as an Example

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Abstract: Urban cultural posters serve as vital tools for promoting city culture and the tourism industry, fulfilling the significant mission of enriching the visual aesthetics of citizens, and disseminating urban culture. Governments utilize various means, such as propagating policy guidelines, promoting the cultural and tourism industry, conserving cultural heritage and humanistic history, showcasing academic and cultural events, and propagating the mainstream values, to harness the potential of urban cultural posters as windows that exhibit the city's cultural heritage and charm, thus providing both tourists and citizens with diverse visual delights. In this study, we embark on a journey through the evolution of urban cultural posters in China, focusing on the application of semiotics theory. By examining the techniques and design approaches employed in Chinese urban posters, and using Taizhou city's poster design as a case study, we aim to uncover the essence of Chinese urban poster design. Through the analysis of gathered data, we put forth valuable suggestions for the application of techniques in Chinese urban poster design, which can serve as a guideline for other cities in their poster design efforts.

Keywords: Urban cultural poster; Semiotics; Chinese poster design; Techniques; Cultural and tourism promotion

1. The urban development process of China

1.1. Overview of China's urban development

The development of urban poster design in China has undergone a continuous process of innovation. From simple combinations of text and images in the early days to gradually incorporating artistic elements and adopting diverse design styles, urban posters have evolved to meet the growing demand for visual aesthetics and cultural experiences [1]. With the widespread application of digital technology, urban poster designs have become more flexible and versatile, utilizing computer graphics software and printing techniques to create more exquisite and distinctive works. Additionally, the rise of social media has presented new opportunities for poster dissemination, making use of mobile internet and social media platforms to reach a wider audience [2].

Moreover, urban posters effectively promote tourist attractions, cultural events, and distinctive products, thereby increasing tourists' interest and engagement, leading to the prosperity of the tourism industry [3].

In the process of continuous innovation, Chinese urban poster design not only meets the urgent demand for cultural products but also enhances the quality of urban life and cultural awareness [4].

1.2. History of the development of Chinese urban poster culture

In ancient China, the development of cities followed a long and gradual process, giving rise to some renowned cities, such as the capital city during the Northern Song period. This city flourished as the capital of the Northern Song dynasty, and its commercial districts experienced robust growth, with the shops lining the streets and riversides becoming a common sight [5].

This period witnessed a transformation from the closed and compartmentalized residential quarters to a more open and vibrant urban environment [6].

An iconic representation of the cityscape during this period can be found in the famous painting "Along the River During the Qingming Festival," which provides us with vivid historical insights into the city's appearance and life during that time [7], as shown in **Figure 1**.
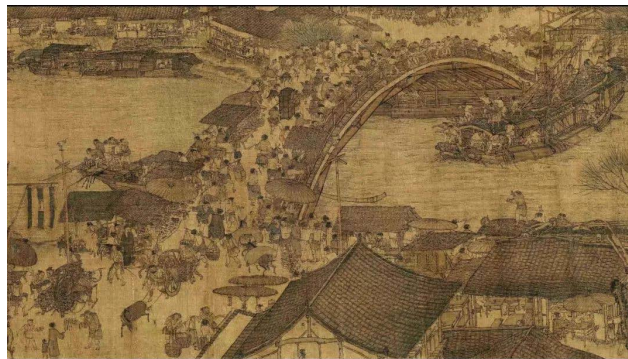

Figure 1. Riverside scene at Qingming Festival (part)

The Yuan Dynasty capital city of China (now Beijing) was very famous in its history. Different from other ancient cities, the center of Dadu was not the imperial palace, but the bell and drum towers, the urban culture of the Yuan Dynasty, with the symbol of imperial power and the majesty of the ruler [8]. There were several forms of urban cultural posters in the Yuan Dynasty.

Business posters advertise their services in the form of calligraphy and painting, by posting it in front of stores or on the street. There are also types of government announcements, usually related to policing and taxation, to strengthen the management of the state.

The Beijing capital, which began in the Jin Yuan, and flourished in Ming and Qing dynasties, is a masterpiece of this period on a grand scale. It is the greatest urban masterpiece in the world, and it is unique even to this day. Beijing has many buildings, such as the Forbidden City, the Temple of Heaven, the Temple of Earth, and the Imperial Temple, and is relatively advanced in the development of science and technology, culture, education, politics, philosophy, and traditional thought as shown in **Figure 2**.

Figure 2. Beijing's urban culture during the Ming and Qing Dynasties

Beijing is the capital of emperors, and there are many activities, including various celebrations, ancestor worship, and city posters with gorgeous fonts and exquisite patterns of the Ming and Qing Dynasties.

In the 1930s, China experienced a period of economic prosperity, and one of the most prominent cities during that time was Shanghai. The urban poster culture in Shanghai flourished and exhibited a remarkable diversity, reflecting the city's economic prosperity, cultural diversity, and societal changes. Notably, the posters from this era were characterized by an abundance of calendar posters, which subtly showcased Shanghai's economic boom and internationalization.

In addition to commercial advertisements, posters also featured cultural events, entertainment activities, and social campaigns, reflecting the multifaceted urban life of 1930s Shanghai. The artistic styles of the posters were diverse, blending traditional Chinese art with modern Western influences, thus capturing the unique fusion of cultures in the city.

After the founding of the People's Republic of China, the urban poster design underwent multiple transformative stages. During the initial period from the 1950s to the 1960s, posters were heavily influenced by socialist realism, promoting socialist construction, rural cooperatives, and the achievements of people's communes. These posters featured simplistic yet impactful designs, emphasizing prominent text and images.

The late 1970s witnessed significant economic reforms and the opening-up policy in China. Urban poster design shifted towards a market-oriented approach. With the booming economy, commercial advertisements proliferated, resulting in diverse styles and content in posters. Entering the digital age since the 2000s, China's urban culture saw the rise of technology-driven propaganda in posters, as shown in **Figure 3**. The evolution of posters shifted from traditional media to a focus on technology and science, presenting a comprehensive challenge to traditional approaches. The advent of multimedia, integrated media, virtual reality (VR), artificial intelligence (AI), and other advanced technologies enriched the poster content, making it more dynamic and engaging.

Therefore, China's urban poster design has evolved from political propaganda to market-oriented advertising, reflecting the country's historical and economic changes.
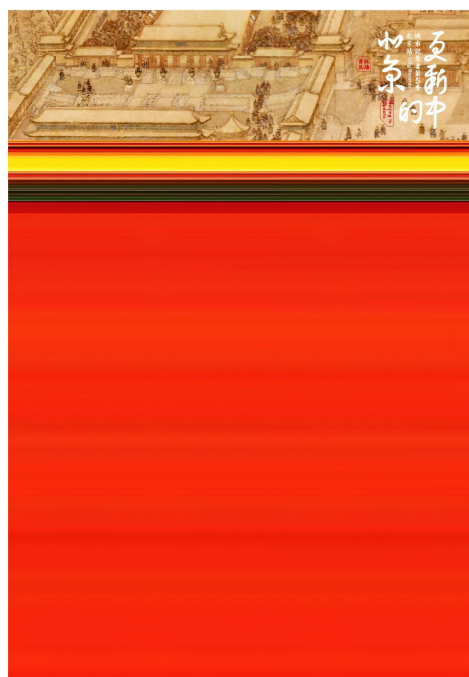

Figure 3. Urban poster design for the 2022 Beijing Winter Olympics（*Source: Yang JianKang work*）

2. Symbolotic theory study using Peirce's theory of symboliology

According to Peirce's trichotomy of signs, the sign involves a triadic relationship of the representamen, the object, and the interpretant. The representamen is the perceptible and explicit part of the sign, the object is what the sign represents, and the interpretant is the cognitive and psychological impression the sign produces in the mind. Each element in this triadic relationship is interconnected and indispensable. Based on this triadic relationship, Peirce developed the "triad of sign types" in his semiotic theory. Indexical signs are related to their objects through physical or logical association, while symbolic signs are related to their objects through conventional or agreed-upon meanings.

To extract symbols for poster elements and obtain visual symbols (iconic signs and indexical signs), Peirce's trichotomy of signs guides the design of urban posters.

3. Urban symbol research

The merit and extract of the Peirce's semiotic theory is shown in **Table 1**.

Table 1. Through the combination of Peirce's semiotics theory and urban symbols

Semiotic theory	Apply	Merit	Extract
Peirce's semiotic theory	Based on ternary relationship construction poster design model	Provide analytic ideas and focus for poster design	Sign application poster design
	The article is based on the trichotomy chemical symbol extraction	Get surface symbols and deep symbols	Focus on the extraction of cultural elements

Urban symbols and posters are not only essential components of urban culture but also vital tools for shaping the city's image and cultural dissemination. They foster cultural diversity and openness in the city, thus driving cultural innovation and integration.

4. Research on the poster practical design in Taizhou, China
4.1. Taizhou urban culture development

Taizhou has a history of over two thousand years, yet it has always remained in a corner by the sea. Before the Song Dynasty, the social and economic development lagged behind. However, during the Song Dynasty, especially the Southern Song period, social stability prevailed. With the advancement of education and the rise of Southeastern Zou Lu academic tradition, and the prosperity of the "land of literature" culture, people shifted their focus from material pursuit to spiritual pursuit. The cultural heritage, spiritual temperament, humanistic wisdom, and artistic pursuits inherited from the Song Dynasty carry profound aesthetic implications.

Taizhou culture has experienced the following parts, as shown in **Figure 4**.

Based on the questionnaire survey, the data analysis of urban poster design in Taizhou is as follows. In urban poster design, we can draw inspiration from Peirce's trichotomy and categorize symbols into resemblance signs, index signs, and convention signs to effectively convey information and express city culture. Resemblance signs utilize visual elements to create vivid images, such as using iconic landmarks, attractions, and buildings to represent the city's uniqueness. Color selection and composition should match the city's atmosphere and style, hence attracting attention and sparking viewers' interest.

About Taizhou city image poster

Questionnaire content	option
What would you think of when you mention Taizhou?	Ziyang Ancient Street, Tiantai Mountain Guoqing Temple, 26 34 Dongtou, Dachen Island 25 30
Mention of Taizhou's delicious food has to say	Fried sugar cake embedded cake walnut ginger juice stewed egg 13 41 43 sugar and sour stir-fried cake plum cake 22 21 Sweet and sour iron plate orange cake black rice 32 22 21
On what platform would you like to see our poster posters?	The Little Red Book TikTok bilibili 25 34 32
What unique experience have you had in Taizhou?	Addulted to the beauty of Tiantai Mountain in the Guoqing 46 Temple faded a impetuous other 44 2
What are you looking forward to?	Dynamic static other 45 42 5
Which form of expression do you prefer to the poster?	Highly brief and creative The visual impact is strong 31 25 Warm and emotional Colour collocation is brilliant 24 27
If Taizhou in the future production of city cultural creation whether you are willing to buy	yes no 38 14

Figure 4. Data analysis

4.2. Application of semiotics and Urban poster design

In urban poster design, cultural symbols are expressed through their visual forms, representing the cultural connotations they refer to. This process involves imbuing the intended cultural meanings into the visual representations. There are four main methods based on the application of visual forms and cultural symbols.

Method 1 involves directly using complete or partial prototype symbols, and incorporating recognizable cultural elements that resonate with the audience.

Method 2 involves employing artistic techniques such as segmentation, mirroring, and reconstruction of symbols to create innovative and captivating visual representations.

Following Peirce's trichotomy, designers extract symbols that align with Taizhou's historical culture and urban memory to capture the essence of Taizhou's tradition, heritage, and innovation within the city's cultural posters. These posters serve as a record of Taizhou's culture, highlighting its unique identity and the interplay between continuity and progress, as shown in **Figure 5**.

4.3. Taizhou poster design practice research

The color scheme of the poster prominently features blue, which is derived from Taizhou's characteristic colors. Bright and deep shades of blue are chosen to enhance the poster's thematic message and appeal to the target audience.

By combining symbolically rich visuals with well-chosen typography and colors, the design effectively conveys the essence of Taizhou's urban identity and cultural heritage. The fusion of urban symbols and cultural elements not only highlights the city's distinctiveness but also creates a strong emotional connection with the
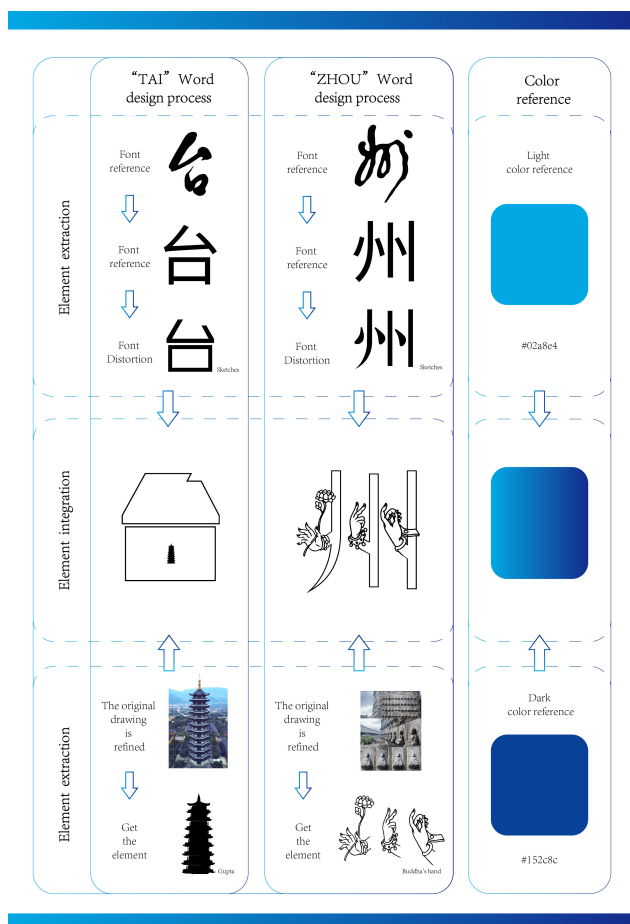
Figure 5. Urban elements are extracted and text elements are expanded according to the principle of Peirce's trichotomy theory of semiotics
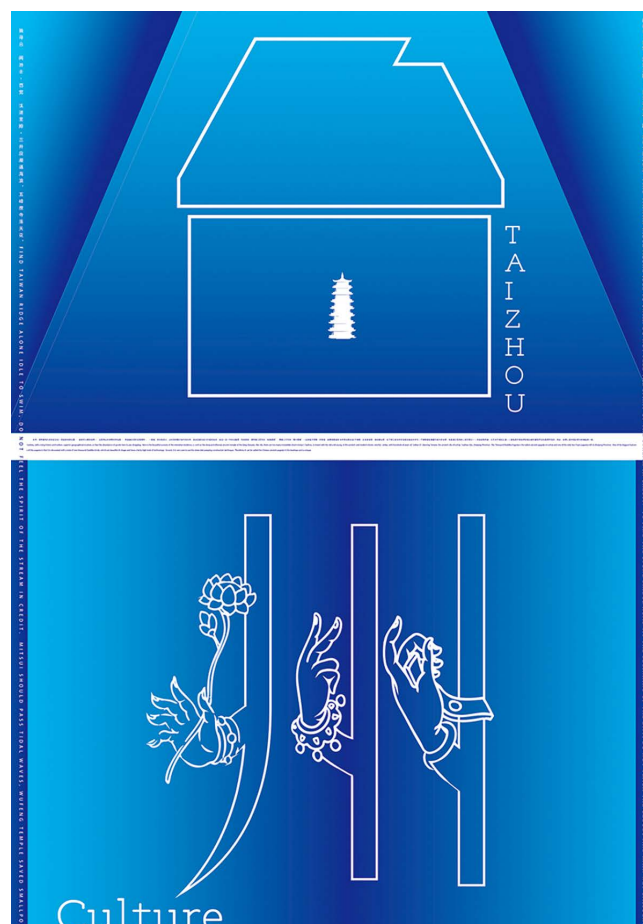

Figure 6. Taizhou city poster design by Miao Ping

viewers, as shown in **Figure 6**.

The lower part of the artwork portrays the combination of the character "zhou" with the image of the Buddha's hand, representing the allure and cultural richness of Taizhou. The seamless blending of these symbols embodies the unique lifestyle and cultural heritage of the city.

5. Conclusion

The article examined the history of urban poster design, and the significance in traditional Chinese culture and modern society, and studied the innovative poster design in Taizhou city, which integrates traditional culture with contemporary elements to emphasize regional traits and modern trends. By analyzing the author's works, the article suggests practical applications and reflections on Chinese urban poster design techniques, with the aim to offer valuable guidelines and inspiration for poster design endeavors of other cities.

Disclosure statement

The authors declare no conflict of interest.

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Community-Built Environment and Cardiovascular Disease Risk: Evidence from Multi-Source Data in Yangzhou

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Abstract: The spatial distribution of cardiovascular disease patients in Yangzhou City and the impact of different community environments was analyzed in this study. Spatial methods like kernel density analysis were used. Results show significant spatial clustering of cardiovascular disease patients within Yangzhou City. The study evaluates the impact of dining environment, culture and entertainment, healthcare, education, and technology on cardiovascular diseases. It was found that dining environment impacted people within a 500 m radius, while culture, healthcare, and education environments impact within 1 km. The influence of the industrial environment is smaller, requiring a 3 km range for significant effects. These findings aid urban planning and community development and helps in formulating measures to improve the residents' cardiovascular health.

Keywords: Cardiovascular disease; Community environment; Spatial distribution; Urban planning

1. Introduction

Cardiovascular disease has become a serious non-communicable disease globally, especially in developing countries. As one of the largest developing countries, China has witnessed rapid socioeconomic development in recent years, leading to changes in lifestyle and an increasing risk of cardiovascular disease [1-3]. Therefore, controlling and preventing cardiovascular disease is crucial for ensuring public health.

Previous research has primarily focused on the impact of demographic characteristics, physiological factors, and behaviors on cardiovascular disease [4,5], exploring preventive or control methods. However, urban land scarcity in recent years has resulted in excessive development, reduced green spaces, and limited opportunities for sports and leisure activities. This resulted in changes in the residents' lifestyles, posing potential threats to their health. Consequently, attention has been drawn to the link between cardiovascular disease and urban environmental factors. To gain a deeper understanding of how multidimensional environmental factors influence cardiovascular disease, this study selected a typical metropolitan area in East China for research.

Therefore, the main focus of this study is on the following questions: (i) What is the distribution of cardiovascular disease in the city, and where are the key areas of high risk? (ii) Which environmental factors can be identified as significant influencers of cardiovascular disease classification? As a result, this study selects a typical metropolitan area in the East China region for research, aiming to deepen the understanding of how multidimensional environmental factors influence cardiovascular disease.

2. Materials

2.1. Study area

We selected Yangzhou City as our research area, an important city in Jiangsu Province and one of the renowned historical and cultural cities in China. As of the end of 2020, Yangzhou City has a total area of 6,591 square kilometers and a permanent population of 4.69 million, comprising six districts and counties, namely Hanjiang District, Guangling District, Jiangdu District, Gaoyou City, Yizheng City, and Baoying County [6]. Its longitude ranges from 119°01′ to 119°54′, and its latitude ranges from 31°56′ to 33°25′. The city's industrial development has generated numerous employment opportunities, attracting a large number of talented individuals to settle here. After decades of stable economic growth, Yangzhou City ranks among the top in terms of regional GDP nationwide.
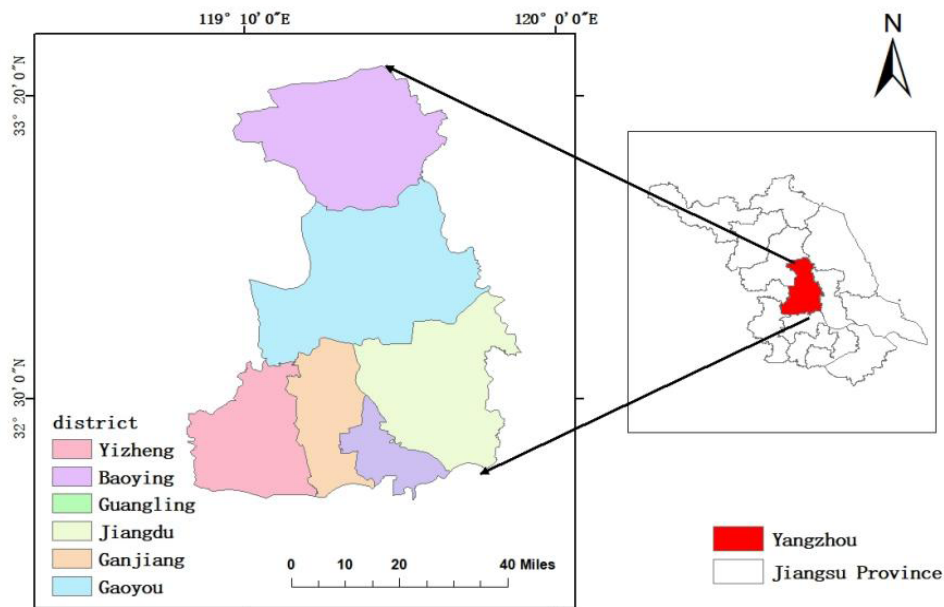

Figure 1. The study area of Yangzhou City

2.2. Data sources

In this study, we utilized multiple data sources, including cardiovascular disease data and point of interest (POI) data. The cardiovascular disease data were provided by a hospital in Yangzhou City and include disease types, age, gender, and addresses. In China, hospitals are classified into three levels based on their medical qualifications: Level One, Level Two, and Level Three [7]. Only major hospitals (Level Two and Level Three hospitals) are qualified to provide services for complex conditions such as cardiovascular diseases.

The point of interest POI data reflects rich urban facility information from a spatial perspective. In the study area, we collected approximately 280,000 POI data points. According to the department classification standards on the platform, we analyzed urban facilities or attractions, including dining, culture and entertainment, industrial, medical and health, and education and technology categories. We created 500 m buffers (approximately within a 10-minute walking distance), 1 km buffers, and 3 km buffers for each patient to

calculate the density of POIs [7]. These buffers represent the availability of urban facilities. **Table 2** summarizes the statistical data of all variables used in this study.

Table 1. Descriptive statistical analysis

	Frequency	Percentage
Cardiac vasculopathy (CV)	102	41.8
Structural and functional lesions of the heart (SFIH)	142	58.2
Total	242	100.0

Table 2. POI reorganization based on sectoral classification

Primary sectoral classification	Classification of secondary departments
Catering class	Chinese food, foreign food, snacks, coffee, dessert, tea house
Culture and entertainment	Sports, scenic spots, etc.
Industrial class	Industrial buildings, industrial parks, factories and so on
Medical and health class	Medical care, fitness, etc.
Education science and technology	Science and education, etc.

3. Result

3.1. Spatial analysis

Through kernel density analysis of cardiovascular disease patient data, we observed a pronounced clustering of cardiovascular disease patients, as shown in **Figure 2**. Building on this, we conducted statistical analysis on cardiovascular disease patients across various townships and streets. We computed the Moran's I index to analyze the spatial distribution of cardiovascular disease patients at the community level. The Moran's I index had a Z-score of 10.08, significantly higher than the critical value of 2.58, with $P < 0.01$. The Moran's I index was 0.399, indicating positive spatial correlation. This suggests that at the community level, cardiovascular disease risk exhibits a closely interconnected network structure.

We further employed hotspot analysis (Getis-Ord Gi*) within ArcGIS to explore local clustering. This analysis method allows for the identification of hotspots and cold spots of cardiovascular disease patients. The hotspot analysis revealed two high-value clusters and one low-value cluster. Guangling and Hanjiang districts each have a significant high-risk hotspot, while Baoying County represents a low-risk cluster (**Figure 3**).

3.2. *t*-test

We conducted independent-samples *t*-tests for cardiovascular disease patients. The results revealed significant spatial distribution characteristics of the impact of community environments on cardiovascular disease. Specifically, we found that the influence of dining environments on cardiovascular disease was mainly concentrated within a 500 m range, indicating that the dining environment within the community significantly affected residents' cardiovascular health (**Table 3**). Additionally, the impact of culture and entertainment, medical and health, and education, and technology environments was mainly within a 1-kilometer range (**Table 4**). The influence of industrial environments on cardiovascular health was relatively small and required a 3 km range to show a significant effect (**Table 5**).

Based on the comprehensive research findings, we emphasize the importance of planning in promoting residents' health and propose recommendations for optimizing resource allocation and creating a more comfortable and healthier living environment.
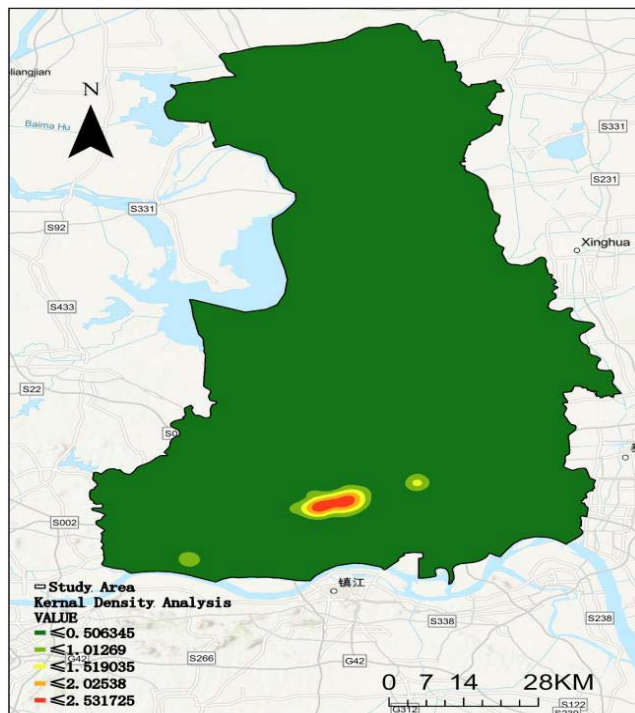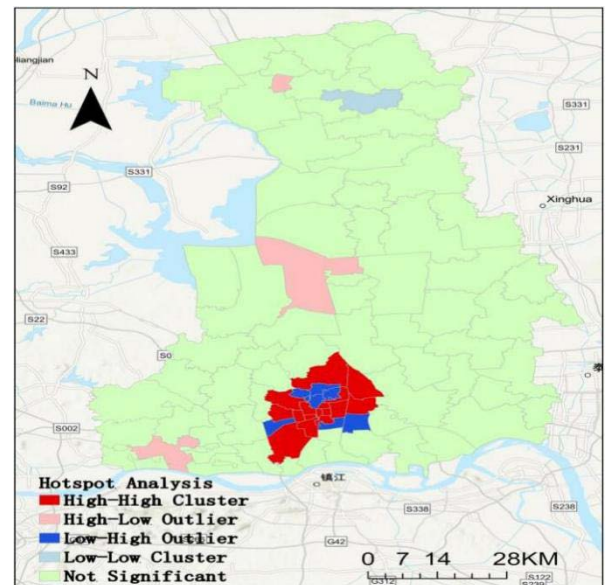
Figure2. Kernel density analysis

Figure3. High-risk communities for cardiovascular disease

Table 3. Buildings with different 500 m ranges

Building	CV	SFIH	*t*-test	
	Mean (SD)	Mean (SD)	*t*-value	Sig.
Chinese food	31.67 (3.472)	23.55 (2.363)	2.003	0.046
Foreign dishes	1.70 (0.377)	1.15 (0.224)	1.323	0.013
Snacka	5.24 (0.507)	6.70 (0.829)	1.499	0.036
Mousse	4.44 (0.545)	2.75 (0.412)	2.475	0.014
Teahouse	2.38 (0.250)	1.43(0.351)	2.676	0.008

Table 4. Buildings with different 1km ranges

Building	CV	SFIH	*t*-test	
	Mean(SD)	Mean(SD)	*t*-value	Sig.
Science education	4.44 (0.545)	2.75(0.412)	1.089	0.029
Literary form	7.41 (0.750)	6.08(0.845)	1.169	0.044
Park	1.80 (0.130)	1.12(0.125)	3.636	0.003
Gymnasium	9.61 (0.717)	7.30(0.766)	2.160	0.032

Table 5. Buildings with different 3km ranges

Building	CV	SFIH	*t*-test	
	Mean (SD)	Mean (S.D.)	*t*-value	Sig.
Industrial	10.76 (0.663)	8.52 (0.861)	2.094	0.037
Factory	24.91 (1.898)	19.70 (1.333)	2.245	0.026

4. Conclusion

In this study, kernel density analysis was performed to reveal a significant spatial clustering of cardiovascular disease patients in Yangzhou City. The study found that the catering environment within communities had a significant impact on residents' cardiovascular health. Additionally, the influences of cultural entertainment, healthcare, and education technology environments on cardiovascular disease were moderate, mainly concentrated within a 1 km radius and overlapping with cardiovascular disease hotspots. Industrial environments had a smaller impact on cardiovascular health, which only became evident within a 3 km radius. Planning should consider these environmental factors.

In conclusion, this study highlighted spatial variations in the impact of community environments on cardiovascular disease. Improving the dining environment, enhancing cultural entertainment, healthcare, and education technology facilities, and rational urban planning for industrial environments could potentially reduce CVD risks and improve residents' cardiovascular health. Future research should delve deeper into the relationships between these environmental factors and cardiovascular disease while expanding the scope of the study for more generalized conclusions.

Disclosure statement

The author declares no conflict of interest.

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Concept Analysis of Fatherhood

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Abstract: *Objective:* To propose a conceptual definition of fatherhood from the perspective of different disciplines and resources. *Background:* The term "Fatherhood" is frequently used in social and health science. Due to the shift of a father's role from being breadwinner to supporting the family and being involved in raising children, an updated and clear concept of fatherhood is needed. *Design:* Walker and Avant's methods for concept analysis was used. *Data source:* PubMed, Cumulative Index to Nursing & Allied Health, the Cochrane Library, Embase, Scopus, Google Scholar, online dictionaries, and thesauruses. *Review methods:* The primary search terms were "fatherhood," "father's role", "the role of fatherhood," and "father's experience." The materials reviewed were not limited to research reports but also included books, case study, and reviews. *Results:* Drawing from four key components, a fresh perspective on defining fatherhood is presented. These components include the father-son relationship and interpersonal dynamics within individual, familial, and societal contexts. This definition encompasses a person's identity as a father, their associated rights and responsibilities in raising children, and the reciprocal processes shaped by societal and cultural influences. It involves identifying distinctive attributes, underlying factors, and resulting outcomes. *Conclusion:* In conclusion, this concept analysis reaffirms the multifaceted nature of fatherhood, highlighting various contributing domains. These insights can prove valuable for future developments in related instruments or theories.

Keywords: Concept analysis; Fatherhood; Fathering

1. Introduction

Scholarly interest in fatherhood began to emerge in the 1970s and 80s, experienced growth in the 1990s, and has been enriched over the past two decades through efforts to elucidate how fatherhood can be understood as a socially constructed concept that has evolved historically [1,2]. Fatherhood is important to men, children and families. Father involvement can be analyzed in the context of marital status, race, residency status, coparenting relationships, and relationships between fathers and their children [2].

Over the last three decades, the role of fathers has undergone significant changes. These changes can be attributed to various factors, including the increased participation of women in the workforce, improved family financial conditions, greater gender equality, the emergence of diverse family structures and living arrangements, the impact of digital parenting through social media, and the evolution of contemporary child-

rearing philosophies [3-7].

The noticeable transformation of a father's role from the traditional archetype of being the breadwinner, disciplinarian, and adhering to authoritarian behaviors to the modern, more involved style of fathering characterized by co-parenting, caregiving, and openly affectionate roles necessitates a redefinition and re-envisioning of the concept of fatherhood [4,6,8-10].

2. Methodology

Concepts are the basic building blocks in theory construction, and concept analysis involves examining the structure and function of a concept [11]. Walker and Avant's concept analysis method is selected as the framework for this analysis due to its linear, straightforward, and rigorous approach. The steps involved in this method are as follows: (i) Selecting a concept to analyze, (ii) specifying the aims or objectives of the analysis, (iii) identifying all known uses of the concept, (iv) determining the defining attributes of the concept, (v) identifying a model case that exemplifies the concept. (vi) identifying cases that are borderline, related, contrary, invented, or illegitimate in relation to the concept, (vii) identifying the antecedents and consequences associated with the concept, (viii) defining empirical referents for the concept.

3. Results

3.1. Step 1: Selecting a concept

Although there has been increasing research on fatherhood from different ethnic, racial, cultural, and economic backgrounds in recent years, the scientific usage of the word "fatherhood" is still somewhat ambiguous. In 2003, an analysis of the concept of "the role of fatherhood" was conducted from a Japanese perspective. This analysis depicted "father's role" as a cultural entity encompassing values, attitudes, and behaviors. This role held the responsibility for family members within a father-mother-child system [8]. Nonetheless, this analysis did not provide a clear definition of "fatherhood" along with its defining attributes. It is crucial to note that the role of fathers is perceived to evolve in response to changing times, diverse cultures, and varying social conditions [8]. Therefore, it is essential to undertake a concept analysis of fatherhood to gain a deeper understanding of the significance of a father's role, behavior, and engagement.

3.2. Step 2: Determine the objectives of analysis

This concept analysis aims to clarify the meaning of fatherhood, develop a holistic and more in-depth understanding of fatherhood from different disciplines and resources, as well as provide a grounding that can support related instrument or theory development in the future.

3.3. Step 3: Identifying all uses of the concept

Suggestion by Walker and Avant included identifying as many uses of the concept as possible through dictionaries, thesauruses, available literatures, and even friends and colleagues [11]. In this concept analysis, the main online dictionaries and thesauruses used were Oxford Dictionary, Cambridge Dictionary, Collins Dictionary, Webster's New World College Dictionary, American Heritage® Dictionary of the English Lang uage, and Urban Dictionary. Besides, a comprehensive search of the relevant literatures from 1990 to 2022 was undertaken in the following electronic databases: PubMed, Cumulative Index to Nursing & Allied Health (CINAHL), the Cochrane Library, Embase, Scopus, and Google Scholar. were "fatherhood," "father's role", "the role of fatherhood," and "father's experience."

A total of 1,184 articles in English, retrieved through computer search, had their titles and abstracts reviewed. Among them, 33 results (including 8 in sociology, 5 in anthropology, 5 in nursing, 4 in psychology, 3 in medicine, 2 in religious, 2 in biology, 2 in management, 2 in politics and law articles) were examined in detail. To capture both the implicit and explicit aspects of the concept, the materials reviewed encompassed various types of sources, including research reports, books, case studies, and reviews.

In dictionaries and thesauruses, "fatherhood" is defined as "the status of being a father" [12,13], "responsibility of being a father" [14], the qualities or character or spirit of a father (synonyms include paternity, fathering, fathership, caregiving, caretaking, raising, rearing, and upbringing) [15-17] and the kinship relation between an offspring and the father (synonyms includes family relationship and kinship) [13,15]. American Heritage® Dictionary of the English Language defines "fatherhood" as "fathers considered as a group" [16]. In anthropology, "fatherhood" also refers to "relatedness or connection by blood or marriage or adoption" [15]. A person enters fatherhood when they become a father. This most commonly happens when their child is born, but it can also happen through adoption or by marrying or becoming a partner to someone with children. Less commonly, "fatherhood" can refer to the status of a religious leader, and God when considered as the first person in the Trinity [15,18]. Urban Dictionary describes "fatherhood" as a male parent, one who loves, supports, guides, inspires, and encourages his children, and a man who is emulated, admired and very loved [19]. The definition or description of fatherhood in different disciplines are shown in **Table 1**.

Table 1. The definition or description of fatherhood from different disciplines

References	Definition or description of fatherhood	Discipline
Dempsey & Hewitt, 2012 [24]; Lut et al., 2022 [5]; Valiquette-Tessier et al., 2019 [3]	Fatherhood means the range of gendered parenting practices, discourses, and identities available to biological or social fathers who are engaged emotionally and fulfil a fathering role in various "hands-on" ways in their children's care, such as a stepfather.	Sociology
Collier, 2018 [33]; Huang, 2014 [6]; Marsiglio *et al.*, 2000 [1]	Fatherhood is a cultural and social construct that encompasses the rights and responsibilities of fathers within the context of family policy. It is shaped by various sociocultural processes and is often framed in terms of a dichotomy between men's public and private roles, encompassing their commitments, responsibilities, and dependencies.	
Gregory & Milner, 2011 [10]; Marsiglio et al., 2000 [1]	Fatherhood is a reflection of the interpersonal processes that lead to developmental outcomes among fathers and children, and an identity that is part of a reciprocal process negotiated by men, children, mothers, and other interested parties.	
Kotelchuck, 2022 [39]	As a life course developmental achievement, fatherhood is not a singular point but a profoundly human experience that occurs over time and across generations.	
Gettler, 2014 [34]	Fatherhood means raising offspring, paternal care, and behavioral plasticity in terms of their willingness to engage with and respond to infants.	Anthropology
Lupton & Barclay, 1997 [31]	Fatherhood is described as a worthy ambition, a demanding challenge, and perhaps the ultimate creative pursuit in terms of tremendous changes in men's marriage and family life.	
Grebe et al., 2019 [32]; Lupton & Barclay, 1997 [31]	Fathers' interactions and negotiations with their partners, children and other family members have been seen as central to individual's construction of the meaning of fatherhood.	
Imaz, 2017 [25]; Ziv, 2020 [38]	For lesbian, gay, bisexual, and transgender (LGBT) families, despite the diversity in the legislation and the differences in historical, social and cultural situations across countries, becoming a father, either alone or as part of a same-sex couple, is a more difficult, convoluted and expensive process than it is for a woman to become a mother, either alone or as part of a same-sex couple. Gay dads rest their fatherhood not on their reproductive contribution or social gender but rather on their masculine gender identification and shape their parental role drawing on elements of contemporary fatherhood.	
Baldwin et al., 2018 [27]; Pirani & Karmaliani, 2015 [30]	As an important or landmark achievement in an individual's life, fatherhood refers to being a father, fulfilling their role as "men," changed priorities and responsibilities in the family, strengthened family ties, and how men perceived themselves as they became fathers.	Nursing
Sansiriphun et al., 2015 [41]; Spector, 2006 [42]	The journey into fatherhood included three phases (labor, delivery, and beginning of a family), and men applied strategies to manage their needs and concerns to deal with emotional and situational changes throughout the process, aiming to develop into masterly fathers.	

Table 1.(continued)

References	Definition or description of fatherhood	Discipline
Genesoni & Tallandini, 2009 [9]; Habib, 2012 [12]	The fatherhood transition phase involves distinct psychological processes. It begins with psychological reorganization as the fatherhood status emerges during the prenatal period, followed by a mix of emotions including helplessness, anxiety, and pleasure during labor and birth. In the postnatal period, fathers often grapple with balancing personal and work needs alongside the new demands of their fatherly role. This transition can be seen as a journey of readjustment to a new self-image, the formation of a triadic family relationship, and adaptation to a new social role.	Psychology
Carneiro et al., 2017 [40]	For gay men, there are a variety of pathways to fatherhood, such as co-parenting, adoption, fostering, or surrogacy. However, gay couples are evaluated by others as being less emotionally stable and less competent parents.	
Darwin et al., 2017 [29]	Most fathers had emphasized that being a "good father" was synonymous with being a "good partner," and "protecting the partnership," which was inherent in navigating fatherhood.	
Kohl et al., 2022 [20]; Paoli *et al.*, 2018 [22]; Sherr, 2010 [21]	While fathers can be biological or adoptive adult males, the essence of fatherhood lies in their overall reproductive potential, the likelihood of becoming parents, and their engagement in all facets of family life. Owing to the development of medicine, assisted reproductive technology (ART) has increased the chance of fatherhood for men.	Medicine
Aune, 2010 [44]; Piechowski-Jozwiak & Bogousslavsky, 2018 [37]	As a Christian evangelical movement in the United Kingdom, Newfrontiers began in the 1970s and has been negotiating the tension between older authoritarian and a newer egalitarian fatherhood. Fatherhood is often depicted as a significant avenue for contemporary men to express their nurturing instincts and share equal parenting responsibilities with their female partners. It also plays a crucial role in shaping their self-identity as masculine figures, both in their familial roles and their work roles. Active involvement in family life is seen as central to embodying the concept of "true manhood," and absentee fathers are deemed unacceptable because human fatherhood is expected to reflect God's fatherhood.	Religious
Gettler, 2014 [34]	When discussing the relevance to evolutionary perspectives on the biology of fatherhood, testosterone in men, as one of neurobiological-endocrine pathways, has been played a significant fathering role in the course of hominin evolution. Fatherhood is a result of natural selection to attune males' physiological systems to father-child interaction.	Biology
Kotelchuck, 2022 [39]	There are some evidences showing paternal brain structure changes with active fatherhood among animals, such as prairie voles and human paternal brain plasticity is associated with greater paternal caretaking involvement, especially in the social–cognitive pathway network (e.g., the amygdala-superior temporal sulcus brain connectivity), which partly allows men to better infer infant mental states from their behavior.	
Gatrell et al., 2021 [23]; Stellner, 2021 [26]	Fatherhood refers to both the status of being a father and the activities associated with fathering. Contemporary generations of employed fathers appear to envision a fuller relationship between fatherhood and employment compared with previous generations who traditionally assume high paternal work-orientation or pure breadwinner role. So, inadequate organizational support for involved fathering may negatively impact employed fathers' performance and experiences in both their father and employee roles, whereas the statement that fatherhood improves leadership behaviors adds an important component to understand what could make a good male manager.	Management
Gregory & Milner, 2011 [10]	Due to broader societal changes, attention to the rights of children, and ethical debates about surrogacy or assistive technologies, fatherhood in politics and law has undergone considerable change in these years. Overall, fatherhood is defined as biological, legal, and ethical approaches to filiation, which seek to establish property rights relating to genetic fatherhood and social fatherhood.	Politics and Law
Lukic, 2016 [35]	Under the logic of "filiarchal" culture in Philippine, father becomes the symbol of all power and its parody. Political theories with philosophical considerations of fatherhood attempted to break off the biological and political realms in order to prevent political tragedy.	

3.4. Step 4: Determining the defining attributes

In this step, the cluster of attributes or characteristics that are the most frequently associated with the concept after identifying all uses of it are gathered [11]. The defining attributes of fatherhood that appear consistently in the dictionaries and literatures are as follows.

(i)   The status of father-child bonding

A person enters fatherhood when becoming a father with or without blood connection [3,5,12,13,15,20-23].

Although bonding with the child is a subjective feeling state of "love" for the child, father-child connection

or relationships can be strengthened in this way [2,28]. Efforts to optimize the quality and amount of paternal sensitivity can promote father–child attachment [2].

(ii)   Interpersonal relationship among individual, family and others

Fatherhood could be the kinship relation between an offspring and the father [13,15,29,30]. The process of fatherhood is constructed by fathers' interactions and negotiations with their partners, children, mothers, and other interested parties [1,10,31,32].

(iii)   Responsibility of supporting and protecting the child

There are five generic stereotypes of fatherhood that are recurrent in the literatures and dictionaries, which regarded father's status as (a) financial providers; (b) role models, guides, moral teachers, or educators; (c) caregivers; (d) protectors; and (e) disciplinarians [1,3,6,10,14,19,33-35]. The roles of contemporary fatherhood emphasize that fathers take a more nurturing and more engaged responsibility in sharing the work of caregiving with their partners and emotionally supporting the child [3,9,36].

Despite facing numerous challenges, men are able to adapt their lifestyles, make adjustments to their new roles, and find ways to balance the demands of work with their responsibilities as fathers [6,24,33]. Physically and emotionally, fatherhood also includes providing safety when needed, seeking health related information for the family and protecting the children from harm [15,37].

In this analysis, the concept of fatherhood can be defined as a status of father-child bonding and interpersonal relationship among individual, family and others, which involves a person's paternal identity, right and responsibility of supporting the child, and a reciprocal process constructed in social and cultural settings.

3.5. Step 5: Identifying a model case

A model case is an example of the use of the concept that demonstrates all the defining attributes of the concept, and it may be actual examples in real life, found in the literature or constructed by the researcher [11]. The following case is an actual example from the researcher's real life which contains all of the defining attributes of fatherhood:

Alice is a 5-year-old girl, and her father, Mr. Fu, works in an architectural design company. On a Saturday morning, he refused the workmate's invitation to attend a dinner party because he has promised Alice to go to the amusement park together with her mother (interpersonal relationship among individual, family, and workmates). On the way to the park, Mr. Fu talked with his daughter happily, told her an interesting story and even sang a song together with her (the status of father-child bonding). When they arrived at the park, Mr. Fu bought the tickets, carried their belongings and helped his wife take care of their daughter (responsibility of supporting the child). He frequently reminded the daughter of drinking water in case dehydration from the hot weather. When his daughter was shy to join other children to play games, Mr. Fu encouraged her. At the same time, he kept an eye on his daughter at a nearby place when she was playing to ensure her safety (responsibility of protecting the child).

3.6. Step 6: Identifying borderlines, related, contrary, invented, and illegitimate cases

Borderline cases are those examples or instances that contain most of the defining attributes of the concept being examined but not all of them [11]. The following is a real borderline case example that happened in China:

Mr. Liu had been living with his 2-year-old son (Tom) together after divorcing with his wife one year ago (the status of father-child bonding). Sometimes Mr. Liu's parents helped him take care of Tom, but the grandmother was hospitalized due to the heart disease last month (interpersonal relationship between individual

and family). Unfortunately, the company that the Mr. Liu had been working at for 5 years went bankrupt and he became unemployed. Considering the financial burden and the less intimate relationship he had with his son, Mr. Liu left him at the railway station in another city at a mid-night, hoping that someone could adopt Tom (lack of responsibility of supporting and protecting the child).

Related cases are instances of concepts that are similar or related to the concept being studied but that do not contain all the defining attributes [11]. The following example of "simulated caregiving" illustrates a similar case of fatherhood, but it involves only emotional desirable characteristics as a father rather than three defining attributes:

Mike is a 19-year-old boy and studies at a nursing school. Last week, he participated in a child care training program of and learned how to take care of children along with his classmates. Through the teacher's guidance and good teamwork, Mike finished the lessons successfully and enjoyed the experience of bottle-feeding, bathing, changing diapers and playing games with a 9-month-old girl. On his way to school, he told one of his friends: "The baby is so fun and much prettier than I expected. I even want to have my baby soon."

Contrary cases are cases are not related to the concept. In the following case, there are no defining attributes towards the concept of fatherhood:

John spent 100,000 dollars on buying a robot that can cook for the family, clean the house, play games with children, and talk to everyone at home.

Invented cases are cases that contain ideas outside our own experience and not all concept analyses need invented cases, and illegitimate cases give an example of the concept term used improperly or out of context [11]. In this analysis, the concept of fatherhood was clearly exemplified through the cases presented and there was no need to present the invented and illegitimate cases.

3.7. Step 7: Identify antecedents and consequences

Antecedents are those events or incidents that must occur or be in place prior to the occurrence of the concept [11]. Consequences, on the other hand, are those events or incidents that occur as a result or outcomes of the occurrence of the concept [11]. The concept analysis has identified the following antecedents and consequences of fatherhood.

3.7.1. Antecedents
(i) An alive child or perceiving the unborn baby as a human being [8].
(ii) Paternal or parental identity: this is a reflection of the change in an individual's role within the social structure, integrating with personality characteristics and beliefs related to fathering [9,28,38].
(iii) Attitude and motivation for engaging with and responding to children as a father [5,21,34].

3.7.2. Consequences
(i) Positive consequences: developmental achievement in one's life [27,39], improved parenting competences [40-42], psychological maturation [34,40], strengthened family bond [28,30], decreased infant mortality, decrease in child abuse and antisocial behavior, and improved children's cognitive outcomes [5,29,34,39,40].
(ii) Negative consequences: stress from the parenting responsibility [27], paternal anxiety or depression [42-43], employed fathers' inadequate work performance [26].

3.8. Step 8: Define empirical referents

Empirical referents are categories of actual phenomena that by their existence or presence demonstrate the occurrence of the concept itself [11]. They are not tools to measure the concept, and they are the means by which

you can recognize or measure the defining attributes [11]. The following observable phenomenon of "fatherhood" have been reported commonly in the literature.

For the status of father-child bonding, face-to-face communication, being available in the same or next room, accessibility to respond to child's requests, time spent with the child and hugging them can be recognized by the degree to which the father behaves in these ways [2,5,32,40].

For interpersonal relationship among individual, family and others, affectionate touch and gaze towards infants, involvement in child's activities, level of intimacy with the child, sharing the work of caregiving with their partners (e.g., bathing, playing, changing diapers, feeding, putting children to sleep, caretaking during the night, and driving the children to kindergarten), participating in household chores (e.g. preparing meals, cleaning the house, shopping, and doing the laundry), and parenting problem solving can be measured in different levels [2,6,8,10,27,33,44].

The responsibility of supporting and protecting the child can measured in terms of financial support, planning childcare, decision making, work-life balance, comforting and communicating with the child, guiding and disciplining the child, providing safe living environment, protecting the child from detrimental forces, seeking health related information for the child, organizing health appointments, take care of sick children, monitoring children's whereabouts and activities, and encouraging them emotionally [6,9,10,32,35].

4. Implications for nursing discipline

In nursing practice, understanding the concept of fatherhood is crucial for nurses and midwives as it impacts the delivery of family-centered perinatal healthcare. This approach goes beyond addressing only women's health needs and extends to encompass the well-being of partners and newborns. Furthermore, in the field of pediatric nursing, recognizing the father's role and involvement in child-rearing allows nurses to provide essential emotional and physical support during a child patient's recovery. To facilitate this, various strategies like engaging in family activities and offering family-focused health education can be employed. In nursing research, this concept analysis of fatherhood confirms a multi-faceted concept of fatherhood with a number of contributing domains. It can provide a basis for other empirical researches on fatherhood or fathering in health care and contribute to the related measuring instrument development and theory development in the future. Besides, the quality of fathering and some interventions of strengthening the fatherhood by health professionals could be explored in the future. In nursing education, armed with a deep understanding of fatherhood, nurses and midwives can employ appropriate assessment and use some approaches to ensure father or expectant father's involvement in perinatal care and children's health promotion. Notably, in-depth knowledge about fatherhood should be provided in nursing curriculums, especially obstetrics nursing and pediatric nursing, in order to educate the nursing students in terms of the updated family-centered health promotion, and even paternal nursing might be new trend for nursing education reform.

5. Summary

This concept analysis has provided some clarity on the frequently used concept of fatherhood. It confirms a multi-faceted concept with a number of contributing domains, which can benefit the future research and discussion. However, most of the fatherhood literatures were related to the role of fathering or father's engagement or responsibility and some interventions of strengthening the fatherhood could also be explored. Because fatherhood is a dynamic concept, further evolution of the concept is required as theoretical and empirical researches emerge.

Disclosure statement

The authors declare no conflict of interest.

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Research Progress of Human Origins

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Abstract: The birth of human is a miracle in earth history, and the earliest human could be traced back to *Sahelanthropus tchadensis*, who had existed for at least about seven million years. In cultural anthropology, human is defined as a creature capable of using language, having a complex social organization, and science and technology. The origin of human has always been the focus of the field of paleoanthropology, including creationism, theory of evolution, panspermia, and aquatic ape hypothesis. Although there is some evidence to support each hypothesis, conclusive evidence is still lacking. China has a favorable geographical location and a good foundation in the field of paleoanthropology and related disciplines. The scientists from China successively discovered the fossils of *Homo erectus*, Heidelberg man, *Homo sapiens* and Danisova man, and made an important breakthrough in the "from fish to man" research. However, the exploration of the origin of human beings in China is facing challenges such as extensive research fields, lack of high-level scientific research bases and insufficient fossil discovery and identification. It is suggested that the research on the origin of human beings in China should focus on the three fields of land, ocean, and space, find more fossils and evidence, strengthen the identification and research of fossils, and cultivate more talents with international perspectives through the construction of high-level research bases and cross collaboration.

Keywords: Human origin; Creationism; Evolutionary theory; Panspermia; Aquatic ape hypothesis; fossils

1. Hypothesis of the human origin

Humans are primate groups that walk upright [1]. Walking upright is an important factor in promoting human evolution, which leads to the division of labor between the hands and feet. The hand, as an independent organ, helps humans to manufacture and use tools, effectively promoting the expansion of human vision, brain development, and intellectual development [2]. Creativity is a comprehensive skill unique to human beings, enabling them to generate new ideas, make discoveries, and create things. Creativity empowers us to shape and transform our environment in a way that no other creature can achieve, and it distinguishes humans and other species more than any other trait.

What is the point of human origin? Where do we come from? For thousands of years, Chinese and foreign scientists and philosophers have continuously explored and contemplated the true origin of human beings. With the progress of science, technology, and the improvement of people's cognitive ability, several theories have emerged regarding the origin of human beings.

1.1. Creationism

"Creationism" is a concept in which a "God" created man [3,4]. It can be found in the myths and legends from various cultures around the world.

In many foreign mythological system, there are widespread legends of God creating humans. For instance, the first chapter of Genesis introduces the legend of God creating the world in seven days. On the sixth day, God formed a man from the dust of the earth and named him Adam. He then created a woman from Adam's rib and named her Eve. After Adam and Eve stole the forbidden fruit, two people were driven out of the Garden of Eden, and human reproduction began, leading to the existence of the present human population.

Egyptian mythology holds that man was called into existence by God; Indian mythology holds that God created heaven and earth and then led man from the ground and lived on the earth. Ancient Indian mythology suggests that Brahma created everything in the universe, including man.

In Chinese mythology, the creation story of Nuwa holds a significant place in the hearts of people. According to historical records like the "Taiping Imperial Tour," it is commonly believed that in the beginning, there was no one in heaven and earth. Nuwa, a revered figure, is said to have created human figures from loess soil. As life unfolded, the need for procreation arose, leading Nuwa to shape more people from mud using ropes, breathing life into them. These human figures, crafted from yellow mud, were called "humans." Over time, the population gradually increased through reproduction, symbolized by humans emerging from dried vines on the ground.

1.2. Evolution

A British biologist, Charles Robert Darwin, proposed the concept of evolution in 1858 [5] (**Figure 1**), which is supported by three main arguments. Firstly, all organisms have a common ancestor, because biology and medicine confirm that all species share a set of genetic codes. Secondly, species are not fixed entities, but rather have evolved naturally over time. Humans, for example, are believed to have evolved from forest-dwelling apes in Africa. Thirdly, natural selection is the main driving force behind evolution. Organisms evolve in order to adapt to the natural environment of life, that is, natural selection and survival of the fittest. As soon as the concept of evolution was proposed, it completely overturned the concept of creationism and ruled the scientific community for more than one hundred years.

In 1865, an Austrian botanist Mendel made a conclusion of particle inheritance through hybrid experiment with peas [6]. He demonstrated that genetic material does not fuse but rather separates and recombines during reproduction and inheritance. Based on these findings, Mendel proposed that organisms evolve through mutation, gene combination, and natural selection. According to Mendelian theory, gene mutation is the fundamental cause of biological evolution instead of external environment alone. This theory complements the causes of evolution proposed in Darwinian evolution.

In 1937, Dubzinsky *et al.* proposed the concept of comprehensive evolution, with the main argument being that the gene pool is the basic unit of biological evolution, and the sum of all genes in a population is called the gene pool of a population [7]. While the genotype of individual species may not be constant for generations, but the sum of all genes in the population is relatively constant Furthermore, various selection mechanisms operate
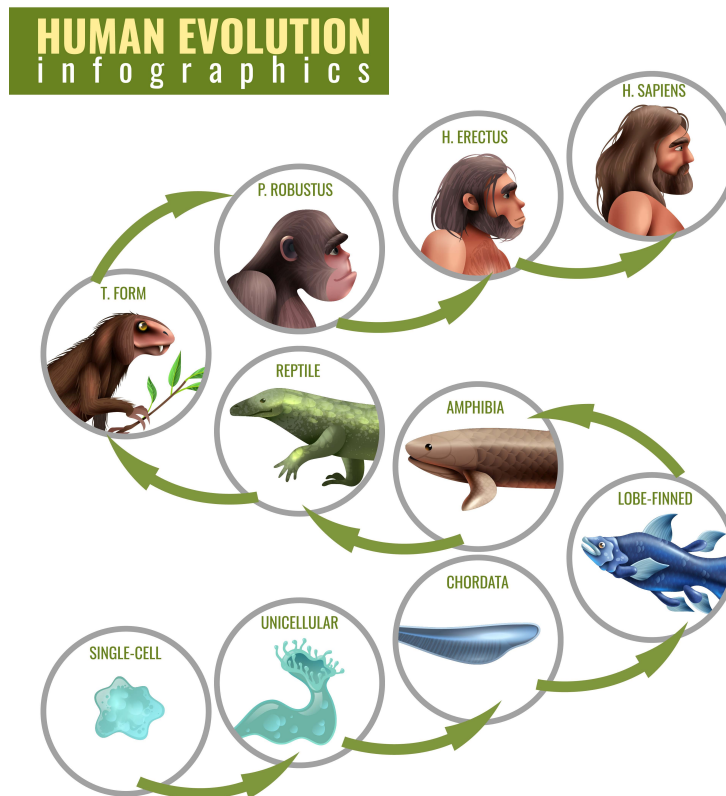
Figure 1. Schematic diagram of the evolution theory [1]

in nature, including gene mutation, natural selection, and isolation. This theory first put forward the concept of "gene pool," which supplemented the evolutionary mechanism proposed in Darwinian evolution and better explains the evolutionary process of population.

The DNA double-helix structure was proposed by Watson and Crick in 1953 [8]. It reveals that DNA is formed by a sequence of deoxyribose and phosphate, which are connected through ester bonds, resulting in a parallel arrangement and forming a double helical configuration. The discovery of DNA double helix structure unveiled the chemical nature of genes and allowed the study of genetics and evolution into the molecular level. It transcended the limitations of merely understanding life phenomena at the genetic phenotype level and revealed the molecular intricacies of genetics. This breakthrough accelerated the advancement of molecular biology, providing deeper insights into mutation and genetic properties.

In 1972, Eldredge and Gould jointly proposed the theory of "intermittent balance," which suggests that evolution is a combination of mutation and gradient, that is, most species are form relatively quickly, while the process of species formation through mutation occurs slowly under the influence of selection [9]. In his evolutionary theory of "natural selection and survival of the fittest," Darwin believed that evolution is a stable, gradual, and continuous process, rejecting the idea of leaps in nature. However, the evolution of organisms is not a slow and gradual accumulation but an alternation of prolonged stability and transient upheaval, leaving many gaps in the geological record. The "intermittent equilibrium" theory better explains the discontinuities and jumps observed in paleontological evolution.

With the continuous progress of science, especially the advancements in geology, cytology, molecular biology, and other fields, strong evidence supporting evolution has been provided. In the field of geology, a

large number of discovered biological fossils offer substantial evidence for evolution. Among these fossils, the Chengjiang fauna, discovered by Luo *et al.*, in 1993, stands as one of the most representative. Located in Kunming, Yunnan province, this fossil group dates back approximately 500 million years and represents the oldest and most complete preserved shell metazoan fossils in China. The Chengjiang fauna comprises a diverse range of species, including arthropods, vercoids, tentacles, trichogillans, echinoderms, chordates, heads, and vertebrates, encompassing almost all major categories on the Earth's animal tree [10]. Notably, the discovery of real vertebrates (Kunming, Haikou, and Zhong Jian) in this group has pushed back the history of vertebrates by 50 million years [11]. As a witness of the Cambrian explosion, the Chengjiang fauna confirms that the vast majority of invertebrates underwent rapid evolution within a short period, which accounted for less than one percent of Earth's overall history. Furthermore, the discovery of the Chengjiang fauna also shows that the evolution of organisms does not always occur gradually, but can involve both incremental and sudden leap forward [12].

In the field of molecular biology and cytology, Shi *et al.* have combined homologous proteins and gene trees to propose a new method for evolutionary verification at the gene level, aiming to determine direct homologous relationships. Orthologous relationships represent identical functions, while paralogous relationships signify functional differences. The relationship between the homology and functional similarity depends on the evolutionary distance. Shi *et al.* built a gene tree of secreted regulatory proteins (hedgehog protein) from flies, zebrafish, frog, chicken, mouse, and human, thereby confirming the orthologous relationship between Drosophila and other chordates [13].

Molecular biology also provides great thrust in the advancement of the evolution concept. Li *et al.* [14] proposed a calculation scheme for the absolute evolutionary rate of homologous biomolecules, calculated the divergence time of some major animal species during the Cambrian biological explosion and concluded that the divergence time between protostomes and deuterostomes was 500 million years ago. This finding offered a new idea and method for studying the origin and evolution of organisms. According to Darwin's theory of evolution, the origins of any complex life form can be traced back to a known or unknown single-cell simple life form. Li *et al.* conducted some calculations and revealed that red algae appeared about 1.331 billion years ago, green algae emerged about 1.174 million years ago, mosses differentiated from green algae 452.7 million years ago, and ferns emerged 437 million years ago. These findings provide evidence that prokaryotes evolved along the direction of algal, fungal, and protozoan lineages. Remarkably, these results were consistent with literature reports based on fossil record [15].

However, it is important to note that Darwin's theory of evolution has faced increasing skepticism from various individuals. The primary concerns raised include the absence of sufficient fossil evidence to support the transition from forest apes to humans and the perceived brevity of the timeline for human evolution, which is estimated to have occurred approximately 7 million years ago [16].

1.3. Biological alien theory

The concept of "biological alien" suggests the possibility that humans may originate in other planets (**Figure 2**) [17,18]. This theory arises due to the perceived lack of scientific clarity in explaining the physiological characteristics of human beings, which seemingly contradict the fundamental principles of evolution.
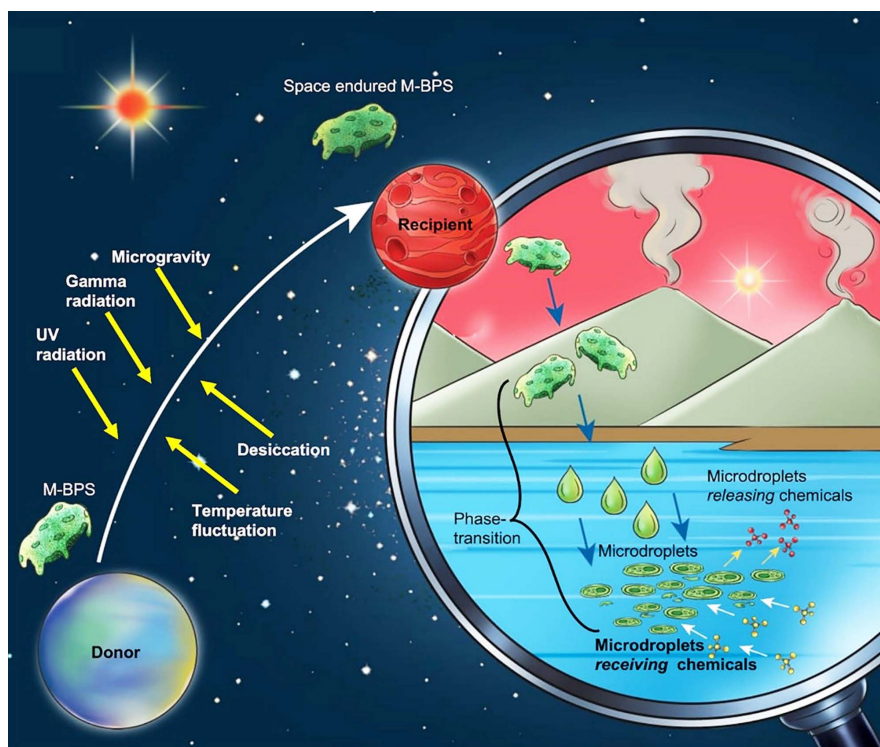
Figure 2. Schematic diagram of biological theory [18]

In 2003, Wang utilized a radio telescope and employed molecular spectroscopy to detect C_{60} molecules in the interstellar cloud, the discovery of which laid the foundation for the study of complex alien organic matter [19]. Subsequently, in 2004, NASA discovered the presence of amino acids in dust particles obtained from Wild 2 comet through the Stardust probe [20]. Moving forward to 2020, American scientists used cutting-edge mass spectrometry to discover a blood stone protein in the Acfer 086 meteorite, which is not native to Earth [21]. Likewise, in 2022, Japanese scientists discovered more than 20 amino acids in sand sample brought back from the Dragon Palace by the Hayabusa 2 asteroid probe [22]. During the same year, American and Japanese scientists discovered purines and pyrimidines in the Murchison meteorite[23]. Although nucleic acids, amino acids and proteins cannot be equated with the source of life, these aforementioned discoveries validate the existence of fundamental life-building materials in space, Consequently, these findings heighten the possibility of favorable conditions for the emergence of life on Earth.

1.4. Aquatic ape theory

In response to the scarcity of ancient ape fossils, British anthropologist Alister Hardy proposed the aquatic ape theory in 1960 [24], It believes that 4–8 million years ago, the sea flooded large areas of eastern and northern Africa, leading some ancient apes to inhabit the water and evolve into aquatic apes. Millions of years later, as the sea water retreated, these aquatic apes transitioned back to the land, eventually becoming the ancestors of mankind. Miyake *et al.* studied the pectoral fins of the Australian lung fish (*Neoceratodus forsteri*) and the African lung fish (*Protopterus aethiopicus*). The fossil scan showed that the muscles of the lung fish were arranged similar to the human shoulder and elbow joints [25]. This group of muscles is involved in maintaining a stable posture and undertaking weight-bearing movements, suggesting a potential evolutionary link between fish fins and animal limbs. In 2002, a French medical scientist Michael Odent put forward a new idea: humans and dolphins are more related than apes, suggesting that dolphins may be the ancestors of humans [26].

After comparing the physiological structures of humans and apes, it was discovered that humans have a lot in common with aquatic animals, such as dolphins. For instance, humans lack a thick hair covering on their bodies. This absence of hair reduces resistance in water, resulting in decreased energy consumption and increased speed of movement. However, the lack of body hair hampers heat preservation. Since water conducts heat more effectively than air, heat is lost rapidly in water. To compensate for this, humans, like aquatic animals, develop a thick layer of subcutaneous fat. Another distinguishing feature is the flexibility of the human spine, which allows for efficient movement in water. In contrast, an ape's spine cannot extend backward [27]. These findings provide clues regarding the potential aquatic origins of humans.

Nevertheless, there exist several objections to both the aquatic ape theory and the dolphin theory, with the primary objection being the absence of fossil evidence for aquatic humans.

2. Research status of human origin in China

2.1. From ape to man

China, with its vast territory, is home to a wealth of ancient human fossil resources. Since the 1920s, many human fossils, including *Homo erectus*, Heidelberg man, *Homo sapiens* and Denisovan, have been found in 25 provinces and regions across China.

In 1930, Pei and his colleagues discovered the "summit" fossil group, which included various human fossils such as skull, mandible, teeth, and limb bones. These fossils were found in the mountains.

Additionally, in 1965, Professor Qian Fang from the Institute of Geological Sciences found the fossil of Yuanmou Man in the northwest region of Yuanmou Shangdu, Yunnan. The fossil consisted two teeth, classified as *Homo erectus*, and was named Yuanmou *Homo erectus*. It is noteworthy that this discovery predates the findings of ape men in Beijing and Lantian, making it the earliest known ape man fossil discovered in southern China [28].

In 1984, Professor Huang Wanbo discovered a fossil assemblage from Longgupo cave, China. These fossils, dating back approximately 2 million years, consisted of over 20 different types, making it the site with the highest diversity of quaternary species fossils. The following year, Professor Huang Wanbo found the ancient human mandible fossils, including a left lower gum and an upper medial incisor, indicating that there were humans in China 2 million years ago [29]. The Longgupo fossil assemblage is earlier than zhoukoudian Beijing people fossils and Indonesian fossils. The emergence of the Longgupo fossil assemblage has revised the timeline for the appearance of hominins in China, suggesting that it may coincide with the period of East African hominin presence [30].

To date, approximately 80 human fossils have been excavated in China. Academician Wu Xinzhi has summarized the characteristics of these human fossils, which include a flat face, low nose bridge, nearly rectangular orbit, bending of the lower edge of the maxilla, and specific features in the lower part of the frontal bone and the back of the upper front teeth [31]. Based on this, in 1998, Academician Wu Xinzhi put forward the hypothesis of "continuous evolution with collateral hybridization." The hypothesis states that the four stages of human evolution are Homo habilis, Homo erectus, early Homo sapiens, and late Homo sapiens. Throughout this process, humans undergo continuous evolution with intermittent contact and hybridization with foreign populations, with each stage not coexisting for extended periods [32]. This theory well explains the process of human origin.

2.2. From fish to people

Zhu, an academician of the Chinese Academy of Sciences, has made significant contributions to the field of

source exploration in the evolutionary process from fish to man. In 2009, Zhu's team discovered ghost fish in the vertebrate fauna of China. Zhu restored the membranous bone model of the skull roof and identified several distinguishing features. These features include long top nails and back tops, a non-toothed middle kissing bone, a midline nasal bone, variable shape and kissing spine, and near midline concave lines in the middle and back sections. The posterior outer nose of the ghost fish is surrounded by the anterior orbital bone, similar to the fin fish. By comparing the ghost fish with the fin fish, it is suggested that the preorbital bone may be a common feature of both ghost fish and fin fish [33]. As a jawed vertebrate, the ghost fish combines the characteristics from various large groups of jawed vertebrates. Filling the morphological gap between fish and vertebrates, ghost fish fossils provide the earliest evidence of jawed vertebrate ancestors [34].

In 2022, Zhu's team studied the fossils of armored fish, shield skin fish and cartilage fish in the Neolithic Age of China, and revealed the origin and early evolution of jawed vertebrates. Typically, the paired fins of fish generally serve as lateral fins. However, over time, only coelurosaurs and jawed vertebrates evolved forward, while the remaining fins shifted to the pelvic position. This evolutionary change favored active propulsion and rotation. This finding indicate that the evolution of chest and pelvic structures began early in the development of jawed vertebrates. This discovery advanced the fossil record of intact jawed vertebrates by 11 million years, filling a gap in the global scientific community in the fossil record of intact jawed vertebrates during this period [35].

2.3. Thoughts on the origin of human beings in China

These findings lay the foundation for research on the origin and evolution of humans. Nevertheless, China encounters several challenges in its pursuit of understanding human origins. Firstly, the scope of research is vast. China's interests span not only terrestrial investigations but also deep-sea and space exploration. In addition, there is a scarcity of top-tier scientific research facilities and institutions. Currently, China has only two high-level scientific research bases: the Archaeological Research Center of the State Administration of Cultural Heritage and the Institute of Vertebrate Palaeontology and Paleoanthropology, which cannot meet the growing demand of human origin research in China. Third, the discovery and identification of fossils are insufficient. Having more specimens forms the basis of exploring the origin of human beings. There are still many blind spots in the evolutionary picture of human origin in China, necessitating the urgent discovery of new fossil specimens as supporting evidence. In recent years, a lot of stone materials have been found in the country. However, many studies have only focused on describing these materials, leading to a limited number of published articles and minimal progress in developing theories. It is urgent to dig deep into the information contained within these specimens and gradually establish the theoretical system of human evolution in China. Given the current scientific research discoveries and the controversies surrounding human origin and evolution, it is imperative to increase funding for research in this field. By directing scientific researchers' attention and leveraging their expertise, we can tackle challenging problems and advance our understanding of human origin and evolution. This increased focus will also lead to the exploration of new evidence related to human origin and evolution, providing fresh insights and arguments to enrich the existing knowledge.

3. Recommendations for future works

Based on the current scientific research discoveries and the controversies surrounding human origin and evolution, we should increase the funding for the study of human origin and evolution. Adequate funding will enable researchers to conduct more comprehensive and in-depth investigations in this complex field.

To optimize the use of available resources, it is imperative to guide scientific research workers to focus their advantage and strengths on addressing the most challenging problems related to human origin and

evolution. By concentrating on these difficult issues, researchers can make significant breakthroughs and contribute valuable insights to the field.

Furthermore, efforts should be made to promote the exploration and analysis of evidence related to human origin and evolution. This could involve conducting further excavations, employing advanced technologies to analyze existing specimens, and fostering international collaborations to access diverse datasets.

The ultimate goal of these efforts is to provide new and robust arguments concerning human origin and evolution. new argument.details are as follows:

3.1. Focusing on three areas: land, sea, and space

China is an ancient civilization with a rich and extensive history, encompassing not only a vast land but also expansive oceans. Throughout its long historical development, our ancestors not only created the brilliant loess civilization but also cultivated a remarkable maritime civilization. The land and waters of China are home to a vast and invaluable cultural heritage, which serves as a precious resource for conducting research on human origins. To advance our understanding of human origin, it is imperative to collect more fossil materials and evidence. The wealth of cultural heritage in China's land and waters holds immense potential for unearthing crucial insights about the origins of humanity. By further exploring and gathering these valuable resources, we can make significant strides in unraveling the mysteries of our human ancestry.

On April 24,1970, China's first man-made satellite, Dongfanghong-1, was successfully launched, marking the country's entry into the space age. Over the past 52 years, China has made remarkable achievements in space exploration. With the development of space technology, China is now planning to construct a near-Earth asteroid defense system to address the potential threat of asteroid impacts and contribute to the safety of our planet and humanity. There are seven directions for space exploration of human origin, namely: Mars exploration, Jupiter and Saturn-related satellites, carbonaceous asteroids and comets, exoplanets, organic matter in meteorites, organic molecules in interstellar molecular clouds, and laboratory simulation reactions.

To sum up, the mainstream theory of human origin covers three different fields: land, sea, and space While each theory is backed by specific evidence, none possesses conclusive proof. To advance our understanding, researchers should be guided and encouraged to conduct comprehensive and in-depth research in all three domains, capitalizing on their own expertise and strengths. By combining efforts and exploring various perspectives, we can strive to unravel the mysteries of human origin more effectively and achieve a more comprehensive understanding of our shared heritage.

3.2. Building a high-level scientific research base

The archaeological Research Center of the State Administration of Cultural Heritage and the Institute of Vertebrate Paleontology and Paleoanthropology in China have made significant progress over the years, diligently developing and conducting research. These institutions have now attained a considerable scale in terms of personnel quality, resources, and specimens. Given China's vast territory, it's crucial to tap into the collective enthusiasm of cultural departments, universities, research institutes, and interested academic and corporate partners dedicated to the study of human origins. Through collaborative efforts to establish high-quality scientific research centers and the cultivation of talented individuals with a global outlook, China can further enrich its scientific exploration in this crucial field of study. This will help enhance our understanding of human origins and evolution.

3.3. Discover more fossils and evidence

Although the study of human evolution in China has made certain achievements and obtained a broad outline,

it is still necessary to find more new fossils, fill the blind spots for the survival of ancient humans in China, and draw a more detailed evolutionary picture. Therefore, it is suggested that the state should formulate detailed archaeological plans and key areas, such as Chongqing, Guangxi, and Hubei provinces, to carry out the census work in a planned way. Simultaneously, efforts should be made to strengthen the popularization of science and enhance the public's appreciation of human fossils. This way, people can promptly report fossil clues to relevant departments for timely tracking and excavation. In fact, many important fossils in China have been discovered through this approach [36].

3.4. Strengthen the identification and research of fossils

In recent years, although many stone materials have been found in the country, there has been a lack of published articles and limited progress in theoretical advancements. To advance the field, future efforts should aim to elevate research findings into theoretical frameworks, including challenging the theory of African origin and exploring the potential of human origins in Asia. By delving into these challenging areas and presenting compelling evidence and arguments, researchers can contribute to the development of more comprehensive and robust theories on human origins.

The research includes stratigraphic comparison, analysis of chemical elements and organic components, and determination of absolute dating. The dating results are crucial for identifying whether our interpretations of human fossils in the past are accurate and for establishing human evolutionary systems.

In terms of research methods, new approaches and technologies, such as digital statistical analysis, computer data processing and modeling, stone making and use simulation, and combination research and are being employed. Only by applying new research methods and technologies and conducting comprehensive investigations on a site or a cultural layer can we aid the development of ancient anthropology. This evolution involves moving from subjective to objective interpretations, from qualitative to quantitative analyses, and from one-sided to comprehensive perspectives.

3.5. Promoting crossover and collaboration

To unravel the enigma surrounding human origins, it is essential for researchers from diverse disciplines to collaborate closely and exchange knowledge. By continuously enhancing the quality and significance of research findings, Chinese paleoanthropology and prehistoric archaeology can achieve a substantial breakthrough in their international status and influence. In this era of rapid scientific and technological advancements, it is recommended that scholars engaged in anthropology research unite their efforts to expedite the resolution of challenging questions regarding human origin. By doing so, we can bring scientific conclusions to the centuries-long mystery and contribute to the advancement of knowledge.

In summary, China has a relatively strong foundation in the research field of paleoanthropology and related disciplines, and has the advantages of geographical location. The current focus is on nurturing a large pool of professionals, providing sufficient financial support, strengthening domestic and international exchanges, leveraging the experiences of international peers, and adopting the latest technical means to extract more information from the strata and specimens. Additionally, it is suggested that comprehensive elective courses on the origin of the universe, earth, biology and human beings should be offered in higher education institutions. This approach would enhance the scientific spirit among college students, cultivate exceptional young talents, and facilitate China's significant contributions to the global study of human origins.

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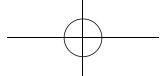
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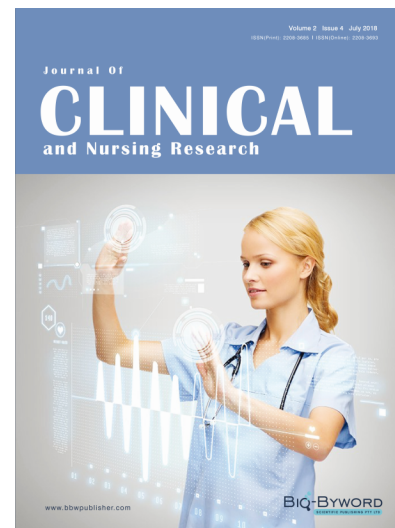
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