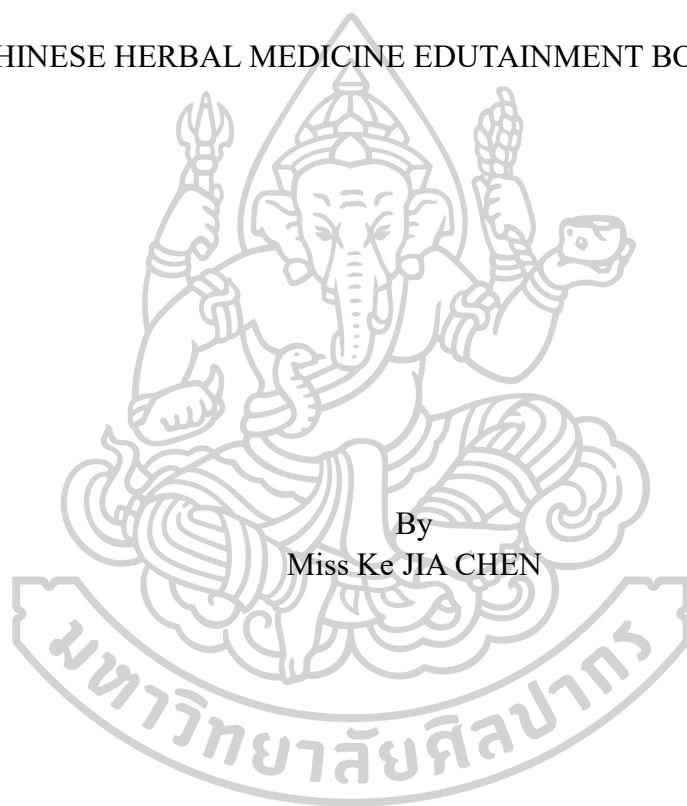




CHINESE HERBAL MEDICINE EDUTAINMENT BOARDGAME



By
Miss Ke JIA CHEN

A Thesis Submitted in Partial Fulfillment of the Requirements
for Master of Fine Arts Program in Design
Silpakorn University
Academic Year 2024
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โดย
MissKe JIA CHEN

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรศิลปมหาบัณฑิต

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ลิขสิทธิ์ของมหาวิทยาลัยศิลปากร



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Title Chinese Herbal Medicine Edutainment Boardgame
By Miss Ke JIA CHEN
Field of Study Program in Design
Advisor Associate Professor Dr. Supachai Areerungruang

Faculty of Decorative Arts, Silpakorn University in Partial Fulfillment of the
Requirements for the Master of Fine Arts

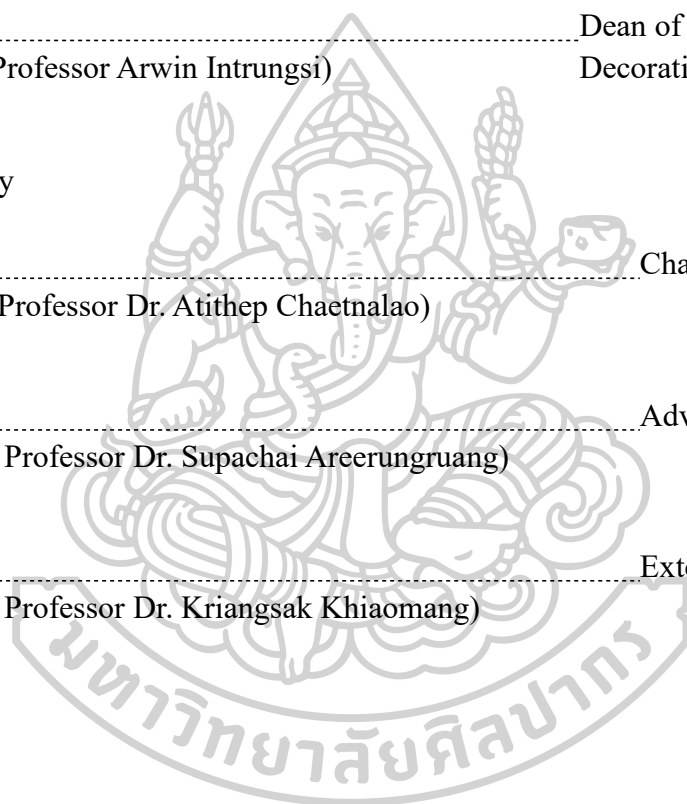
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Keyword : Chinese Herbal Medicine/ Board Game/ Education/ Children/ Qin Medicine

Miss Ke JIA CHEN : Chinese Herbal Medicine Edutainment Boardgame
Thesis advisor : Associate Professor Dr. Supachai Areerungruang

Traditional Chinese Medicine (TCM) shares a long-standing history and global recognition, yet faces significant challenges with only 20.69% of Chinese citizens possessing TCM cultural literacy. This cultural transmission crisis necessitates broader promotion of TCM knowledge, particularly within primary and secondary education systems. This study developed a Chinese herbal medicine board game, "I am a Little Miracle Doctor," targeting children aged 7-11, designed to enhance understanding of TCM concepts including herbal classifications, Four Properties and Five Tastes, Meridians, processing methods, and medicinal parts through gamification.

The study methodology involved comprehensive literature reviews, expert interviews, and questionnaire surveys to evaluate age-appropriate TCM knowledge, children's learning needs, and parents' expectations. Through multiple iterations and expert consultations, the final game design emerged from three prototypes, emphasizing key TCM concepts. The game was tested with 64 children aged 7-11 in Shaanxi, evaluating its educational value, entertainment appeal, cooperation elements, and strategic components.

Descriptive statistical analysis revealed high scores in three key dimensions: repeat play intention ($M=4.484$, $SD=0.713$), satisfaction ($M=4.453$, $SD=0.733$), and visual presentation effect ($M=4.438$, $SD=0.871$). The game's moderate difficulty level ($M=2.922$) aligned well with the target age group's cognitive abilities. Pearson correlation analysis indicated a significant negative correlation between player age and perceived difficulty, with older players finding the game easier. Player preference strongly correlated with perceived enjoyment. Paired t-tests demonstrated significant improvements in children's knowledge of Chinese herbal medicine types ($t=-4.200$, $p<0.01$) and Four Properties and Five Flavors ($t=-7.456$, $p<0.01$).

While the game's scope was limited by the number of herbs included, it successfully integrated TCM knowledge into an engaging educational format, effectively sparking children's interest and expanding cultural dissemination pathways. The study contributes to TCM cultural preservation and intergenerational knowledge transmission, offering a novel approach to traditional medical education.

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Secondly, I am profoundly thankful to my family for their unwavering support, encouragement, unconditional trust, and selfless dedication, which allowed me to pursue my goals fearlessly. I am also grateful to my siblings, whose assistance facilitated each step of the game-testing process. Their love has been my foundation, giving me the strength to move forward confidently.

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Finally, I would like to thank myself for never falling by the wayside.

In these two years of graduate school, I feel like a small boat on the river has crossed ten thousand mountains, profoundly experiencing a transformation in academics, life, and personal cognitive growth. Each experience has added color to my journey; now, a new chapter

of life unfolds before me.

Ke JIA CHEN



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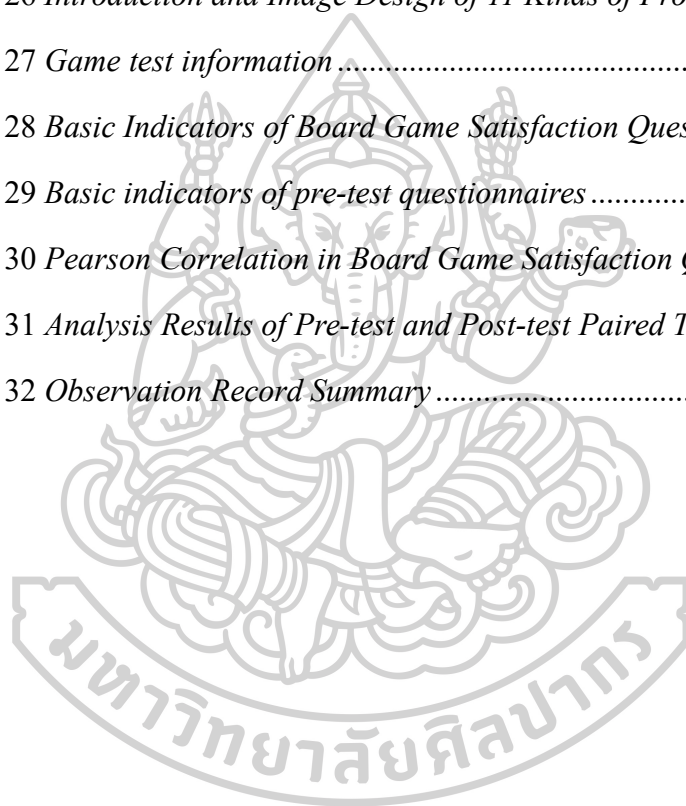
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CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

Chinese medicine has a long history. According to relevant books, Chinese medicine originated from primitive society. After a long development period, the theoretical system of Chinese medicine was roughly formed during the Spring and Autumn Period and the Warring States Period. After being compiled into books, it was spread and used in a broader scale(Ding & Guan, 2015). From the records in books such as Huangdi Neijing and Shennong Bencaojing, we know that the ancients began to study and use plants in nature to prevent and treat various diseases very early. In the development process, they combined theory with practice to make Chinese medicine culture continue to innovate, evolve, and develop in the long river of history(Mao et al., 2017).

Therefore, it not only carries the wisdom of the Chinese people in fighting against diseases for thousands of years but is also the most complete traditional medical system preserved in the world. According to relevant literature, traditional Chinese medicine includes many complex disciplines, such as Chinese medicine, acupuncture, cupping, and massage. Chinese medicine treatment is the earliest treatment method. It refers to a unique medicine used to help people prevent and treat diseases under the guidance of traditional Chinese medicine theory, which has a rehabilitation and healthcare effect(Xu et al., 2022; Wang et al., 2020); this is a critical identification point that can clearly distinguish TCM from other medical disciplines. TCM mainly comes from natural medicines and processed products of natural medicines, including herbal animal medicines, mineral medicines, and some chemical and biological products. Since TCM is herbal, primarily medicines, it is known as “all medicines are based on herbs,” TCM is also called “Chinese herbal medicine.”

Chinese herbal medicine refers to medicines obtained by directly using plants and plant forms or after special processing, and Chinese medicinal materials refer to the raw materials used to prepare Chinese herbal medicines, usually including the plants themselves or the roots, stems, leaves, flowers, fruits, seeds, etc. of plants, which are used as medicines after processing and special processing(Sun et al., 2014). Among the traditional high-quality Chinese medicinal materials, the most representative are authentic medicinal materials, medical products selected after long-term practice of traditional Chinese medicine after many clinical trials. Because of the excellent efficacy and the high environmental requirements of the plants themselves, they need to grow and pick in a specific geographical environment. Compared with the same kind of Chinese medicinal materials produced in other regions, the quality and efficacy of the same type of Chinese medicinal materials produced in a specific area are more stable have a higher reputation(Xiao et al., 2009).

Therefore, authentic medicinal materials are recognized by the Chinese pharmaceutical market and recognized by the Chinese pharmaceutical market and gradually gaining more attention worldwide. Although traditional Chinese medicine culture has a long history and profoundly and profoundly in China and the world, most Chinese people do not know much about Chinese herbal medicine. According to data released by the State Council of China in 2022, the Chinese citizens' literacy in traditional Chinese medicine is 20.69%. The document mentions the need to strengthen the research and dissemination of traditional Chinese medicine culture(2022). The inheritance and development of traditional Chinese medicine culture are facing enormous challenges and new crises. The core of TCM culture is authentic medicinal materials. The document "National Authentic Medicinal Materials Production Base Construction Plan (2018-2025)," jointly issued by the Ministry of Agriculture and Rural Affairs, the State Food and Drug Administration, and the State Administration of Traditional Chinese Medicine, clearly states that "the development of authentic medicinal materials is an urgent need to promote Chinese traditional culture"(2018). It is known that the country highly values TCM culture, and it is imperative to promote the intangible cultural heritage of TCM to the public, especially in the TCM cultural education of primary and secondary school students. The Opinions of the CPC Central Committee and the State Council on Promoting the Inheritance and Innovation of TCM pointed out that it is necessary to deepen TCM cultural education in primary and secondary schools and make it a cultural consciousness of the masses(2019). Therefore, implementing TCM culture into national education is the only way to spread TCM culture.

Based on this, improving TCM cultural literacy, health literacy, and cultural confidence is significant to contemporary primary and secondary school students. It is urgent to convey the culture of Chinese herbal medicine and develop authentic medicinal materials. It is imperative to build the inheritance and development of TCM culture.

1.2 RESEARCH QUESTION

Question 1: How can Chinese herbal medicine knowledge be classified so children can accept and learn it?

Question 2: How to broaden the way to spread and promote Chinese herbal medicine culture among children?

1.3 RESEARCH OBJECTIVES

1: Comprehensively and deeply understand the culture of Chinese herbal medicine and the mechanism of board games.

2: Visually transform the knowledge related to Chinese herbal medicine and fully integrate it into board games to give the game educational significance.

3: Develop themed board games to enhance children's knowledge of Chinese herbal medicine and recognition of Chinese medicine culture.

1.4 EXPECTED BENEFITS

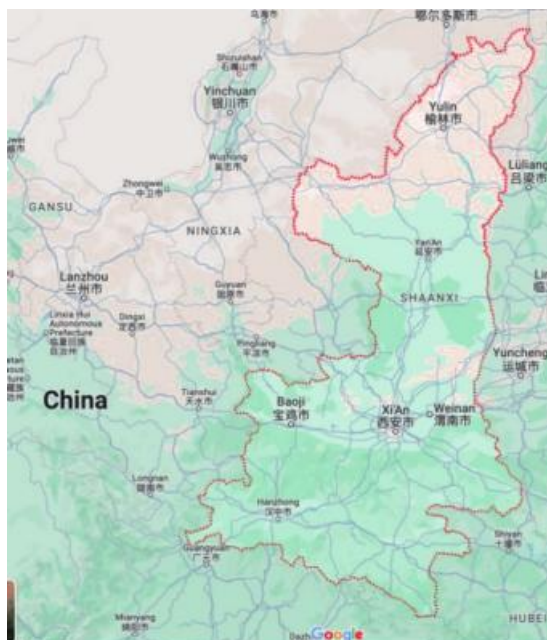
1: Fully integrate Chinese herbal medicine knowledge with board games.

2: Use board games as a communication channel to enhance children's cognition and recognition of Chinese medicine culture and increase communication efficiency.

1.5 SCOPE OF RESEARCH

The research scope of this paper is as follows:

(1) Geographical study area: The study area is Shaanxi Province (see Figure 1). Shaanxi Province is in the hinterland of China. Its terrain is long and narrow in the north and south and narrow in the east and west. It has a continental monsoon climate. Because the terrain spans many latitudes, it can be divided into three climate zones from south to north: subtropical, warm, and temperate. Therefore, Shaanxi has a diverse ecological environment(Ren & Han, 2010). Because of the rich resources of medicinal plants, it is known that "there is no idle grass in Qin." According the official data, the fourth survey of Chinese medicinal resources in China shows that Shaanxi has 3,291 kinds of Chinese medicinal resources and 2,730 types of botanical medicines, accounting for more than 30% of China's medicinal resources. Among them are 283 critical medicinal varieties, accounting for 77% of the country. It is also a key construction area in the 2018-2025 construction plan of China's authentic medicinal production base(2018).

Figure 1*Map of Shaanxi Province, China*

Note. Image from Google Maps.

(2) Scope of herbal medicine research: According to Shannxi Daily, Qin medicine are selected in this study from the list of 45 vaairieties from the authentic medicinal materials in Northwest China as cases(2020), namely *Salvia miltiorrhiza* Bge., *Cornus officinalis* Sieb.et Zucc., *Polyporus umbellatus* (Pers.) Fries, *Eucommia ulmoides* Oliv., *Bupleurum chinense* DC., *Corydalis yanhusuo* W.T.Wang, *Moschus berezovskii* Flerov, *Ziziphus jujuba* Mill.var:*spinosa* (Bunge) Hu ex H.F.Chou, *Gastrodia elata* Bl., *Astragalus membranaceus* (Fisch.) Bge., *Rheum palmatum* L., *Fraxinus rhynchophylla* Hance, *Gentiana macrophylla* Pall., *Polygala tenuifolia* Willd., *Physochlaina infundibularis* Kuang, *Bergenia scopulosa* T. P. Wang, *Fritillaria taipaiensis* P. Y. Li, *Asarum heterotropoides* F. Schmidt, *Gynostemma pentaphyllum* (Thunb.) Makino, *Astragalus complanatus* R.Br., *Polygonatum kingianum* Coll.et Hemsl., *Forsythia suspensa* (Thunb.) Vahl, *Scutellaria baicalensis* Georgi, *Rubia cordifolia* L., *Aconitum carmichaelii* Debx. (25 species in total) were the primary design studies.

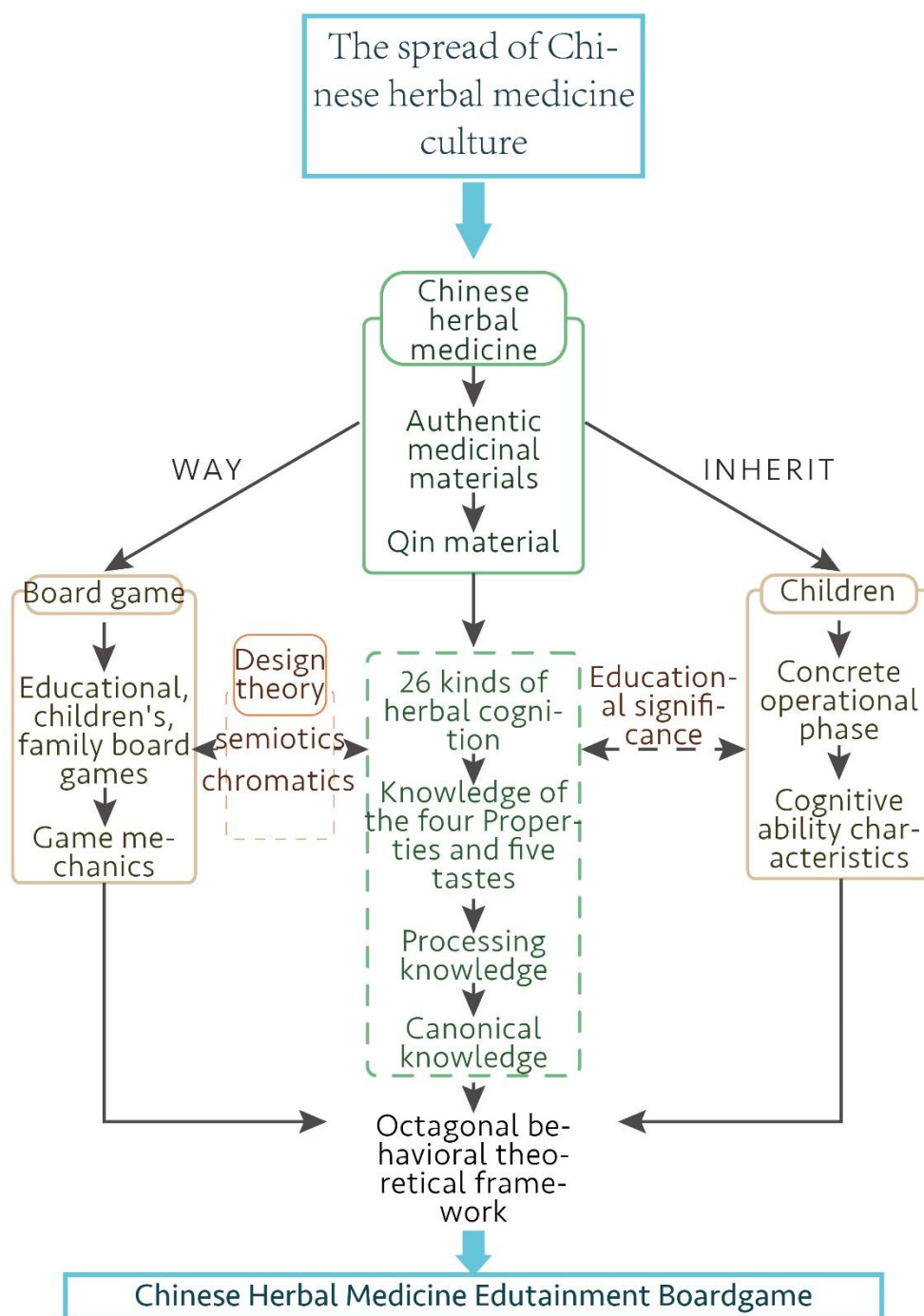
(3) Target population: In this paper, children aged 7-11 years old are selected as the research objects. At this stage, children have reached their teenage years and spend most of their time in social activities. Their cognitive ability has been improved, and they can detect life changes and observe natural properties. The received information can be thought, summarized, and integrated. Able to study and explore independently, looking forward to new knowledge, new experience, and new experience. Able to research and explore independently, looking forward to new

knowledge, new experience, and new knowledge; Use the learned knowledge to deal with and solve the problems encountered in life.

1.6 RESEARCH CONCEPTUAL FRAMEWORK

Figure 2

Research conceptual framework



Note. Illustrated by the author.

1.7 RESEARCH METHODS

The methodology of this study mainly uses quantitative and qualitative comprehensive research, including:

(1) Literature review: used to search for a large amount of relevant knowledge about Chinese herbal medicine, children's development characteristics, board games, semiotics, color science, and another related theoretical knowledge.

(2) Case study: Collect information and conduct feedback analysis on children's board games, educational board games, and Chinese herbal medicine-themed board games currently on the market.

(3) Questionnaire survey: used to investigate children's and parents' knowledge of Chinese herbal medicine, learning needs, and acceptance of board games.

(4) Observation method: In-depth observation of the characteristics of Chinese herbal medicine plants, the diagnosis process of traditional Chinese medicine, children's learning habits, living habits, game preferences, etc.

(5) Prototype design method: quickly create a draft to show the design ideas, then conduct self-testing, find out the defects and modify them, then conduct third-party testing, update the design version, conduct expert testing and update again, and improve the game design through repeated iterations.

(6) Intervention study: Conduct pre-game and post-game tests on children in questionnaires to compare whether their cognition and understanding of Chinese herbal medicine knowledge have improved and whether the board game developed and designed by this research institute is educational.

1.8 DEFINITION OF TERMS

(1) Chinese herbal medicine: Chinese herbal medicine is an integral part of traditional Chinese medicine. It originated in ancient China and is widely used for prevention, treatment, and rehabilitation. Chinese herbal medicine also has low side effects and high efficacy. Chinese herbal medicine is selected from plants or leaves, stems, fruits, or whole plants for medicinal use. It must be used under the guidance of traditional Chinese medicine practitioners.

(2) Children: From a legal perspective, children refer to those between 0 and 18 years old. They can be further divided into fetal period, neonatal period, infant period, toddler period, preschool period, school age, etc. Children have the characteristics of stage, imbalance, sequence, and difference in physical and mental development. According to the stage classification of children by the famous Swiss child psychologist Jean Piaget, he proposed that the theory of children's cognitive development stage has four stages: 0-2 years old is the perceptual operation stage; 2-7 years old is the pre-operation stage; 7-11 years old is the concrete operation stage; 11 years old and above is the formal operation stage.

(3) Board games: Originating from Germany, it is called GE-SELLSCHAFTSSPIEL in German, which means games played on the table or the

ground. Board games have experienced a long period of development, and there are more and more ways to classify them - according to game type, they can be divided into German games, American games board, etc.; according to game mode, they can be divided into: competition, cooperation, mixed, etc.; according to the game mechanism, they can be divided into: Card Driven, Area Movement, Betting/Wagering, etc.



CHAPTER 2

LITERATURE REVIEW

2.1 TRADITIONAL CHINESE MEDICINE AND AUTHENTIC MEDICINAL MATERIALS

2.1.1 CONCEPT OF “FOUR PROPERTIES AND FIVE TASTES” IN

TRADITIONAL CHINESE MEDICINE

The theory of TCM property is the core of the basic theory of TCM, which mainly includes four properties, five tastes, normalization, ups and downs, toxicity and non-toxicity, etc.(Wei, 2018). Among them, the theory of “four properties and five tastes” first appeared in Shennong’s Herbal Classic, whose secretary said that “medicine has five tastes of acid, salty, sweet, bitter and pungent, and four properties of cold, hot, warm and cool”(1999), and the medicinal properties and taste of drugs are called four properties and five tastes.

Four properties is “cold, hot, warm, cool,” four attributes; each attribute is used to reflect the different functional changes of the human body. Both cold drugs and cold drugs are negative from the attribute point of view and have the effects of clearing heat and fire, cooling blood and detoxification, clearing heat and relieving constipation, clearing heat and dampness, clearing heat and eliminating phlegm(Zuo et al., 2010). Warm drugs and heat drugs have the functions of warming the interior to dissipate cold, warming Yang to promote water, inducing fire to return to the original, warming channels, and clearing the channels(Yan, 2010). According to “Plain Question · True to great Theory”, cold is hot, hot is cold(Xie, 1999). In Shennong’s Herbal Classics · Preface, it was writing that “to cure cold with hot medicine, to cure heat with cold medicine.” To sum up, Cold and warm refers to the difference in degree, warm after hot, cool after cold. Four sex is relative, not an absolute concept; there are some drugs that cold and heat properties are not prominent, called parallel drugs, between cold and heat, and still not out of the range of four properties(1999). Through the four properties analysis, this study will classify and design “Qin medicine” based on the Four properties of traditional Chinese medicine in the follow-up research process.

The taste senses distinguish the five tastes, that is, the five different tastes of “sour, sweet, bitter, pungent and salty”, which reflect the taste and performance of drugs. Of course, some drugs don’t taste obvious: mild drugs and astringent drugs. Light medicine has no special taste, so it is generally believed that “light attached to sweet”, while astringent medicine and sour medicine have the same function, so they are called five tastes(Song et al., 2023), According to Li Shizhen’s Compendium of Materia Medica, pungent has the function of divergence, qi, moistening and nourishing(Li, 1800); sweet has the functions of supplementing, reconciling and

slowing down(He et al., 2018). According to Wu Huazu's Compilation of Compendium of Materia Medica, sour has the function of astringent and astringent(1809). Bitter has the tasks of draining, dryness and firmness(Lu et al., 2022). Salty: It functions soft and firm, diarrhea and so on(Wang, 2015). Through analyzing the five tastes, this study will classify and design "Qin medicine" based on the five tastes of traditional Chinese medicine in the follow-up research process.

2.1.2 THE SOURCE AND IMPORTANCE OF WARP THEORY

China's earliest medical classic "Huangdi Neijing," first involved the concept of return to the meridian: "The five tastes into, acid into the liver, into the lung, bitter into the heart, salty into the kidney, sweet into the spleen, is called five into"(Yao, 2016), its sister article "Lingshu • nine needles on" also has related stories, that is, acid walking tendons, pungent walking qi, bitter walking blood, salty walking kidney, sweet walking meat, is called five walk(Su & Wang, 2011). Both Shennong's Herbal Classic and Mingyi Bie Lu reflect the meridians of drugs. The former records that "Boshi: treats palpitations and soothes the five internal organs; Mahuang: treats stroke, typhoid headache; Lily: treats abdominal distension caused by evil spirits, heartache, etc." The latter says that "Zengqing: non-toxic. Mainly nourishes the liver and gallbladder, eliminating cold and heat; Puxiao: pungent, cold, non-toxic. It mainly treats heat accumulation caused by heavy food and drink; Weirui mainly treats qi accumulation in the heart and abdomen, deficiency heat, dampness and toxins, and low back pain."(Tao, 2013). Works including "Illustrated Materia Medica" also explain the importance of meridians from different perspectives. The theory was formed in the Northern Song Dynasty - Jin Yuan period; the founder of the Water Yi School of Traditional Chinese Medicine, Zhang Element, thought that different drugs belong to a certain one, and their effects on the zang-fu organs are very different. The same is true for the draining powder, Coptis main into the heart, lung, and spleen meridian, and dandelion into the liver, and stomach meridian. It's hard to hit the nail on the head when you don't understand the tropism. The sutra has been reflected as one of the essential contents in the book "Clean Ancient Pearl Sac"(Li, 1986). Wang Haogu learned from Zhang elements, and his book "Decoction Materia Medica" clearly indicates the return of each medicine, such as Rhubarb: Qi cold. Bitter taste, big cold. The taste is robust, and Yin is also healthy. Non-toxic. Start foot Yang Ming Jing(Wang, 2014). This has laid an immeasurable and solid foundation for developing Guijing studies in later generations. Shen Jinao, in the Qing Dynasty, wrote a book called "medicine and Prescription," which refers to the words "guiding classics," "walking," "entering," and "returning to the classics," so that the word "returning to the classics" was formally used(Shen, 1958).

Belongs to the drug effect, the meridian is the viscera meridian in the human body. In short, the meridian is the location of the zang-fu meridians acting on the human body. The channel is generally expressed by the twelve zang-fu meridians,

which are divided into liver, lung, stomach, spleen, kidney, heart, large intestine, bladder, small intestine, gallbladder, pericardium, and sanjiao(Wang et al., 2024). Zhou Fengwu, edited in “Practical Chinese Medicine,” pointed out that “drugs only have effects on a few or a certain menstruation, and the effect on other menstruation is little or no.” the importance of normalization is that it can improve the accuracy of medication(Zhou, 1985).

2.1.3 PROCESSING METHOD OF TRADITIONAL CHINESE MEDICINE

Traditional Chinese medicine has been processed for at least two thousand years. In primitive societies, ancient people found that after living with animals and plants for a long time, they would change the function of the human body or cure or poison. To be able to use these animals and plants accurately, ancient people carried out certain treatments, crushing, washing, selecting, etc., Chinese medicine processing thus sprouted(Liu, 2015). The emergence of fire makes the processing of traditional Chinese medicine not only a superficial treatment but also a difference between “raw and cooked,” and the appearance of wine lays the foundation for the processing method with auxiliary materials(Zhou, 2018).

In the Warring States Period, “Fifty-two Disease Prescriptions” is the earliest record of processing methods including clean, cut, water, fire, and water and fire together(Lang & Qu, 1983). “Leigong Paozhi Lun” is the first book that systematically talks about processing, which laid the foundation for the science of processing and made it an independent discipline. It summarized the processing methods and experiences before the Wei, Jin, Southern, and Northern Dynasties and innovated them, such as roasting, stewing, frying, calcining, refining, processing, measuring, flying, and hiding(Lei & Wang, 1985). “New Cultivation of Materia Medica” is the first pharmacopeia in China, and its contents explain the processing technology in detail, which was included in the Tang government’s medical students learn books(Xie et al., 2010). The Song Dynasty economy, culture and science and technology were in full bloom. Processing technology was in rapid development, “Taiping Huimin and Agent Bureau” recorded processing methods such as paper simmering, vinegar quenching, pound slices, water flying, noodles simmering, croton frost, strictly swill soaking and so on(Song, 1959). The contemporaneous “Certificate-type Materia Medica” indicates that the processing of Chinese medicine has matured(Qiu et al., 2024). Zhao Xuemin’s Collection of Compendium of Materia Medica reflects the study of processing technology in the Qing Dynasty, which pushed the processing method of traditional Chinese medicine to a new height(Zou et al., 2023).

After the founding of the People’s Republic of China, the state also attached great importance to processing technology and promulgated the “General rules of Chinese medicine processing,” “integration of Chinese medicine processing experience,” “Collection of traditional Chinese medicine processing methods,”

“Camphor tree Chinese medicine processing book” and other works have been published. In 2001, “Chinese Medicine Processing” was listed as a textbook for higher medical colleges. In 2006, Chinese medicine processing technology was listed as a national intangible cultural heritage. Processing technology in different regions has gradually formed different local schools: “Camphor tree Gang,” “Jianchang Gang,” “Beijing Gang,” and so on. The standard processing methods listed in the book “Chinese Materia Medica” are: Washing (cleaning impurities), bleaching (reducing a particular odor or toxicity by repeatedly cleaning and soaking), soaking (adding a particular drug juice or ingredient to clean water to wash a drug), staining (spraying water on the drug to soften it), water flying (after the drug is ground into a coarse powder, it is ground with water, and after standing, Take the bottom powder and grind it again until the texture is fine and slag-free.), calcining (changing the texture and effect of the medicine through fire), frying (placing it in a pot to heat and stir fry), shooting (roughly the same as frying, The difference is that the processing firepower is required to be more intense), simmering (small fire to slowly simmer the drug), moxibustion (add honey or sand to the drug mix), baking (use a small fire to slowly bake the drug dry), steaming (water heating), boiling (placed in water heating), quenching (after the drug is heated in vinegar or other drug juice, so that the drug fully absorbs the juice) thirteen methods(Gao, 2000).

Of course, the processing method of each drug is different, and the processing method of each drug is not unique. And it is necessary to analyze and process according to the specific efficacy you want to achieve.

2.2 DEFINITION AND CLASSIFICATION OF AUTHENTIC MEDICINAL MATERIALS

2.2.1 DEFINITION OF AUTHENTIC MEDICINAL MATERIALS

True is the essence of traditional Chinese medicine; as early as ancient times, there was a division of the quality of medicinal materials; according to Dong Zhongshu’s *Fan Ziji Ran*, Rhino horn, out of the south county, the price of eight thousand, three thousand, the next thousand. China’s ecological environment, geographical environment, and climate environment are rich and complex, so they must be carefully identified after the origin, color, shape, etc. Tao Hongjing, a Chinese medicine master in the Wei, Jin, Southern, and Northern Dynasties, first described “authentic medicinal materials.” He wrote: “Pinellia, the best Piniella today comes from Qingzhou and Wuzhong, and white meat is the best. The longer the storage time, the better.”(Tao, 1955). He graded them according to species, origin, and shape. The Ming Dynasty’s “Compendium of Materia Medica” clearly defined “authentic”. The book listed “authentic” entries under each medicinal material. For example, the book described Chinese yam as follows: The best ones are from Siming in the north and Henan today”(Sun et al., 2023).

With the progress of science and technology and the increasing demand for medicine, artificial cultivation of medicinal materials has gradually replaced wild medicinal materials. Authentic medicinal materials are recognized as the quality representative of excellent medicinal materials with excellent curative effect, With unique regional resources and characteristic industries, After a long period of natural and artificial selection, breeding, and formation(Liu, 2016). Chinese herbs must be processed before they can be used as medicine, so processing technology is also an essential guarantee of the high quality of authentic medicinal materials.

The 2023 First China Authentic Medicinal Materials Industry Conference and the National Chinese Medicinal Materials Rural Revitalization Conference emphasized the need to continue to develop the Chinese medicinal materials industry, consolidate poverty alleviation, and continue rural revitalization(Wang & Shang, 2023). Huoshan County is a good example. Its geographical conditions are unique, the land is fertile, and the products are abundant. It is an excellent environment for growing “*Gastrodia elata*”. Dongxixi Township has built a large-scale *Gastrodia elata* planting base by attracting investment and incorporating social and government resources. To increase production and farmers’ income, it has renovated old factory buildings, introduced new technologies, and protected the ecological environment through reasonable planting planning. It has built a primary school to improve educational resources, and the village’s collective income has increased by 300,000 yuan. In a true sense, it has achieved the goal of promoting rural revitalization with authentic medicinal materials(Zhu et al., 2023).

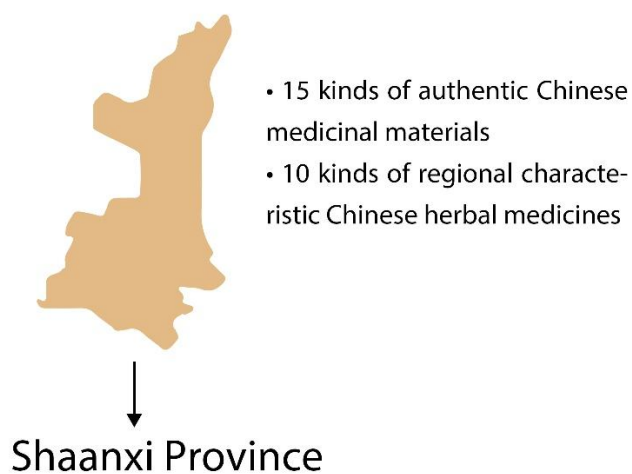
According to Li Chuyuan’s report “The biopharmaceutical and health industry will become a new economic growth pole in the Guangdong-Hong Kong-Macao Greater Bay Area”, China is a vast country with rich natural resources. Each region has its own suitable Chinese medicine for cultivation. The importance of developing authentic medicinal materials lies not only in its contribution to traditional Chinese medicine but also in bringing higher economic benefits to farmers during poverty alleviation, thereby promoting rural revitalization and rural development(Li, 2023).

2.2.2. AUTHENTIC MEDICINAL MATERIALS - THE CONCEPT OF “QIN MEDICINE”

According to “Notice on the Approval of the National Standard for Traditional Chinese Medicine”, the production areas of genuine medicinal materials can be divided into seven parts: Northeast (the main producing area of Guan medicine), North China (the main producing area of northern medicine), East China (the main producing area of Zhejiang medicine, Jiangnan medicine, Huai medicine, etc.), Central China (is the main producing area of Huaiyao medicine, pit medicine, etc.), South China (is the main producing area of southern medicine), Southwest (is the main producing area of Sichuan medicine, Guizhou medicine, cloud medicine),

Northwest (is the main producing area of Qin medicine, Tibetan medicine, and Uyghur medicine) (2018).

Qin medicine refers to the region of the ancient state of Qin, the present Shaanxi (see Figure 3), Ningxia, Gansu, and Qinghai region production of authentic medicinal materials. This paper will focus on the study of authentic medicinal materials in Shaanxi. Because of the relationship between Qin medicine and Shaanxi medicine, they are collectively called “Qin medicine” (see Figure 4). Shaanxi is China’s largest province of traditional Chinese medicine and is also known as China’s “natural herbal medicine library” and “hometown of Chinese herbal medicine.”, and the annual production of herbs in Shaanxi exceeds one million tons, creating several traditional Chinese herbal medicine breeding bases in the province, and the production chain of traditional Chinese medicine tends to be complete. Shaanxi Provincial Health Commission and eight other departments jointly issued the “Qin medicine” selection results of 15 kinds of large-scale traditional medicinal materials: *Salvia miltiorrhiza* Bge., *Cornus officinalis* Sieb.et Zucc., *Polyporus umbellatus* (Pers.) Fries, *Eucommia ulmoides* Oliv., *Bupleurum chinense* DC., *Corydalis yanhusuo* W.T.Wang, *Moschus berezovskii* Flerov, *Ziziphus jujuba* Mill.var.*spinosa* (Bunge) Hu ex H.F.Chou, *Gastrodia elata* Bl., *Astragalus membranaceus* (Fisch.) Bge., *Rheum palmatum* L., *Fraxinus rhynchophylla* Hance, *Gentiana macrophylla* Pall., *Polygala tenuifolia* Willd., *Physochlaina infundibularis* Kuang, 10 kinds of regional characteristics of Chinese herbs are: *Bergenia scopulosa* T. P. Wang, *Fritillaria taipaiensis* P. Y. Li, *Asarum heterotropoides* F. Schmidt, *Gynostemma pentaphyllum* (Thunb.) Makino, *Astragalus complanatus* R.Br., *Polygonatum kingianum* Coll.et Hemsl., *Forsythia suspensa* (Thunb.) Vahl, *Scutellaria baicalensis* Georgi, *Rubia cordifolia* L., *Aconitum carmichaelii* Debx. There are 25 kinds of fructus paniculata, *Fritillaria taibai*, *asarum chinensis*, *gynostemon chinensis*, milkvetch seed, yellow essence, *forsythia*, *Scutellaria baicalensis*, madder and aconite. Which has passed the national GAP (Good Agricultural Practice) certification are: *Gastrodia elata* Bl., *Gynostemma pentaphyllum* (Thunb.) Makino, *Polygonatum kingianum* Coll.et Hemsl., and other 7 kinds of national agricultural products geographical indication protection product certification: Shangluo *Salvia miltiorrhiza* Bge., Zizhou *Astragalus membranaceus* (Fisch.) Bge., Taibai *Fritillaria taipaiensis* P. Y. Li, Zhenba *Rheum palmatum* L. and other 18 varieties(2020).

Figure 3*Producing Areas of Authentic Medicinal Materials in China**Note.* Illustration by author.**Figure 4***Relationship between Chinese Herbal Medicine and Qin Medicine**Note.* Illustration by the author.

Therefore, this study will choose authentic medicinal materials in Shaanxi for design. On the one hand, the producing area of authentic medicinal materials in Northwest China accounts for 30% of the country, making it the largest producing area of medicinal materials in China, demonstrating its important position in the national medicinal materials market and highlighting the unique resource advantages of Shaanxi. On the other hand, this study is expected to help people better understand the authentic medicinal materials in Shaanxi and highlight regional characteristics. Strengthen people's recognition of Chinese herbal medicine culture so as to make positive contributions to Shaanxi rural revitalization and regional economic development.

2.2.3 BRIEF DESCRIPTION OF THE BASIC FUNCTIONS AND EFFICACY OF “25 QIN MEDICINES”

Based on the screening of Qin medicines in Shaanxi, this study consulted the “Pharmacopoeia of the People's Republic of China” (compiled by the Chinese Pharmacopoeia Committee, which is scientific and authoritative)(National Pharmacopoeia Committee, 2010) to review the knowledge of the four properties, five flavors, meridians, medicinal parts, processing methods, and main therapeutic effects of 25 kinds of herbs, aiming to clearly and deeply understand the efficacy and application of these herbs, and at the same time provide a simple basic cognitive framework for interdisciplinary research. The following is a detailed summary of the knowledge of “25 kinds of Qin medicines”(Table 1) :

Table 1

A Brief Description of The Basic Effects and Functions of 25 Traditional Chinese Medicines (National Pharmacopoeia Committee, 2022)

Serial number/Herb name	Four Proper ties	Five Taste s	Channel tropism	Medicated part	Processing method	Primary efficacy
1. <i>Salvia miltiorrhiza</i> Bge.	Cold	Bitter	Heart and liver	Roots and stems	Remove impurities, wash, moisten, cut thick slices and dry.	Promoting blood circulation to remove blood stasis and relieve pain through menstruation.

Serial number/Herb name	Four Proper ties	Five Taste s	Channel tropism	Medicated part	Processing method	Primary efficacy
2. <i>Cornus officinalis</i> Sieb.et Zucc.	Warm	Sour	Liver and kidney	Ripe flesh	Remove impurities and core, wash and dry.	Tonifying liver and kidney, receiving astringent solid shedding.
3. <i>Polyporus umbellatus</i> (Pers.) Fries	Neutral	Sweet	Kidney, bladder	The sclerotium of poraceae fungus Porus	After soaking, wash, moisten thoroughly, cut into thick slices and dry.	Relieve water and permeate dapness.
4. <i>Eucommia ulmoides</i> Oliv.	Warm	Sweet	Liver and kidney	skin	Remove impurities, wash, shred or dice, and dry.	Tonifying liver and kidney, strengthening muscles and bones, placenta.
5. <i>Bupleurum chinense</i> DC.	Cold	Bitter	Liver, gallbladder, lung	tuber	Remove impurities, rinse thoroughly, cut into thick slices, and dry.	Dispelling fever, soothing liver and relieving depression.
6. <i>Corydalis yanhusuo</i> W.T.Wang	Warm	Pungent	spleen, liver	tuber	Remove impurities, wash, dry, slice or mash.	Activating blood to relieve pain, sedation and hypnosis.

Serial number/Herb name	Four Proper ties	Five Taste s	Channel tropism	Medicated part	Processing method	Primary efficacy
7. <i>Moschus berezovskii</i> Flerov	Warm	Pungent	Heart and spleen	Dry secretions in the sachets of mature males of musk deer and musk deer (deer family).	Open the sachet, dry in the sun, and grind when necessary	Awaken the spirit, activating the blood to pass menstruation.
8. <i>Ziziphus jujuba</i> Mill.var. <i>spinosa</i> (Bunge) Hu ex H.F.Chou	Neutral	Sour	Liver, gallbladder, heart	Ripe fruit	Remove the hard shell, wash and dry, mash and use.	Nourishing the heart and nourishing the liver, calming the heart and calming the mind.
9. <i>Gastrodia elata</i> Bl.	Neutral	Sweet	liver	tuber	Remove impurities, wash, steam soft, cut thin slices and dry before use.	Calming liver-yang, dispelling wind and clearing collaterals.
10. <i>Astragalus membranaceus</i> (Fisch.) Bge.	Warm	Sweet	Spleen and lung	root	After removing impurities, wash, soak, cut into thick slices, and dry.	Tonifying qi and uplifting Yang, strengthening the surface and preventing perspiration.

Serial number/Herb name	Four Proper ties	Five Taste s	Channel tropism	Medicated part	Processing method	Primary efficacy
11. <i>Rheum palmatum</i> L.	Cold	Bitter	Spleen, stomach, liver, large intestine	tuber	Remove impurities and wash, soften and cut into pieces, dry and use.	Clearing heat and draining fire, cooling blood and detoxifying.
12. <i>Fraxinus rhynchophylla</i> Hance	Cold	Bitter	Liver, gallbladder, large intestine	Twig bark	Remove impurities and wash, soak thoroughly, cut into pieces or shreds, and dry before use.	Clearing heat and drying dampness, brightening eyes.
13. <i>Gentiana macrophylla</i> Pall.	Neutral	Pungent	Stomach, liver, gallbladder	root	After removing impurities, wash, soak, cut into thick slices, and dry.	Dispel wind dampness, clear damp heat.
14. <i>Polygala tenuifolia</i> Willd.	Warm	Bitter	Heart, kidney, lungs	root	After cleaning, moisten the cut and use after drying.	Calm the mind, dispel phlegm and reduce swelling.
15. <i>Physoclaina infundibularis</i> Kuang	Warm	Sweet	Lung and Heart Meridians	root	Wash and dry, crush when using.	Coughing, wheezing, insomnia.

Serial number/Herb name	Four Proper ties	Five Tastes	Channel tropism	Medicated part	Processing method	Primary efficacy
16. <i>Bergenia scopulosa</i> T. P. Wang	Neutral	Bitter	Stomach, spleen, lung, kidney, large intestine	tuber	Wash to remove impurities, slice and dry.	Chronic gastroenteritis, dysentery, edema.
17. <i>Fritillaria taipaiensis</i> P. Y. Li	Cold	Bitter	lung	bulblet	Wash and dry.	Moistening lung and eliminating phlegm to relieve cough.
18. <i>Asarum heterotropoides</i> F. Schmidt	Neutral	Pungent	Heart, liver, stomach	tuber	Remove impurities, spray water, slightly moisten, cut, dry.	Dispelling cold, expelling wind and relieving pain.
19. <i>Gynostemma pentaphyllum</i> (Thunb.) Makino	Cold	Sweet	Lung and kidney	tuber	Wash, dry and cut into sections.	Cold, headache, toothache.
20. <i>Astragalus complanatus</i> R.Br.	Warm	Sweet	Spleen, lung, kidney	Ripe fruit	Wash and dry before use.	Nourishing liver and brightening eyes, tonifying kidney and assisting Yang.
21. <i>Polygonatum kingianum</i> Coll.et Hemsl.	Neutral	Sweet	Lungs, heart, small intestine	tuber	Rinse, moisten, cut thick slices, dry and use.	Invigorating spleen, moistening lung and benefiting kidney.

Serial number/Herb name	Four Properties	Five Tastes	Channel tropism	Medicated part	Processing method	Primary efficacy
22. <i>Forsythia suspensa</i> (Thunb.) Vahl	Cold	Bitter	Lungs, heart, small intestine	fruit	sun-dry	Clearing heat and detoxifying, evacuating wind and heat.
23. <i>Scutellaria baicalensis</i> Georgi	Cold	Bitter	Lung, gallbladder, spleen, large intestine, small intestine	root	Remove impurities and rinse, place in a steaming container with water and warm sheet, dry before use.	Clearing heat and drying dampness, purging fire and detoxifying.



24. <i>Rubia cordifolia</i> L.	Cold	Bitter	liver	tuber	Remove impurities and wash, moisten and then cut thick slices, dry and use.	Cool blood, remove stasis, stop bleeding.
25. <i>Aconitum carmichaelii</i> Debx.	Hot	Pungent	Heart, kidney, spleen	The child root after processing	Stir-fry the river sand in a wok with a martial fire, then add the attached pieces, stir-fry until it bulks up and becomes hot, remove, sieve the sand, let cool before use.	Return Yang to save the reverse, replenish fire to help Yang.

Note. Compiled from the Chinese Pharmacopoeia Committee.

2.2.4 CLASSIFICATION BASED ON THE FOUR PROPERTIES, FIVE TASTES, AND PROCESSING METHODS OF QIN MEDICINE

2.2.4.1 CLASSIFICATION BASED ON FOUR PROPERTIES

The four properties refer to the properties of the drug, namely “warm”, “hot”, “cold”, “cool” and “neutral”, which represent the effect of the drug on the human body during the treatment of disease. Table 2 will classify and summarize the Four Properties of the “25 Qin medicines” above. The summary of the “four properties” of these herbs aims to provide clear guidance in the follow-up research process.

Table 2
Classification Based on Four Properties

Serial number	Warm	Hot	Neutral	Cold
1	<i>Eucommia ulmoides</i> Oliv.	<i>Aconitum carmichaelii</i> Debx.	<i>Polyporus umbellatus</i> (Pers.) Fries	<i>Rheum palmatum</i> L.
2	<i>Corydalis yanhusuo</i> W.T.Wang		<i>Ziziphus jujuba</i> Mill.var. <i>spinosa</i> (Bunge) Hu ex H.F. Chou	<i>Fraxinus rhynchophylla</i> Hance
3	<i>Moschus berezovskii</i> Flerov		<i>Gastrodia elata</i> Bl.	<i>Scutellaria baicalensis</i> Georgi
4	<i>Polygala tenuifolia</i> Willd.		<i>Gentiana macrophylla</i> Pall.	<i>Rubia cordifolia</i> L.
5	<i>Physochlaina infundibularis</i> Kuang		<i>Bergenia scopulosa</i> T. P. Wang	<i>Salvia miltiorrhiza</i> Bge.
6	<i>Cornus officinalis</i> Sieb.et Zucc.		<i>Polygonatum kingianum</i> Coll.et Hemsl.	<i>Bupleurum chinense</i> DC.
7	<i>Astragalus complanatus</i> R.Br.		<i>Asarum heterotropoides</i> F. Schmidt	<i>Forsythia suspensa</i> (Thunb.) Vahl
8	<i>Astragalus membranaceus</i> (Fisch.) Bge.			<i>Fritillaria taipaiensis</i> P. Y. Li
9				<i>Gynostemma pentaphyllum</i> (Thunb.) Makino

Note. Compiled and analyzed by the author.

2.2.4.2 CLASSIFICATION BASED ON FIVE TASTES

Through the classification of the five tastes knowledge “sour,” “salty,” “bitter,” “sweet” and “pungent,” the above “25 Qin medicines” were classified (Table 3), and the relationship between herbs and herbs was found, aiming to provide ideas for subsequent research and design.

Table 3

Classifies Based on Five Tastes

Serial number	Sour	Salty	Bitter	Sweet	Pungent
1	<i>Cornus officinalis</i> Sieb.et Zucc.		<i>Salvia miltiorrhiza</i> Bge.	<i>Polyporus umbellatus</i> (Pers.) Fries	<i>Asarum heterotropoides</i> F. Schmidt
2	<i>Ziziphus jujuba</i> <i>Mill.var.spinosa</i> (Bunge) Hu ex H.F.Chou		<i>Rheum palmatum</i> L.	<i>Eucommia ulmoides</i> Oliv.	<i>Gentiana macrophylla</i> Pall.
3			<i>Fraxinus rhynchophylla</i> Hance	<i>Gynostemma pentaphyllum</i> (Thunb.) Makino	<i>Corydalis yanhusuo</i> W.T.Wang
4			<i>Polygala tenuifolia</i> Willd.	<i>Gastrodia elata</i> Bl.	<i>Moschus berezovskii</i> Flerov
5			<i>Fritillaria taipaiensis</i> P. Y. Li	<i>Astragalus membranaceus</i> (Fisch.) Bge.	<i>Aconitum carmichaelii</i> Debx.
6			<i>Forsythia suspensa</i> (Thunb.) Vahl	<i>Physochlaina infundibularis</i> Kuang	
7			<i>Scutellaria baicalensis</i> Georgi	<i>Astragalus complanatus</i> R.Br.	
8			<i>Rubia cordifolia</i> L.	<i>Polygonatum kingianum</i>	

Serial number	Sour	Salty	Bitter	Sweet	Pungent
9			<i>Bergenia scopulosa</i> T. P. Wang	Coll.et Hemsl.	
10			<i>Bupleurum chinense</i> DC.		

Note. Compiled and analyzed by the author.

Through the research and analysis of 25 kinds of Qin medicines and the analysis and induction of the four properties and five tastes, it was found that “salty” and “cool” medicines were lacking. To show the basic theory of “four properties” and “five taste” Chinese traditional medicine comprehensively in the subsequent design and research, *Monetaria annulus* (National Pharmacopoeia Committee, 2022), which belongs to both “salty” and “cool” medicinal materials, was added (see Table 4). The design and research were carried out jointly with the Qin mentioned above Yao, a total of 26 kinds of traditional Chinese medicine, and the visual transformation design and study of “four properties” and “five tastes” were carried out from the perspective of semiotics and color science.

Table 4

Brief Description of the Basic Functions and Effects of Monetaria Annulus

Serial number/Herb name	Four Properties	Five tastes	Channel tropism	Medicated part	Processing method	Primary efficacy
26. <i>Monetaria annulus</i>	cool	salty	Bladder and liver	The shell of baby shellfish, ring shellfish, etc	sun-dry	Edema of water and air, urinary obstruction

Note. Compiled and analyzed by the author.

2.2.4.3 SUMMARY OF PROCESSING METHODS BASED ON 26 HERBS

The processing of Chinese herbs refers to the physical and chemical methods they need to be processed through, which is an important step in the processing and preparing Chinese medicine. The purpose is to enhance the therapeutic effects of the medicine or reduce its toxicity. Chinese herbs must be processed before they can be used as medicine, which is one of the features of traditional Chinese medicine and an

important part of traditional Chinese medicine (Wang, 1998). Based on a summary of the processing methods of 26 herbs: washing, drying, cutting (slices, segments, threads), drying in the sun, spraying, moistening, grinding into fine powder, processing method, soaking, steaming, and pounding. The following provides a specific introduction to 11 processing methods (see Table 5):

Table 5

Introduction to the Processing Methods of 26 Kinds of Herbal Medicines

Serial number/Preparation Method	Processing method introduction
1. ablution	It refers to the original drug placed in clean water to wash the sediment impurities on the surface of the drug.
2. desiccation	The process of removing moisture from wet materials by gasification.
3. slice, segment, silk	After washing and softening the medicinal materials, according to the texture of soft and hard or individual size, thickness, etc., with a machine or artificial cut to make sheet processing process.
4. sun-dry	Place the medicinal materials or preparations in a dry place with air circulation and air dry naturally. The drying method can remove water and improve the quality and stability of medicinal materials, and is often used in the preliminary treatment of various Chinese medicinal materials.
5. spray	A method of softening medicine by spraying or drenching it with water.
6. embellish	Cover with wet cloth, wet sack and other wet things, often spray an appropriate amount of water, keep moist state, so that the external water of the medicinal materials slowly penetrates into the internal tissue, to achieve the same internal and external humidity, easy to cut.
7. levigate	The medicine is mashed or ground into powder.

- | | |
|----------------------|--|
| 8. Processing method | The gun needs to fire so hard that the drug is bloated and soft. |
| 9. steep | To reduce the intensity or toxicity or irritation of the original drug by soaking. |
| 10. steamed | The method of putting the purified medicine with or without excipients (steaming) into the steaming container and heating it with steam or isolated water to a certain extent is called steaming. |
| 11. mash | When ramming, the Chinese medicinal materials are ground, rolled and other operations, so that it is in the form of small particles or powder, in order to facilitate the subsequent frying, soaking or into pills, powder and other preparations. |

Note. Compiled and analyzed by the author.

2.3 COMBINATION OF BOARD GAMES AND CHINESE HERBAL MEDICINE

2.3.1 DEFINITION AND TYPES OF BOARD GAMES

The original concept of board games refers to the game played face to face at a table, on a board marked with a specific pattern, by moving pieces against players. The new definition of modern board games is to promote the progress of the game by implementing the game rules on the limited graphic layout, making the corresponding objects move and place (Lu, 2022). It can be seen that board games are not new; the earliest can be traced back to about 3000 BC, when they were found in the tomb of the Egyptian pharaoh Tutankhamun Senet (Tristan, 2018). Although board games have a long history, people have not weakened their popularity with the passage of time, but have derived into various fields, such as language, mathematics, science, medicine, psychology, quantum mechanics, and so on (Fabio & Maria Gabriella, 2016; Frederick et al., 2019).

Board Game Geek (hereinafter referred to as BGG), is the world's largest and most authoritative board game fan forum (Board Game Geek), almost 99% of the board games can be found on this website, according to the BGG official website of the board game types classified as many as 80. Gstone Games is a large Chinese user group of table information platszabls, and BGG also has a game database, evaluation system, ranking, and other functions. Board games are complex and comprehensive games (gstonegames). The author synthesized BGG and Gstone games and classified them according to common types of games (see Table 6).

Table 6
Types of Board Games

Type name	Type introduction	Representative works
1. Abstract policy class	This type of game has no hidden information, unknowns, or context, and is generally a game in which two or two groups of players compete over a limited number of rounds.	<i>Weiqi</i> <i>Chinese chess</i> <i>Mahjong</i> <i>Chinese checkers</i>
2. Customizable class	Usually based on card types, players build their own game accessories after obtaining cards through collection, layout and other ways. Within the scope of the rules, players can match their own accessories, and the game accessories used by each player are unique. Such games have a very large system, there are many sub-categories: CCG (collectible card games), CDG (collectible dice games), CMG (collectible model games), LCG (growth card games) and TCG (collectible card games) and so on.	<i>Arkham Horror: The Card Game</i> <i>Android: Netrunner</i>
3. Subject class	Such board games have a strong story background, the typical player will play a role in the game, bring the story to experience the plot and fun of the game. American games generally fall under the theme category	<i>Plague Crisis</i> <i>Deer Harbor</i> <i>Maze</i>

4.Family category	Suitable for the family to play together games, such board games are characterized by attention to the cooperation between players, the game is happier, the theme is more broad and common, the game length and game difficulty is moderate, tend to cultivate a harmonious atmosphere of the family, win-win games, competitive is not strong.	<i>The Islands of Catan</i>
5.Children category	The rules are relatively simple, the joy is relatively strong, and it is also suitable for the icebreaker in social activities. Different types of children's board games train children's ability is also different, educational children's board games mainly train children's knowledge and skills; The strategy class focuses on children's thinking ability, decision-making ability and strategic planning ability; Intelligent board games can cultivate children's logical ability, reasoning ability and problem-solving ability; Cooperative board games foster teamwork and communication skills between players; Creative board games pay more attention to children's imagination and creativity, and express their ideas and feelings through children's unrestrained thinking	<i>UNO</i> <i>Pixy Cubes</i> <i>Go go gelato</i>



- | | | |
|---------------|---|-------------------------------------|
| 6. Congregate | Generally, many players can participate in the game, high playability, strong interaction, pay attention to the player's language expression ability, communication ability, cooperation ability, to create a cheerful, tense, lively atmosphere. | <i>The Werewolf Killing Avalon</i> |
| 7. Strategy | Such games test the player's thinking ability very much and are called heavy strategy games, that is, heavy strategy games. Every decision of the player affects the direction of the whole game, and a small move even affects the win or lose of the game, which requires the player to think carefully, calculate, judge and so on. Strategy board games are characterized by clear and generally complex rules, perfect mechanics without loopholes, and obvious antagonism between players, and most German games can be classified as strategy board games. | <i>The Power Company Ark Zoo</i> |
| 8. War flags | Also known as war games, generally speaking, this kind of game involves the strategy game of military action, using chess pieces, cards, models and other tokens to simulate exercises on the map. Themes are: history, fantasy, future, science fiction and so on. | <i>Annals of The Three Kingdoms</i> |

Note. Compiled and analyzed by the author.

Through the definition and category analysis of board games, the author preliminarily focuses on the theme of children based on the research goal of improving children's knowledge and identification of Chinese medicine culture.

2.3.2 SERIOUS GAMES AND BOARD GAMES

The words "serious" and "game" seem to conflict, and in general, people seem to associate fun with games rather than seriousness. In his book *Serious Games*, Clark. C. Abt explains this concept: Explicitly designed for games with a purpose that goes beyond mere entertainment(Clark, 1987). Game designers Michael and Chen also provide a definition of serious games: serious games are games whose primary goal is education, not entertainment(Michael & Chen, 2005). It can be seen that serious games are entertaining, but not just for fun. On the contrary, games designed solely for entertainment are not serious games, and this concept temporarily divides games into serious games and non-serious games.

The essence of traditional games is entertainment, enjoyment of the fun in the game process, and the sense of achievement brought by the game victory, while the essence of serious games is education as the main goal, and the educational goal is achieved by integrating game elements into the educational process (Clark, 1970). Although traditional games themselves have educational significance, they pay more attention to entertainment value and have no clear educational goal. Whether education is the main goal is an important sign to distinguish serious games from traditional games. Second, there is a difference in motivation between the two, with players often engaging in traditional games driven by curiosity and self-challenge, while serious gamers engage in games to achieve specific educational goals, acquire effective knowledge and skills, and develop problem-solving skills. Third, the two evaluation methods are also very different; traditional games do not have a clear educational goal, so there are no clear evaluation criteria, while serious games need to have corresponding tests to assess the mastery of knowledge.

Although both serious games and traditional games involve game elements, their essence and goals are obviously different, and their forms include but are not limited to electronic games, VR, AR and other experiences. Board games are one of the many forms of serious games. Although the scope of serious games is much larger than board games, they have an intersection, and this intersection is educational board games. Educational board games have the educational goal of serious games and are compatible with the form and entertainment of board games. In a narrow sense, educational board games are a specific application form of serious games in the field of education.

Educational board games also have a clear educational goal, aiming to teach specified knowledge and skills through games. It is a tool to help students learn by combining educational content with the form of board games. Full of interesting game fun and interactive cooperation, boring learning content can be well conveyed to players. Players in the game, through challenges, the level, cooperation, communication, collaboration, question and answer, and other modes to win the game, and the reward mechanism to the player instant feedback, encourage players to repeatedly play the game so as to achieve the purpose of education.

By analyzing and sorting out the concept of serious games, this study once again focuses on educational-themed board games. Since the theme of board games is not unique, combined with the target group and the way of the use of this study, this paper will design the theme of comprehensive education, family, and children.

2.3.3 ADVANTAGES OF USING BOARD GAMES IN EDUCATION

Through the changes in The Times, board games have long been innovated in various aspects such as mechanism, style, and art, and the usage scenarios are not only limited to party entertainment. The use of board games in educational scenes has been proposed as early as the 1990s (Joan & Homo, 1955). At the same time, research

shows that the use of board games in the learning process can arouse students' interest and make them actively participate in learning, and in this process, students' communication, strategy, thinking, cooperation, and other abilities can be improved (Sri & Atika, 2019; Chen, 2010; Wong & Yunus, 2021).

Different from other games, the advantages of board games are also clear. Board games are educational in themselves (Rahayu & L., 2013), which can be carried out by simply planning and organizing activities after setting learning goals (Luliana & Ana, 2020), not only has low cost and easy access, but also has wider applicability and flexibility (Jonas da Silva et al., 2024). In addition to developing mental agility, it also improves the player's ability to recover quickly in times of adversity. Board games promote interaction with classmates, teachers, parents, and other close relationships, and these social behaviors can promote learning (Conrad et al., 2007). Compared with other games, board games make it easier to acquire new knowledge and it is more effective in improving scientific and health knowledge (Andrea et al., 2019), such as Kaledo, a game from Italy. Through the experiment of the control group, the author found that students in the treatment group had a significant increase in weekly intake of vegetables, which proved that this board game could not only improve students' health knowledge but also affect their behavior changes in daily life (Amaro et al., 2006). Bacttle is a microbiome board game that greatly improves children's understanding and awareness of microbiome knowledge through research findings (Salvatore et al., 2024).

Therefore, board games are an ideal tool to help students learn new things and entertain them at the same time. A study has shown that most children enjoy playing board games, and parents will buy fun board games for them (Miguel, 2020). This encourages them to actively learn the rules of the game and study the gameplay, and as students continue to challenge and discuss the board game, knowledge will naturally be acquired.

2.3.4 MECHANICS OF BOARD GAMES

At present, there is no research that clearly shows which mechanisms are applicable and which are not applicable to educational children's board games, so the following is a unified analysis of common board game mechanisms. The official website of BGG shows 192 kinds. Samarasinghe and other researchers extracted and analyzed the relevant mechanisms of the top 10,000 board games ranked on the official website of BGG, totaling 182 kinds of mechanisms. The top 10 most-used game mechanics are Dice Rolling, Hand Management, Variable Player Powers, Set Collection, Hexagon grid Grid, Simulation, Card Drafting, Area Majority/Influence, Modular Board, Tile Placement, Hand Management, Variable Player Powers, and Worker Placement have become increasingly popular among designers in recent years (Dilini et al., 2021).

By collecting information about educational and children's board games on the BGG website, children's board games suitable for 7–11-year-olds were selected, and game mechanics were extracted from the top 10 games (see Table 7 and Table 8).

Table 7

BGG Ranked the Top 10 Board Games for Children Aged 7-11

Serial number/Game name	Game mechanics	Game duration
1. Defending the Campus: Evolution	Point-to-point movement, variable player abilities, roll dice	5-15min
2. The tortoise and the hare	Betting and betting, hand management, racing	15-25min
3. Da Bao	Action response, pattern recognition	15min
4. Karak	Roll dice, variable layout, plate placement	45min
5. Kingdom of Throwing Stones	Action response	20-30min
6. The Three Little Pigs	Roll the dice, play for luck	20min
7. Cheeky monkey	Luck, set of collection	15min
8. Mystery event book Moonstone adventure	Storytelling, variable player abilities, reasoning	30-45min
9. Fireball Island	Hand management, dice casting, action response	45min
10. SOS DINO	Plate placement	25min

Note. Compiled from Board Game Geek.

Table 8
Top 10 Educational Board Games for Ages 7-11

Serial number/Game name	Game mechanics	Game duration
1.Battle for the hill	Multi-purpose card, point-to-point movement	15-45min
2.Aversion	Paper-and-PencilReal-Time	5-15min
3.Chametz	Roll / Spin and Move	30min
4.Divvy	Dice RollingHand Management	40min
5.Electric Card	ConnectionsHand Management	15-30min
6.All Masjid	EventsRoll / Spin and Move	55min
7.Monsters Outnumbered	Hand Management, Multi-Use Cards	15-20min
8.Mythical Beings	Campaign, Battle Card Driven, Deck Construction	25-45min
9.Mythology	Hand management, open drafting	30min
10.Pasaporte	Acting, Dice Rolling, Role Playing	30-90min

Note. Compiled from Board Game Geek.

Firstly, 11 game mechanisms were extracted through the top ten used tabletop game mechanisms in the tabletop games included in the BGG website, and the favorite tabletop game mechanisms of designers in recent years, and secondly, 18 game mechanisms applicable to children aged 7-11 years old were extracted through the top ten ranked educational tabletop games and children's tabletop games collected in the BGG website, and a total of 29 game mechanisms which are common and in line with the present study have been collected (see Figure 5).

(1) Dice: Dice are the most common props in board games, which can be used for random verification, counting, marking, determining the order, and so on.

(2) Hand management: Players need to arrange the layout of the hand through a certain strategy so as to play the advantage, with the current situation and the expected effect to play the most advantageous combination or order. Hand

management requires players to compete for the most valuable cards under special conditions, and the advantage of this mechanism is that players do not need to fight for cards quickly, nor do they need to play cards in order.

(3) Variable player ability: There will be different abilities between players, and the means of winning may not be the same, but the winning conditions are generally the same. In some games, player abilities increase or decrease as the game progresses.

(4) Set Collection: The player's condition for winning is to collect a set of items.

(5) Hexagon grid: many hexagonal small squares form a large area, six directions can be moved, often used in board games.

(6) Simulation: A game that simulates real events/worlds.

(7) Card selection: commonly seen in card drive games, the fun of this mechanism is that the randomness is very strong; players draw a certain number of cards from the public card library, complete the task of the card or collect some cards to obtain the victory of the game; Some games require players to pass unwanted cards to the next player until they are satisfied, which requires players to not only think about their own cards but also to observe the cards in the hands of players on the field.

(8) Regional control: Different areas in the board game map have different effects, resources, rewards, penalties, and other effects; players will represent their own token sent to different areas in order to obtain the ownership of the area so as to win resources, rewards, and achieve the final victory. Of course, players need to compete, match, fight, and other actions to fight for ownership or drive out other players.

(9) Module edition layout: This type of game is to assemble small cards or boards into game boards. In order to make the experience of each game different, random cards or boards are used at the beginning of the game or during the game process, and some games will have multiple boards.

(10) Plate placement: the player will arrange the fixed plate according to the rules of the game the plate will link through the game, and the splicing between the plate and the plate will produce different game effects which may be directly to get scores, maybe to get special rewards, maybe to hinder the opponent's game process, such mechanism is placed for the plate.

(11) Worker's placement: Players should reasonably allocate human resources among their opponents, taking full account of time cost and labor cost, to benefit. The key to winning the game is whether the manpower in their hands is sufficient to support the plan formulated by the player and whether the player's plan can maximize the advantage of manpower and time. In some games, the number of human resources is fixed in others, human resources are gained or lost in certain ways. Worker placement mechanics are more common in German games, where players place their workers in different modules or areas to grab resources, and the more areas they can move, the stronger the action.

(12) Point-to-point movement: The player can occupy the territory with markers and move from point to point.

(13) Betting and betting: This type of mechanic encourages players to bet on an outcome to win the game.

(14) Style recognition: Pieces or cards with different styles are randomly placed on the court, and players need to quickly determine whether a certain style or a certain combination can win the game.

(15) Race: Under the rules of the game, who reaches the end or goal first can determine the game's victory.

(16) Action reaction: Players need to quickly complete the victory conditions given by the rules, which can be judged as victory and test the reaction speed of players.

(17) Variable Layout: Performed on a layout consisting of multiple layouts or cards that are randomly placed so that different strategies are required to achieve game victory.

(18) Each player will have a certain number of holdings, which may be acquired at the beginning of the game or during the game. The player's goal is to destroy the other family's holdings and prevent their own holdings from being destroyed, such mechanics are usually personal battles, there is only one winner.

(19) Storytelling: Players are given some information at the beginning of the game, and during the game, players need to use this information to tell a story.

(20) Reasoning: In the game, the player will get some information through the analysis of this information to deduce the truth.

(21) Multi-purpose card: refers to a card has multiple uses, can be played in a variety of ways, this mechanism requires players to make the best decision between different options, test the player's strategic ability. Common forms include resource and action selection, multi-function card surface, and so on.

(22) Pen and paper: Players record the result of rolling dice or card function and other random results on paper. This mechanism is simple and easy to use and can also meet the needs of multiple people to participate at the same time.

(23) Instant: Players are required to complete actions within a limited time, not in rotation. This mechanism tests the player's ability to withstand pressure and make quick decisions, adding excitement and tension to the game.

(24) Roll, Spin, and Move: Players roll dice, turn tables, card moves, etc., to determine the number of moves or direction of an action, which relies on randomly generated results.

(25) Network/Route Building: Common in traffic games, this is a form of building and connecting to achieve the game's goals.

(26) Card Driven: Players advance the game through the cards they play. The functions of the cards may affect the player's actions, resources, etc. The player needs the cards of the opponent for planning and arrangement.

(27) Deck Building: This mechanic deeply affects the player's resources and strategy in the game, which requires the player to purchase cards throughout the game and gradually build their own card library.

(28) Open Drafting: Players can select cards, items, and resources from a public pool of options to win the game. This mechanic focuses on the player's strategy, and players have to make tradeoffs as they progress through the game.

(29) Role-playing: Players play a Role in a game. Generally speaking, such games have a strong story background. Players make actions and decisions through the perspective of the story characters to promote the game, and a strong sense of engagement improves the interaction between players.



From 2 to 7 years old, they are in the pre-operational stage, in which they can use language and symbols to represent objects and things, but their thinking remains self-centered, and they are less capable of other people's ideas and opinions. Although they have the ability to imitate and pretend games, they do not have the ability to perform logical calculations.

7-11 years old for the concrete operation stage. This stage of children's thinking is more logical and systematic, but only in the concrete things and events to carry out logical thinking operations, but also understand that the number of objects will not change due to changes in shape or appearance, that is, conservation concept. At this point, they already have logic, deduction, reversibility, causality, categorization, transitivity, and the elimination of egocentrism.

Over the age of 11, children at this stage have been able to deal with abstract and hypothetical problems in their intellectual development and can carry out abstract thinking, logical reasoning, systematic planning, and other abilities. At this time, they can fully think scientifically, formulate hypotheses, and systematically implement and verify them.

Play is an important source of enhanced cognitive development for children, who are naturally curious and love to use play to explore novel ideas and show rich imagination. Between the ages of seven and eleven, children begin to acquire the skills of operational reasoning and are able to understand cause and effect using classification, which is the golden age for developing logical thinking skills, relying on concrete images to understand concrete things.

Studies have shown that the more time students spend playing every day, the faster their cognitive ability will be enhanced with the extension of playing time (Carrie et al., 2016). In order to lay a solid foundation for the formal operation stage, considering that 7-11 is the stage of children's greatest curiosity, it is necessary to rely on specific images to help them understand specific things. The brain shape of children at this stage is basically the same as that of adults, which is an important period for them to receive education and learn knowledge and skills. Moreover, considering that students above the age of 11 enter junior high school, and the learning task and time are more urgent than that of primary school, the author chooses children aged 7-11 as the research object, who just enter primary school at this time and are full of desire for knowledge and the world. It is also an important stage to receive education. Board games are used to encourage them to train and learn knowledge and skills faster. The strong interest and interaction of games can maximize their interest in learning and stimulate children's love and inheritance of traditional culture in the process of relaxing and interesting games.

2.4.1 CHARACTERISTICS OF CHILDREN AGED 7-11

From 7 to 11 years old, in the specific operational stage of Piaget Jean's cognitive development theory, the following characteristics of children's physiology, psychology, society, and other aspects are studied (Jean, 1976).

(1) Physiological development characteristics

The state of physical growth is stable, and the coordination and movement ability are gradually improved, which is not only simply manifested in sports but also reflected in manual activities.

(2) Characteristics of cognitive development

Thinking logic: Limited development of abstract thinking ability but has been able to use concrete operations to solve practical problems.

Conservation concept: The ability to understand the number of objects, length, volume, and other properties remain unchanged when the external image changes.

Classification and ordering: Can distinguish objects by classification and ordering and understand the connections and primary and secondary relationships between things.

Understanding ability and analysis ability: can understand the whole picture of things and can have a more in-depth analysis and understanding of events.

(3) Characteristics of social and emotional development

Socialization: At this stage, children gradually learn how to communicate with their peers, establish more profound friendships, participate in group activities, and significantly improve their social skills.

Self-awareness: began to strengthen self-awareness, pay attention to their external image and people in the group, self-esteem, and self-confidence.

Moral development: able to understand and internalize social norms and moral standards, distinguish right from wrong, and have empathy and a sense of responsibility and mission.

(4) Creativity and imagination

Creativity: The discovery of new methods and solutions through exploration and practice, manifested in games and hands-on activities.

Imagination: They are highly imaginative and enjoy role-playing and creative activities, although they have shifted to logical thinking.

Based on the above analysis, the subsequent design will incorporate the characteristics of the specific computing stage of children aged 7-11 years old and the game mechanism of board games, aiming to develop Chinese herbal medicine board games to improve children's physiology, cognition, social emotion, creativity, and imagination.

2.4.2 TYPES OF GAME PLAYERS

Understanding different types of game players can help to design games that are more suitable for the target audience and bring them a better game experience. Because different types of players have different needs in the game, accurately identifying these types of players can bring new guidance to the game design, explore the diversity of gameplay combined with game mechanics, and make the game more engaging. The performance of children aged 7-11 in games is closely related to the stages of cognitive, emotional, and social development. Based on the above literature analysis, the types and characteristics of common players are classified (Richard, 1996; Carrie et al., 2011; Rita et al., 2013; Rita et al., 2014).

Achievement player: Children in this period have shown a desire and expectation for achievement and victory, and they expect to win and achieve a sense of accomplishment by participating in missions, collecting gold, and other specific ways.

Social players: This stage is an important period of children's social development; children like to participate in the game with friends, collaborate and communicate with peers, and sharing game experiences and reviews make the game more attractive.

Exploratory player: This player is constantly exploring and experimenting with the game's gameplay and is excited to hide items or find special rewards. Children between the ages of 7 and 11 are in a curious age, they like to explore the unknown and be good at discovery.

Customized players: Players of this age have super creativity, are good at using the game's props and resources to transform, create, and design; they enjoy the process of creation.

Killer players: Since players at this stage have a desire to win or lose, beating other players makes their competitive needs strong.

This paper then relies on the analysis of the types of game players to design Chinese herbal medicine cultural board games, aiming to meet the needs of more players.

2.5 METHODS OF COMBINING CHILDREN'S BOARD GAMES WITH CHINESE HERBS

2.5.1 OCTALYSIS FRAMEWORK

Yu-kai Chou, a gamification expert, proposed the Octalysis framework, and the purpose of the theory is to use the core drivers to motivate player behavior and engagement in the process of designing games. He classified all player behaviors into eight core drivers (see Figure 6), and his research shows that as long as behavior is involved, the drivers are involved, and the drivers drive player motivation. When the core drivers are understood, the real reason for driving player behavior can be identified, which will lead to the success of the game (Chou, 2019).

Eight core drivers of gamification:

(1) Epic significance and mission

In the sense that the player is in the midst of a great event, the game may give the player a sense of mission to protect a certain culture to save something.

(2) Progress and sense of achievement

Usually in the form of badges, trophies, gold, and other rewards given to players as the game progresses, the achievement system greatly increases the players' stickiness.

(3) Creative authorization and feedback

Players are free to create and use their imagination and get real-time feedback from colleagues who are creating new things.

(4) Ownership and sense of achievement

Incentivized players to earn a privilege or an item, which is often protected to a great extent once it is owned/captured, the player gets a unique reward and stays engaged or invested for a long time.

(5) Social influence and relevance

This drive is often seen in multiplayer games and social networks, using social factors to drive the behavior of nearby players or using group influence to influence individual behavior.

(6) Scarcity and desire

When an item or reward is scarce, it encourages desire, and people tend to find it valuable.

(7) Ignorance and curiosity

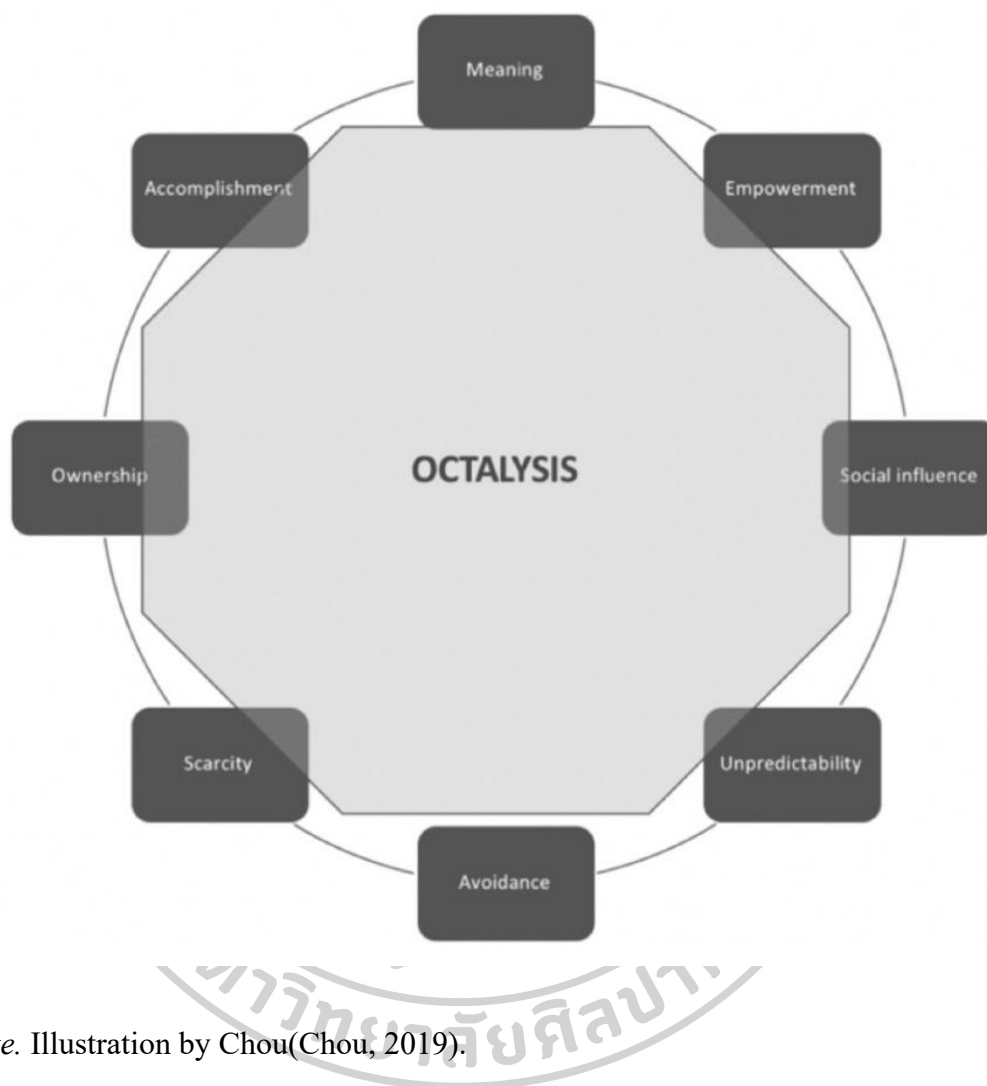
When the player doesn't know what is going to happen or what is possible, it fuels their desire to explore further.

(8) Loss and escape

The player will do something to avoid losing an item or a reward.

People's actions or choices are derived from one or more of the eight core driving forces, and the octagonal theory is applicable to games, education, business, finance, and other fields. Research shows that when gamification is used in educational settings, the opportunities for experiential, self-paced, and lifelong learning grow exponentially (Suzette & Mário, 2017).

Figure 6
Octalysis Framework



Note. Illustration by Chou(Chou, 2019).

Based on the above literature review, this paper has embedded the theory of octagon gamification into the design of board games, with the aim of increasing attractive and interactive games and satisfying the psychological needs and motivations of non-users. In addition, it also analyzes the core driving force based on the characteristics of children's specific computing period and uses the driving force to enhance children's interest and love so as to achieve the purpose of education.

2.5.2. SEMIOTIC PERSPECTIVE

Semiotics originated in linguistics and later expanded into fields such as cultural studies, philosophy, psychology, and sociology(Malcolm, 2013; Roland, 1967; Jean, 1994). As a discipline, it studies signs and sign systems, using symbols or markers to

represent concepts, objects, or emotions(Winfried, 1995). Ferdinand de Saussure and Charles Sanders Peirce are considered the founders of semiotics(Charles Sanders, 1955). Saussure proposed that a sign consists of the signifier and the signified(Ferdinand, 1959), while Peirce suggested a sign comprises the icon, index, and symbol.

According to Saussure (1959), the relationship between the signifier and the signified is arbitrary, as words bear no natural relationship to their referents. The sign derives its meaning from its difference between other signs within the system rather than any inherent quality. Peirce(Charles Sanders, 1974), on the other hand, categorized signs into icons, indexes, and symbols. Icons resemble their referents, indexes have a causal link, and symbols develop meaning through social conventions. While Saussure focused on the synchronous nature of signs, Peirce examined their diachronic aspects(John, 1990).

Semiotics encompasses many branches, including linguistic semiotics, visual semiotics, and cultural semiotics(Marcel & Paul, 1999). Linguistic semiotics examines verbal signs and their rhetorical, literary, and pragmatic functions(Roy, 2019). Visual semiotics analyzes images, graphics, and other visible signs(Gillian, 2022). Cultural semiotics explores shared cultural codes, myths, values, and ideologies(Roland, 1964; Loretta, 1997). It examines how signs relate to cultural practices and reveal underlying power structures(Stuart, 1997).

Semiotics always has significant anthropological and sociological dimensions, as it deals with how groups and individuals make and communicate meanings (BETS & Peter, 1994). It considers how signs reflect and shape social reality(John, 2010). For example, a red traffic light signifies “stop” through shared social conventions. The meaning emerges through its relation to broader sign systems and codes of road safety and regulation. Semiotics examines these cultural frameworks that allow signs to carry meaning.

Semiotics provides invaluable insights into communication, artistic expression, mass media, and consumer culture(Judith, 1978). It reveals how advertisements, films, and other cultural products function as signifying systems that both mirror and influence society. An advertisement depicting happy people drinking a soda not only reflects associations of fun and refreshment but also perpetuates the idea that buying this brand leads to good times. The ad draws on and shapes cultural attitudes regarding consumption and status.

In semiotics, a sign is defined as anything that conveys meaning, whether intentionally or unintentionally, to a receiver(Roland & Chandler, 2002). For instance, a dark cloud signifying an impending rainstorm has an indexical relation, while a red rose symbolizing passion relies on cultural conventions. Meaning arises when a sign meets an interpretant, which can be an effect, concept, or thought in the mind of the interpreter(Charles Sanders, 1974) . An interpretant links the sign to a wider meaning framework. If someone has no knowledge of flowers, a red rose will fail to signify love or romance.

Interpretants allow signs to signify by relating them to broader cultural frameworks and codes(John, 2010). When we see a white coat, we associate it with doctors and medicine through interpretants connecting white coats to those roles. Without those learned interpretive links, a white coat would just be a garment with no symbolic meaning. The relationship between the sign, object, and interpretant is the foundation for how humans make sense of reality.

Semiotics provides invaluable analytical tools for deconstructing meanings in diverse domains, from fashion to photography(Malcolm, 2013). It reveals the social dimensions behind what may initially appear natural or given(Roland, 1964). For instance, black clothing signifying mourning relies on cultural conventions, not inherent meanings. Different colors denote grief in other societies. Semiotics problematizes the process of representation itself by highlighting how signs are not neutral reflections of reality(Jean, 1994). It provides critical perspectives on how meanings serve particular interests and power dynamics in society(Hodge & Kress, 1988).

Semiotics can reveal hidden agendas and problematic assumptions by examining how signs construct ideology and identity. Advertisements often perpetuate narrow beauty standards and gender roles through symbolic meanings. Uncovering the signs behind social inequality and prejudice is an important application of semiotic analysis. It unpacks the cultural myths and codes upon which structural oppression relies.

Moreover, semiotics is valuable for understanding new media and communication technology. Emojis, memes, and other digital symbols have become an important part of how people interact online. The emergence of this visual vocabulary reveals novel ways that users signify tone, emotion, and meaning. Applying semiotic approaches can provide insight into these new forms of signs grounded in internet culture.

Overall, semiotics has significantly expanded from its linguistic origins to become an expansive, interdisciplinary field for studying signification in language, images, commodities, cultural rituals, and more. With its focus on how meanings are made through signs, semiotics continues generating valuable insights across the humanities and social sciences. It provides conceptual tools for analyzing countless symbols and meanings embedded in everyday life. Semiotics enables more critical, nuanced readings of the world by revealing the socially constructed nature of signs.

Semiotics' broad application is not limited to the fields of language, culture, and media but can also extend to many other areas, including board games. As a complex form of social entertainment, board games encompass a wide range of symbol systems. These symbols play a role in the game's rules, design, visual elements, and player interactions. Semiotics provides an essential analytical tool for understanding how board games use symbols (such as pieces, cards, maps, numbers, and icons) to convey information, construct meaning, and shape the gaming experience.

In board games, each symbol has a specific function and meaning. According to Peirce's classification of signs, the symbols in board games can be categorized as

icons, indexes, and symbols. For example, the images on game pieces or cards often bear some visual resemblance to the characters or actions they represent, which makes them iconic signs, as defined by Peirce. Meanwhile, some symbols serve as indexical signs; for instance, in strategy games, the movement of a piece may indicate a strategic intention or the direction of the next action. Symbolic signs, such as game rules and victory conditions, are understood by players through social learning. Their meaning is not inherently obvious but is formed through shared cultural and gaming experiences. This system of signs constructs a unique game world through rules, visual design, and player interactions, allowing players to engage in this fictional, symbol-laden reality. Semiotic analysis can also reveal the deeper cultural and social meanings embedded within board games. Board games are not just tools for entertainment; they also reflect and shape societal values, cultural narratives, and ideologies. For instance, many board games communicate historical narratives, political viewpoints, or moral lessons through their symbolic systems. In historical board games, these symbols are used to simulate events and actions, recreating specific cultural contexts and historical processes. The game's symbols are not merely gameplay tools; they may also influence how players understand history, politics, or social relationships. Semiotic analysis helps us identify the ideologies behind these symbols and uncover how game designers use them to shape players' perceptions and behaviors.

In summary, semiotics provides a powerful analytical framework for understanding board games. By studying the symbol systems within games and their underlying cultural and social meanings, we can better grasp the complexity of board games as a form of symbolic entertainment. Board games reflect the social and cultural structures of the real world and create a meaningful virtual space through semiotic mechanisms, allowing players to engage in symbolic interactions, competition, and cooperation.

2.5.3 COLOR RESEARCH

Color has the power to inspire users, linking human cognition and emotions. In many fields, such as advertising, interior design, packaging, emotions, and psychology, color influences deeply. It possesses aesthetic value and affects users' emotional, attitudinal, and behavioral responses.

Research shows that there is a connection between specific colors and flavors, and color can influence people's taste perception (Charles et al., 2010). Lu Huang recruited 40 participants, showing them product packaging and asking them to evaluate sweetness levels. After integrating the participants' basic information, it was concluded that, in product packaging, people perceive products with red packaging as sweeter than those with blue or green packaging. People's perception of sweetness is higher with red (Lei & Ji, 2015). Other researchers also suggest that light red and light yellow can evoke a sweet taste (Amy, 2011). Koch and other researchers conducted a

classic experiment, in which they investigated the relationship between color and taste using drinks as experimental tools. They surveyed 45 college students with an average age of 23.2. The results showed that red and orange are positively correlated with sweetness, green and yellow with sourness, and white with saltiness (Christopher & Eric, 2003). From birth, people tend to associate colors with flavors (Fergus, 1993). For example, when people see yellow, they often associate it with bananas or honeydew melon. When deep red appears, people expect it to be cherry or strawberry flavors (Cynthia et al., 1980). Green is often associated with lime, and brown with the bitterness of herbal medicine. When high-saturation and high-brightness red appears, people associate it with chili peppers' spiciness.

Of course, the feelings colors evoke are not immutable. Taste preferences are influenced by genetics, environment, and life experiences. People from the same region often have similar tastes. For instance, when seeing a brown liquid, 70% of British participants thought of cola, while 49% of participants from Taiwan thought of grape juice. This suggests that the synesthesia between color and flavor is largely influenced by culture (Charles et al., 2010). People's perception of color is influenced by factors such as nationality, culture, religion, and social background. For example, red symbolizes celebration and good fortune in Chinese culture, while in some South African cultures, it represents funerals. This section will combine the influence of color on taste in both Chinese and Western contexts, ultimately adopting a design approach that aligns with the Chinese perception of color.

Natural colors tend to evoke feelings of authenticity, purity, vividness, and simplicity. Based on the literature review, the author will derive colors from natural fruits and foods to convey the five flavors of traditional Chinese medicine: sour, sweet, bitter, salty, and spicy. For example, candy represents sweetness, coffee represents bitterness, lime represents sourness, sea salt represents saltiness, and chili represents spiciness.

In Traditional Chinese Medicine (TCM), color plays a crucial role in symbolizing the energetic properties of foods, herbs, and treatments, particularly in relation to their thermal effects on the body's balance of Qi. TCM practitioners use a system of five key colors—orange for warmth, red for heat, light blue for coolness, dark blue for coldness, and gray for balance or neutrality—to categorize the energetic qualities of substances. These colors are not merely aesthetic but carry deep therapeutic significance. For instance, foods and herbs associated with orange and red, such as ginger and chili peppers, are considered warming and are used to treat conditions related to coldness or Yang deficiency, helping to invigorate the body's energy. In contrast, substances linked to light blue and dark blue, such as cucumber or mint, are considered cooling and are used to reduce excess heat, bringing relief to conditions associated with excessive Yang or internal heat. Gray, representing neutrality or balance, is frequently associated with foods that are neither warm nor cool but instead serve to stabilize and harmonize the body's internal environment. These neutral foods, such as rice or tofu, are often included in diets aimed at

maintaining overall equilibrium. The use of these colors in TCM reflects the broader philosophy of maintaining harmony within the body by balancing opposing forces, such as heat and cold, or Yang and Yin. This color-symbol system informs dietary and herbal choices in traditional practices and offers a framework that modern designers and product developers can adopt to align with cultural understandings of health and wellness, creating products that resonate with both physical and emotional well-being.




2.6 CASE STUDY

2.6.1 CASE OF CHINESE HERBAL MEDICINE BOARD GAME

There are few board games about Chinese herbal medicine on the market, and even fewer board games that can show knowledge of Chinese herbal medicine. In this study, three board games with relatively large amounts of Chinese herbal medicine content were searched for and analyzed in terms of gameplay, game mechanics, number of people, and time Settings, as well as advantages and disadvantages (see Table 9). First of all, there are some differences in the painting style of these board games, but they all tend to be Chinese style, presented in the form of illustration, and the painting style is beautiful and very suitable for the story background and content of the game; The playing age of “Materia Medica” is above 8 years old, and the playing age of “Legendary Medicine Master” and “Medicine Comes to the Disease” is above 8 years old, and the game Settings are suitable for children to play. In terms of the game time, 30 minutes is the main one, and in terms of the choice of game mechanics, “hand management” is the most popular choice, which is relatively consistent with the results of the research on game mechanics in the third part of this chapter. Secondly, although the three board games all involve Chinese herbal medicine-related content, they are only based on Chinese herbal medicine as the story background, and the game content is paved. The core goal of “Herbalism” is reasoning, while “Legendary Pharmacist” and “The medicine works” are more focused on strategy and through the game.

Table 9

Case of Chinese Herbal Medicine Board Game

Case name	Herbalism (Lin, 2017)	The Legendary Medicine Man (Li, 2021)	The medicine works (Ruinan, 2023)
Case picture			

Case name	Herbalism (Lin, 2017)	The Legendary Medicine Man (Li, 2021)	The medicine works (Ruinan, 2023)
Playable age	10 +	8 +	8 +
Number of players	3-4	2-4	1-6
Game introduction	The game has 14 color cards: two red, three yellow, four green, and five blue; two cards are randomly removed before the game starts, and then the remaining 12 cards are divided equally among all players, and the player's goal is to choose the card color he needs with the least amount of action to guess the color of the removed two cards.	Players upgrade their harvesting tools by collecting and selling drugs, players need to complete the content of the "reward card", when a player completes the corresponding goal, it is regarded as the end of the game.	The game has five kinds of number cards, players take turns to put cards on the medicine pack, the number of the card is more than 13 to take away the medicine pack of herbs. All cards are played at the end of the round, if the player has more cards of a certain color than other players can discard the set, otherwise a card is deducted one point, each poison card is deducted two points, and the player with the lowest total score is awarded the title of "Living Hua Tuo".

Case name	Herbalism (Lin, 2017)	The Legendary Medicine Man (Li, 2021)	The medicine works (Ruinan, 2023)
Playtime	15-30min	40min	30min
Game mechanics	Reasoning/Hand,management/Betting and betting	Collection in sets	Hand management
Case merit	The game has three versions of simplified Chinese, traditional Chinese and English instructions, fresh and delicate painting style; The game is small, easy to carry and social.	This game painting style is meticulous style, accessories material thick, durable; The game is reasonable and easy to organize. Due to the constant use of tools to pick medicines in the game, players have a certain understanding of the picking tools and growth environment in this process.	This game painting style is ink style, the whole picture is beautiful, it is easy to bring people into the game scene; All the characters in the game have pinyin annotations for easy reading, and the game is equipped with a simple introduction of ancient doctors, as well as an introduction to the four gases and five tastes of herbs.
Case weakness	This game has 14 herbal medicine cards, less herbal medicine volume, the game is based on reasoning, and does not involve Chinese herbal medicine knowledge content.	There are only 12 kinds of herbs involved in the game, involving Chinese herbal elements, but it is difficult to learn Chinese herbal knowledge during the game;	Because this game is a Chinese version of the famous “Poison”, limited by the game mechanics, although it involves the knowledge of

Case name	Herbalism (Lin, 2017)	The Legendary Medicine Man (Li, 2021)	The medicine works (Ruinan, 2023)
		Too many and complicated tokens.	Chinese herbs, such as doctors, four gases, five tastes, etc., but the victory of the game lies in the numbers of the cards, so the players pay more energy and attention to the numbers rather than the Chinese herbs, and the Chinese herbal knowledge notes of the cards are less.

Note. Compiled by the author and the picture from Gstonegames.


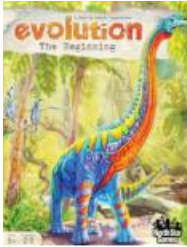

2.6.2 CHILDREN'S BOARD GAME CASES

Children's board games have many and complicated themes. Considering the age of playing, research compatibility, education, fluency and praise of the games, this study selected the three games "The descendant of the medicine saint", "Evolution: The Beginning" and "Mountain and River Traveler" to make the following analysis and summary (see Table 10). Most of these game mechanisms are mainly "dice rolling", "hand card management", "betting and betting", which is basically consistent with the summary and analysis of game mechanisms in the third part of this chapter. The number of players is concentrated in about 2-5 people, suitable for small cooperation and competition, the time is concentrated in about 20min, the game is not difficult, easy and easy to use; The style of the game is presented by hand painting, with bright colors and eye-catching, which enhances the player's sense of substitution through rich visual effects and adds vitality and fun to the game. These board games bring knowledge to players through "repetitive actions", "card display", "layout design" and other ways, so that knowledge is first presented in front of players, through education and entertainment. In "The Descendant of the Medicine Saint", players need to constantly learn herbal medicine management knowledge; Evolution of Species: Origin introduces the player to the diversity of life through cards;

“Mountain and River Travelers” combines geography, put knowledge first in front of the player and make learning fun. For example, in “Medicine Bearer”, players learn Chinese medicine knowledge by managing herbs and treating diseases; “Evolution: The Beginning” presents popular science biodiversity through the evolution of species cards; “Mountain and River Traveler” combines geography, urban characteristics, humanistic knowledge and other relevant knowledge, and cleverly transmits through the “map” in the game.

Table 10

Children’s Board Game Cases

Case name	The Descendant of the Medicine Saint (Zeng Enli 2023)	Evolution: The Beginning (Crapuchettes, 2016)	Mountain and River Traveler (Mountain Traveler, 2024)
Case picture			
Playable age	4 +	8 +	7 +



Number of players	2-5	2-5	2-4
Game introduction	Each player starts with four cards, dice corresponding to different areas and skills, areas are divided into: Western regions, Central Plains, East China Sea, roll to the dice “area” side can get a herb, “skill” side can draw skill cards in the card library for use. The final winning condition of the game is to compete for the number of herbal tokens.	The game is played on a turn-based basis. After deciding on the starting player, in a clockwise direction, each player carries out four stages of collection, adaptation, feeding and settlement in their own turn.	Players roll dice at will each turn to get tickets. Get a city card by saving up tickets to travel to different cities. The game requires players to simultaneously plan high-speed rail lines, parking lots, hotels, taxis, scenic spots, and consider prices.
Playtime	20min	20-40min	15-20min



Game mechanics	Betting and betting, area control, dice rolling	Action point allocation/hand management	Card selection/line and network construction/hand card management/set collection/dice rolling
Case merit	<p>More is a parent-child game, the game atmosphere is cheerful and relaxed, the rules are simple and easy for players to get started, is a light strategy game, the game can help players improve math ability and herbal knowledge. The game accessories are exquisite and unique, the size ADAPTS to the age of the player, easy to grab. It is suitable for players around 4 years old to exercise their observation, thinking and math skills, and the game is small in size and easy to carry, suitable for going out, traveling, partying and other occasions to play.</p>	<p>The background of this board game is closely matched with the content, so that the player is deeply immersed in it, and really feel the cruelty and reality of the animal kingdom. The game is a light strategy game. The rules are easy to understand and the timing is right. The game cards are vivid and show the whole process of species evolution, which helps children to learn biological knowledge, arouse their interest in science, and exercise children's logical thinking ability and planning ability.</p>	<p>In the process of the game can cultivate children's planning ability, logical thinking ability, concentration, mentality and math ability. To enhance children's knowledge of Chinese geography and common sense of humanity. Help children understand the characteristics of each city, location, food.</p>
Case weakness	<p>Because the target group of this game is younger, only three kinds of herbs are displayed in the game, and the number is</p>	<p>The antagonism of the game is weak, due to the limitations of the game mechanism, it is a set of card games to a greater extent, and the</p>	<p>The size of the game map is large, the requirements of the table are high, and the design of</p>

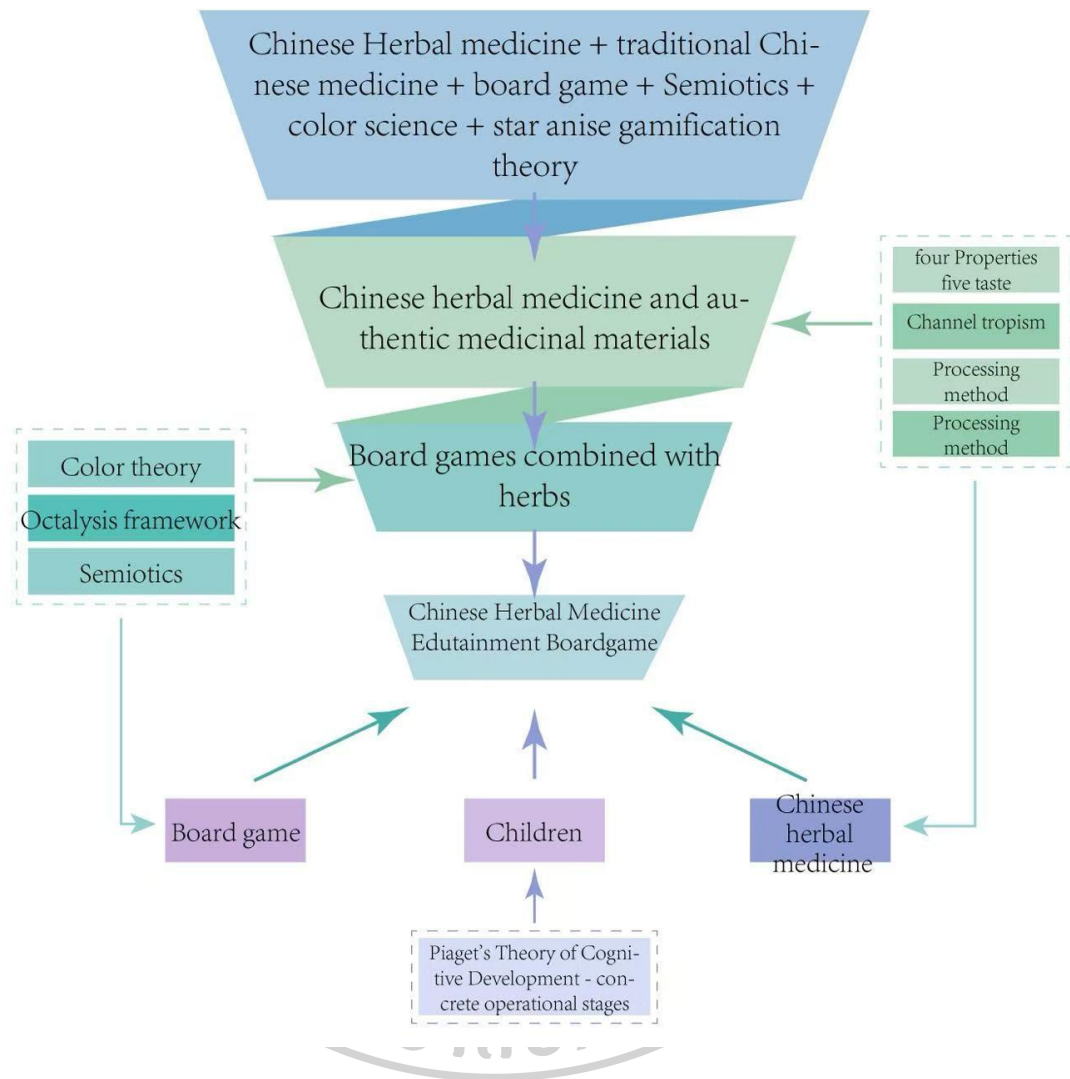
<p>small. The game is in line with the cultural background of Chinese herbal medicine, but the core goal is to exercise the players' thinking ability, game ability and number ability, which has little correlation with Chinese herbal medicine.</p>	<p>interaction between players is weak, cooperation and competition are not strong.</p>	<p>the card deck is not easy to accept.</p>
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Note. Compiled by the author and the picture from Gstonegames.

2.7 SUMMARY

After collecting a large number of literatures related to traditional Chinese medicine, children's physical and mental development characteristics, types of game players, board game mechanisms, semiotics, gamification design methods, etc., the sources include but are not limited to: academic journals, academic dissertates, conference journals, and relevant theoretical websites. Through sorting, categorizing and analyzing the collected literature, the author has a deep understanding of the theory of Chinese herbal medicine culture and the mechanism of board games, and has preliminarily completed the theoretical system of developing themed board games, thus obtaining the theoretical basis for children's knowledge and recognition of Chinese traditional medicine culture. At the same time, the cards of Chinese herbal medicine board games are subsequently quantified and case studies are carried out. According to the literature summary, the current theoretical research on board games does not clearly indicate a board game mechanism suitable for children's Chinese herbal medicine learning. Therefore, in the subsequent research, market research, practical interviews, expert inquiries, and practical tests will be used to make up for this theoretical defect. In the theoretical research on semiotics, it is found that there is also a theoretical gap in the visual transformation of theoretical knowledge related to Chinese herbal medicine (such as four qi, five taste, sutra, and processing methods). Therefore, in the follow-up research, this theoretical deficiency will be remedied through online interviews, expert consultation, interdisciplinary cooperation, practical testing, and other research methods. Ensure that concepts related to Chinese herbal medicine can be effectively translated into visual forms suitable for children's cognition.

Figure 7
Literature Funnel Diagram



Note. Illustrated by the author.

CHAPTER 3

RESEARCH METHODS

Based on the title “Chinese Herbal Medicine Children’s Educational Board Game”, qualitative and quantitative research methods are used in this research method to ensure the applicability and science of the game, and to achieve the dual purposes of effective knowledge transmission and entertainment. In order to ensure the universality of the study, a primary school and an educational institution in Shaanxi Province were used to study children aged 7-11.

3.1 PREPARATION PHASE

First, we visited and observed the TCM clinics and investigated the characteristics and smell of TCM herbs, TCM diagnostic tools, and storage methods. We experienced the TCM diagnostic methods (observation, smell, questioning, and palpation), the entire process from prescribing to taking medicine, and gained a more practical understanding of TCM. We learned about the growth environment of TCM herbs by visiting the TCM herbal medicine planting bases and online pictures, aiming to gain a deeper understanding of TCM herbs. We recorded the information as detailed and accurate as possible through observation, photos, hand-drawing, and taking plant samples.

Secondly, we visited representative primary schools and educational institutions in Shaanxi Province to observe students’ daily living habits, play behaviors, and in-school course learning content. The purpose was to provide more meaningful reference value for this study, understand the interests and learning methods of the target group, and lay the foundation for game design and content development (see Table 11).

Table 11*Physical Visit and Actual Observation of TCM Clinics, Schools, etc.*

Note. Illustrated by the author.

3.2 IMPLEMENTATION PHASE

3.2.1 QUESTIONNAIRE

The questionnaire was mainly aimed at children aged 7-11 years old and their parents (see Appendix 1), with the purpose of understanding the degree of knowledge of Chinese medicine culture among children aged 7-11 years old. Whether children prefer the board game format, Children's expectations of this board game, and the level of parental support. Considering that the target group is children, the questionnaire mainly adopts the form of multiple-choice questions, which makes it easy to collect questionnaires and collect and analyze data. This questionnaire was released through the WJX platform, which is a commonly used online questionnaire tool in China. It is characterized by simple and convenient operation, a broad user base, and rich and powerful functions, which can basically meet the needs of most researchers. Due to the location of this study in Shaanxi province, the questionnaire was distributed to people in Shaanxi, aiming to understand the attitude and needs of children and parents towards Chinese herbal medicine, which provided the design focus for the subsequent design research. This questionnaire is filled out jointly by children and parents. The children's questionnaire is based on the following aspects:

(1) Basic information of children

Mastering the basic information of children is convenient for later induction and analysis of the preferences of men and girls at different ages in design, whether the level of education will affect the cognition of Chinese herbal medicine and the attitude to the form of board games.

(2) Children's understanding of Chinese herbal medicine-related knowledge

Starting from some basic issues of Chinese medicine, including but not limited to familiar herbal names, four qi, five tastes, authentic herbs, medicinal parts, effects, medical scientists in history, etc. The purpose of this study is to assess the children's knowledge of various aspects of Chinese herbal medicine and to clarify which knowledge points they know well and which knowledge is insufficient and needs to be strengthened. It provides important data support for the subsequent design and makes the design focus of subsequent games clearer.

(3) Children's attitude and acceptance towards board games:

Children's attitudes towards and acceptance of board games are crucial. Firstly, by assessing children's fondness for board games, we can understand children's interest in board games. Through this question, we can also know whether board games are learning tools that children often play or use in their daily life and study, and whether they are familiar with basic and simple board game mechanism rules. Secondly, the purpose of evaluating children's acceptance of the combination of board games and Chinese herbal medicine is to judge whether it can help them learn knowledge in this way and whether there is a good fit between the two. Finally, asking about the expectations of Chinese herbal medicine board games can reflect whether children's Chinese herbal medicine board games are attractive and expectant, and also hope to collect children's ideas and suggestions for the game.

The parents' questionnaire is based on the following aspects:

(1) Basic information of parents

The collection of basic information about parents will bring important reference significance and value to this study. First of all, it is necessary to determine whether mothers and fathers have different choices of educational AIDS for their children. If there are differences, they may have different views on board games, which will lead to the promotion and practical application of board games in families. The price acceptance range of board games is crucial for parents to facilitate subsequent game materials, pricing, and other strategies to ensure that this research is of market promotion value.

(2) Parents' understanding of traditional Chinese medicine culture and whether they support their children's learning

The purpose of asking this question is to assess whether parents have basic knowledge of Chinese medicine, whether they support the knowledge of Chinese medicine, if parents know the knowledge of Chinese herbal medicine, whether they can help their children develop related knowledge outside the board game, if not, whether they will have a stronger interest in this board game, and whether parents

support their children to learn Chinese herbal medicine through games. It can greatly reflect parents' attitude towards traditional Chinese medicine cultural inheritance.

(3) Parents' support for Chinese herbal medicine board games

The purpose of this study is to evaluate parents' support and recognition of Chinese herbal medicine board games, whether parents approve the way of learning by games, whether they support their use in families, and whether they can be an effective tool for learning Chinese herbal medicine knowledge. This data will be one of the important evaluation criteria for the promotion of this study.

3.2.2 EXPERT INTERVIEW

Through in-depth conversations with experts, we gained rich professional insights to further explore the basic knowledge of Chinese medicine culture that children aged 7-11 should master, whether it is suitable for classroom/school applications, and the rules for designing Chinese medicine board games. The suggestions of experts will lay a solid foundation for this paper, and more importantly, the experience of experts will bring important guiding factors to this paper. The results of expert interviews are used to ensure the practicability, guidance and accuracy of the research results. This study will interview game experts, Chinese medicine experts, and education experts in-depth Interviews with game experts focused on the following areas:

(1) Game time

Controlling the duration of the game is to ensure the experience and participation of children players and, more importantly, to control the rhythm and tension of the game. Too long will easily make players feel bored, procrastinate and lose interest, while too short will make players feel rushed and unenjoyed. Therefore, reasonable time control helps to stabilize the balance of the game. Allowing players to have time and energy for strategic planning and task challenges and ending the game at the right time is more likely to bring satisfaction and a sense of accomplishment, thus increasing the repetition rate of the game.

(2) The balance between knowledge transmission and entertainment

A higher proportion of knowledge or more entertainment is directly related to the design direction and game mechanism of board games. This question aims to solve the balance between knowledge transfer and entertainment from the professional perspective of game designers, gain experience from their past successful cases, and better understand the current market demand and future trends of children's board games. Increase the core competitiveness and popularity of the game.

(3) Game style

The success of a game cannot be separated from beautiful graphics and precise style control. Only a visual style that fits the theme of the game can give the player an immersive experience. This question aims to understand the current trends in the board game market and the aesthetic preferences of players. The setting of a game

style affects not only the initial appeal of a game but also its long-term market survival. Therefore, choosing a style that will continue to appeal to children requires long-term vision and market insight.

(4) Game mechanics

Game mechanics are key to the success of a board game. In order to ensure the consistency of game mechanics with the objectives of the game, explore new possibilities, and promote the appeal and quality of the game, game mechanics need to be designed specifically for children aged 7-11. This not only helps make the knowledge of Chinese herbal medicine easier to accept and learn, but also improves the market competitiveness of board games.

(5) General suggestions, etc.

(6) To supplement the professional part not mentioned in the interview and to avoid risks in advance, as well as problems and loopholes that may occur in the design.

The interview with Chinese medicine experts focused on the following aspects:

(1) Basic knowledge of TCM

In order to clarify which knowledge points are suitable for children to learn, which can not only meet the needs of learning TCM knowledge but also ensure that children can accurately understand, understanding the expert's advice helps the knowledge conveyed by the game to be scientific and age-appropriate. The aim is to ensure that children's knowledge in the game is authoritative and accurate while avoiding overly complex or esoteric knowledge content that loses the balance between education and cognition.

(2) Make the game interesting

Through the understanding of the exciting stories or the cultural meanings behind "26" Chinese herbs, researchers can better understand these herbs, which is conducive to the integration of them with games to enhance the interest and attraction so that children can feel the charm of cultural inheritance when learning Chinese herbal medicine knowledge, and enhance the enthusiasm of learning Chinese medicine.

(3) Broaden the depth of TCM culture

Make sure that in addition to the basic information of Chinese herbal medicine, other contents need to be expanded and more meaningful elements added. A deep and extensive understanding of the background of traditional Chinese medicine will make it handier to design games, improve the cultural and historical dimensions of board games, and increase the educational value of games.

(4) TCM diagnosis methods

"Look, smell, ask and cut" is one of the contents of traditional Chinese medicine. Understanding this concept can be integrated into the game, which is conducive to simulating some diagnostic game links or tasks, increasing the playability of the game. Children can understand the basic steps and principles of traditional Chinese medicine

diagnosis through simple game experience, and enhance the perception and understanding of traditional Chinese medicine culture.

(5) General recommendations

Asking for expert advice on this board game aims to ensure that the game is designed in accordance with the core principles of Chinese medicine as well as children's engagement and interests.

The interviews with education experts focused on the following aspects:

(1) Game time

Control children's play time to ensure that board games better match children's attention spans; Prevent excessive addiction and excessive fatigue, sitting for a long time or continuous nervous thinking will cause a certain degree of physical harm to children, and avoid losing interest in children because of too long game time, so that the game repetition rate is reduced. Too short game duration design may make each child unable to express themselves during the game duration fully, lack of cooperation and communication between children and players. Hence, the rationality of the game duration is critical.

(2) The balance between knowledge transmission and entertainment

The purpose is to determine the core goal of the game through this question: knowledge or entertainment first, to ask education experts about the balance of education and entertainment in the game, hoping to find a balance between education and entertainment to ensure that the game mechanism, content, story background, etc. can attract children, but also to convey the cultural knowledge of traditional Chinese medicine effectively.

(3) Game application scenarios

Find out what educational experts think about the application of this game scenario, assess whether it can be used as an educational tool in schools or as part of a school-based curriculum, whether it can open up another avenue of use for this board game, and also determine whether it has sufficient educational value.

(4) Broaden the game dimension

For children aged 7-11, they are at a critical stage of comprehensive development. In addition to accumulating and learning Chinese herbal medicine knowledge, the other value of broadening the game is to enhance the core competitiveness of this board game is necessary to cultivate the ability in social, cognitive, and emotional aspects, such as teamwork and logical thinking ability.

(5) General recommendations

The purpose is to further discuss the rationality of the game, collect the specific feedback of education experts on the game content, story background, game mechanism, application scenario, cultural connotation, and other aspects, and formulate suggestions to optimize the design of the game, in order to achieve a Chinese herbal medicine children's board game that is more in line with the needs of education, and enhance the implementation and interaction of the game.

3.3 ANALYSIS OF THE DESIGN PHASE

3.3.1 DATA ANALYSIS

Systematically analyze the questionnaire data collected in the early stage and the interview contents of experts, such as descriptive analysis and difference analysis. The purpose is to quantify the collected quantitative data and facilitate direct comparison. Qualitative data extracts effective and key information for design reference by analyzing the subject content and the malleable content.

3.3.2 PROTOTYPING

Based on the information storage and summary of the preparation stage, and the results of qualitative and quantitative data analysis, the game theme, background, story, mechanism, entertainment, education, vision and other multi-dimensional designs are carried out.

First, sketches are drawn to quickly show the design ideas, and obvious problems are modified after multiple self-tests. Then, multiple third-party tests are carried out, and the game is modified based on the opinions of third parties. Finally, expert tests are carried out, and the opinions of experts are integrated to produce the final design prototype.

By continuously collecting user feedback and updating the iterative game version, it aims to ensure that the final design can meet the needs and expectations of the target audience in terms of functionality, design, education, fun, fluency, and vision.

3.4 TEST SUMMARY PHASE

3.4.1 INTERVENTION RESEARCH

Pre-test (see Appendix 2): Before the game, children do a questionnaire about Chinese herbal medicine knowledge, assess their understanding of Chinese herbal medicine, and collect baseline data.

The pre-test and post-test questionnaires mainly focus on the following aspects:

(1) Basic information of the tested child

The purpose is to master the basic information of children for more detailed analysis and comparison of data in the later stage, such as age, gender, grade, etc., and whether there are differences in the learning of children from different backgrounds in games.

(2) Understanding of Chinese herbal medicine

The pre-test assessed the children's understanding of Chinese herbal medicine knowledge, and the post-test assessed the degree of improvement of Chinese herbal medicine knowledge after the game.

(3) The degree of mastery of basic information of a certain Chinese herbal medicine

The effectiveness and learning effect of board games in conveying knowledge were evaluated by the method of before and after comparison test on the children's mastery of 26 herbs.

Intervention: Through the intervention of Chinese herbal medicine board games, so that they can obtain relevant knowledge in the game and commission the understanding of Chinese herbal medicine.

Post-test (see Appendix 2): After the game, the children were asked to do the same questionnaire as the pre-test in order to assess the degree of improvement of the children's knowledge of Chinese herbal medicine and judge the degree of influence of the game on them. At the same time, questionnaires on multidimensional evaluation of games were distributed to children to collect their overall evaluation of games (see Appendix 3). The questionnaire uses a scoring system, requiring the children to give corresponding scores based on their experience of the game (1 = lowest; 2 = slightly lower; 3 = average; 4 = higher; 4 = highest) as an important statistical measure for the overall evaluation of the board game. The questionnaire mainly focuses on the following aspects:

(1) Likeability

This kind of question mainly evaluates the appeal and fun of the game to children, and judges whether the game has reached the target expectation, and how to improve it in the future.

(2) Difficulty

The goal is to determine the child's perception of the difficulty of the game, to ensure that the game mechanics are designed properly, to meet the target audience, to ensure that the balance between educational and entertaining is found, to ensure that the content is challenging and risky but also manageable, to ensure that they are engaged in the game and to ensure that they are engaged and replayed.

(3) Harvestability

Evaluate the knowledge of Chinese herbal medicine that children gain through games to judge whether the games are educational, whether the games can accurately convey the effectiveness of traditional Chinese medicine culture, and at the same time, help the authors evaluate the actual learning impact of games on children.

(4) Suggestion

By collecting the suggestions of the tested children on the game, we aim to provide a strong reference for future improvement. By using the suggested feedback, we can also truly reflect the ideas of the children, understand their demands and aspirations, and make targeted adjustments and changes in the subsequent version optimization.

3.4.2 FOCUS GROUPS

The game test was divided into three sessions. The first and second sessions were held in a primary school in Shaanxi, and the third session was held in an educational

institution in Shaanxi. The number of participants in the first, second and third sessions were 24, 28 and 12 respectively, with a total of 64 children participating in the test. To protect the privacy of children, the children tested were numbered 1-64. In order to ensure the fairness of the selection process of the members participating in the focus group, the random number generator software was used to extract numbers. A total of six children participated in the first focus group interview, and the numbers drawn were: 7, 11, 8, 15, 3; the number of participants in the second focus group interview was also six, and the numbers drawn were: 25, 30, 50, 45, 32; in the third session, due to the small number of children tested, four children were selected to participate in the focus group interview, and the numbers drawn were: 56, 58, 60, 53. The interview was guided by the school teacher and the discussion was hosted. In order to ensure the concentration and depth of the topic, the host would not interfere after throwing out the topic so as to ensure the authenticity of the children's insights and opinions. Its content includes:

(1) Game experience and gameplay feeling

The purpose is to evaluate the attractiveness and advantages and disadvantages of the game, to clarify which parts can make children feel happy and interesting, and which parts are confused and bored. By clarifying these problems, it can help adjust the difficulty, rule setting, game mechanism and other aspects in the subsequent games, and improve the game experience of players.

(2) Learning and harvest

The purpose is to evaluate the educational effect and the fun and memorability of knowledge, evaluate the effectiveness of the game in knowledge transmission through the answers of the tested players, and ask the tested children's which aspects of the knowledge in the game impressed them so that they can judge which knowledge points are interesting and easy for players to remember, so as to facilitate the upgrading of the game in the later stage.

(3) Cooperation and interaction

Ask whether the cooperation mode can greatly improve the progress and victory of the game to evaluate the effect of the cooperation mechanism. If the cooperation process is not smooth, it needs to consider the adjustment of the cooperation mode. Another purpose of cooperation is to enhance the interaction between players, and asking the test players how they feel about the interaction is a good way to assess whether the interaction of the game brings positive experience and feelings.

(4) Game design and gameplay

The intelligibility and rationality of game rules and the effectiveness of prop design are the key points in game design. Feedback from players is used to assess whether the rules are clear and complex and whether they meet the age cognition of the target group. Props in the game directly affect the fun and fluency of the game, and further feedback from players is needed to judge whether the props are reasonable.

(5) Overall evaluation

The purpose is to evaluate whether the overall experience of the game makes the players feel the harvest and pleasure, whether the game meets their expectations and needs, followed by the evaluation of the recommendation, an important indicator to analyze the market potential of the game is the recommendation, if the recommendation is high, it can show that the Chinese herbal medicine children's board games have communication and promotion.

3.5 DATA COLLECTION AND ANALYSIS METHODS

3.5.1 QUANTITATIVE DATA COLLECTION AND ANALYSIS METHODS

(1) In the implementation phase, questionnaires were distributed to the target population through “Questionnaire Star”, relevant data were collected and recovered, and descriptive analysis, analysis of variance, Pearson correlation analysis, and other methods were used.

(2) Questionnaires for intervention studies were issued on-site and recovered, and descriptive statistical analysis, Pearson correlation analysis, and paired T-test were used.

3.5.2 QUALITATIVE DATA COLLECTION AND ANALYSIS METHODS

The author collects a large number of relevant literatures from books, academic papers, academic journals, conferences, websites, etc., and classifies the collected literature.

Use mobile phone audio/video recording, random number generator, mobile phone photos, iPad paperless recording, and other methods to record the process during observation studies, expert interviews, intervention studies, and focus groups.

CHAPTER 4

ANALYSIS AND DESIGN

This chapter focuses on five contents: data analysis, sketch drawing, expert inquiry and prototype making, prototype testing and improvement, and test result analysis and summary.

Data analysis: Data on children's cognitive development and educational needs were collected through literature research, market research, and interviews. Education, Chinese medicine, gaming experts, parents, and children were interviewed, qualitative research was conducted, and evaluation was combined with input-output control (IOC) methods to ensure that the design meets the needs of users.

Drawing concept sketches: Based on the collected data, the authors drew three editions of concept sketches and built the rules of the game in detail. The goal is to combine education with entertainment while preserving the learning experience of Chinese herbal medicine knowledge.

Expert inquiry and prototyping: Through expert interviews and qualitative research, the design was perfected and optimized again. On the basis of expert opinions, the final rules and mechanisms of the game were determined, and prototype production began.

Prototype testing and improvement: The resulting prototype is tested in a real-world environment, and feedback is used to further optimize the design and functionality of the game, ensuring the effectiveness and market fit of the final product.

Analysis and summary of test results: Through the analysis of relevant test data, the purpose is to evaluate the implementation of the game in multiple dimensions, summarize the replicability of the research and design process, and develop a Chinese herbal medicine educational board game suitable for children, so as to meet the market demand and provide children with a pleasant learning experience.

4.1 INDEX OF ITEM OBJECTIVE CONGRUENCE

Based on the research needs of the title “Chinese Herbal Medicine Children's Educational Board Game”, in order to ensure the scientific, feasibility and rationality of the results of the questionnaire survey and expert interview, The “Objective Consistency Assessment of Goals” was conducted with the assistance of supervisor Associate Professor Dr. Supachai Areerungruang and three experts Assistant Professor Dr. Athiphat Wichitsathitrat, Professor Dr. Sucha Thongsima and Assistant Professor Dr. Atitthep Chaetnalao. Through expert review and evaluation (see Appendix 4), the questionnaire and interview questions are scored and given feedback comprehensively and systematically. At this stage, experts independently scored the relevance,

consistency and effectiveness of all the problems, and the analysis results were calculated as follows:

$$IOC = \frac{\sum R}{N}$$

Calculated by the formula, the final “IOC” index is “0.9”:

$$IOC = \frac{57}{62}$$

It is proved that the overall questionnaire has a high consistency and effectiveness, but five of the questions have a low index of “0.5”, and these questions are modified after further optimization. The evaluation of “IOC,” brings strong support for the follow-up research and applies to the practicability of the topic.

4.2 DATA ANALYSIS OF MIXED QUESTIONNAIRE SURVEY OF CHILDREN AND THEIR PARENTS

Based on the target region of the study, 410 questionnaires were distributed to Shaanxi, and 401 were recovered, including 372 from Shaanxi, 28 from Guizhou, and 1 from Shandong. It is concluded that the regions where the questionnaires were collected may have changed due to the inconsistency between the respondents’ actual location and household registration. The questionnaire recovery rate was as high as 97.8%, indicating that respondents were strongly willing to participate and attracted strong interest from the target audience.

4.2.1 DESCRIPTIVE ANALYSIS

Table 12

Frequency Analysis Results

Heading	Options	Frequency	Percentage (%)	Cumulative percentage (%)
1. How old are you? (Children)	7.0	85	21.20	21.20
	8.0	91	22.69	43.89
	9.0	78	19.45	63.34
	10.0	67	16.71	80.05
	11.0	78	19.45	99.50
	12.0	2	0.50	100.00

Heading	Options	Frequency	Percentage (%)	Cumulative percentage (%)
2. What is your gender? (Children)	I am a girl.	228	56.86	56.86
	I am a boy.	173	43.14	100.00
3. What grade are you in? (Children)	Freshman year	80	19.95	19.95
	Second grade	88	21.95	41.90
	Junior class	79	19.70	61.60
	Senior class	62	15.46	77.06
	Fifth grade	71	17.71	94.76
	Sixth form	21	5.24	100.00
4.Can say the number of Chinese medicine (children)	0.0	206	51.37	51.37
	1.0	68	16.96	68.33
	2.0	37	9.23	77.56
	3.0	38	9.48	87.03
	4.0	25	6.23	93.27
	5.0	27	6.73	100.00
5. Do you know what the four Qi and five taste are? (Children))	Be ignorant of	343	85.54	85.54
	Know	58	14.46	100.00
11. Do you play board games? (Children)	I won't play.	155	38.65	38.65
	Play.	246	61.35	100.00
12. Do you expect to learn Chinese medicine with your friends while playing board games? (Children)	No, I don't.	21	5.24	5.24
	It can be considered.	166	41.40	46.63
	Yes, I want to play with my friends.	214	53.37	100.00

Heading	Options	Frequency	Percentage (%)	Cumulative percentage (%)
13. What do you want this TCM board game to be like? (Children)	None of the above, please explain: [Does not like to make friends]	1	0.25	0.25
	None of the above, please explain: [dislike playing games]	1	0.25	0.50
	None of the above, please explain: [Do not play games]	1	0.25	0.75
	None of the above, please explain: [Do not play games]	2	0.50	1.25
	None of the above, please explain: [Making a lot of good friends]	1	0.25	1.50
	None of the above, please explain: [I don't like playing games]	1	0.25	1.75
	None of the above, please explain: [I don't play games]	1	0.25	2.00
	None of the above, please explain: [time is on learning]	1	0.25	2.24
	None of the above, please explain: [parents do not let play games]	1	0.25	2.49
	All of the above.	56	13.97	16.46
	It can help me understand the use and efficacy of Chinese herbs.	39	9.73	26.18
	It allows me to have more interaction with my friends.	171	42.64	68.83
	Can let me know more about Chinese medicine knowledge.	125	31.17	100.00

Heading	Options	Frequency	Percentage (%)	Cumulative percentage (%)
2. How much do you know about Chinese medicine culture? (Parent)	Incomprehension	95	23.69	23.69
	Understand	95	23.69	47.38
	Basic understanding	171	42.64	90.02
	Know very well	40	9.98	100.00
3. Do you want your child to learn Chinese medicine culture? (Parents)	Not wish	29	7.23	7.23
	Hope	372	92.77	100.00
4. If there are board games about TCM culture knowledge, will you support your child to play them? (Parents)	Nonsupport	55	13.72	13.72
	Support	346	86.28	100.00
Total		401	100.0	100.0

Note. Compiled and analyzed by the author.

4.2.1.1 SAMPLE CHARACTERISTICS OF CHILDREN

A total of 401 children aged 7 to 11 were investigated in this study, of which 173 were boys, accounting for 43.14%, and 228 were girls, accounting for 56.86%. In terms of age distribution, children aged 8 years accounted for the highest proportion (22.69%), followed by 7 years (21.20%) and 9 years (19.45%). Children aged 10 and 11 accounted for 16.71% and 19.45%, respectively, and there were only two children aged 12, accounting for 0.50%.

The grade distribution shows that the number of students in Grade 1 and Grade 2 is larger, accounting for 19.95% and 21.95%, respectively, Grade 3 accounts for 19.70%, Grade 4 accounts for 15.46%, Grade 5 accounts for 17.71%, and Grade 6 has the least students, accounting for only 5.24%.

4.2.1.2 CHILDREN'S UNDERSTANDING OF TRADITIONAL CHINESE MEDICINE CULTURE

About the knowledge of Chinese medicine, 51.37% of children could not name any Chinese medicine, and only 6.73% of children could name five Chinese medicine.

16.96%, 9.23%, 9.48%, and 6.23% of the children who could name one to four kinds of Chinese medicine, respectively. For the concept of “four qi and five taste,” 85.54% of children said they did not know, and only 14.46% of children said they knew.

In terms of entertainment, 61.35% of children said they usually play board games, while 38.65% said they do not play board games. As to whether they expect to learn Chinese medicine knowledge while playing board games, 53.37% of children said, “Yes, I want to play with friends,” 41.40% said, “Can consider,” and only 5.24% said, “No, I don’t want to.”

4.2.1.3 CHILDREN’S EXPECTATIONS OF TCM BOARD GAMES

In terms of expectations for Chinese medicine board games, 42.64% of children hope that “can let me have more interaction with friends”, 31.17% of children hope that “can let me know more about Chinese medicine”, 9.73% of children hope that “can help me understand the use and efficacy of Chinese herbs”, 13.97% of children think that “all of the above”. In addition, a small number of children gave specific reasons for not wanting to play games, such as “Mom and dad don’t let them play games,” “time is all about learning,” “I don’t like playing games,” and so on.

4.2.1.4 CHARACTERISTICS OF PARENT SAMPLES

In the sample of parents, the distribution of parents with different degrees of understanding of traditional Chinese medicine culture is relatively uniform: 23.69% of parents do not understand, 23.69% of parents understand, 42.64% of parents have a basic understanding, 9.98% of parents understand very well. The vast majority of parents (92.77%) want their children to learn Chinese medicine culture, and only 7.23% do not want their children to learn Chinese medicine culture. For board games with knowledge of traditional Chinese medicine culture, 86.28% of parents expressed support, and only 13.72% of parents said they did not support it.

4.2.2 DIFFERENCE ANALYSIS

4.2.2.1 GENDER DIFFERENCE OF TCM KNOWLEDGE

Table 13

Results of Variance Analysis

	2. What is your gender? (mean \pm standard deviation)		F	p
	I am a girl (n=228)	I am a boy (n=173)		
Can tell the number of Chinese medicines	1.22 \pm 1.67	1.23 \pm 1.53	0.000	0.991
Understanding degree of Chinese medicine	2.82 \pm 2.74	3.16 \pm 2.79	1.545	0.215

* $p < 0.05$ ** $p < 0.01$

Note. Compiled and analyzed by the author.

In order to investigate the difference in Chinese medicine knowledge among children of different genders, variance analysis was carried out (Table 13). The main variables analyzed included the number of Chinese medicine names and the degree of knowledge about Chinese medicine. The degree of understanding of Chinese medicine was obtained by summarizing the results of questions 4 to 10 of the questionnaire. The specific scoring method is as follows: the fourth question is 1 point for each name of Chinese medicine, up to 5 points; 0 points for unclear answers to questions 5 to 9, 1 point for specific answers; 1 point for correct answers to question 10, 0 points for wrong answers. The scores of questions 4 to 10 were added to obtain the variable “understanding degree of Chinese medicine”.

The analysis results showed that the mean value and standard deviation of the number of Chinese medicines that could be said were 1.22 and 1.67 for girls (n=228), and 1.23 and 1.53 for boys (n=173).

The results of ANOVA showed that there was no significant difference between the sexes in the number of Chinese medicine names ($F=0.000$, $p=0.991$). This shows that whether it is boys or girls, they can name the number of Chinese medicines is basically the same.

In terms of the understanding degree of Chinese medicine, the mean value of girls is 2.82; the standard deviation is 2.74, the mean value of boys is 3.16, and the standard deviation is 2.79. The results of ANOVA showed that there was no significant difference in the understanding degree of Chinese medicine between the sexes ($F=1.545$, $p=0.215$). Although the average score of male students in the

knowledge of Chinese medicine was slightly higher than that of female students, the difference was not statistically significant.

In summary, the analysis results showed that there was no significant difference in the mastery of TCM knowledge among children of different genders. This means that in the sample of this study, gender is not an important factor affecting children's knowledge of Chinese medicine.

4.2.2.2 GRADE DIFFERENCE OF TCM KNOWLEDGE

Table 14

Results of Variance Analysis

3. What grade are you in? (mean ± standard deviation)	Can tell the number of Chinese medicines	Understanding degree of Chinese medicine
First year (n=80)	0.11±0.32	1.02±0.90
Year 2 (n=88)	0.40±0.74	1.56±1.23
Third grade (n=79)	1.01±1.18	2.76±2.20
Fourth grade (n=62)	2.13±1.63	4.65±3.14
Grade 5 (n=71)	2.59±2.03	5.11±3.13
Sixth grade (n=21)	2.43±1.40	4.81±2.66
F	45.385	41.576
p	0.000**	0.000**

* p<0.05 ** p<0.01

Note. Compiled and analyzed by the author.

In order to investigate the difference of Chinese medicine knowledge among children of different grades, the number of Chinese medicine names and the degree of Chinese medicine understanding were compared by ANOVA (Table 14). The results showed that children of different grades had significant differences in the number of Chinese medicine names and the degree of Chinese medicine understanding. In terms of the number of Chinese medicines, the mean value of children in grade 1 was 0.11, the standard deviation was 0.32, the second grade was 0.40, the standard deviation was 0.74, the third grade was 1.01, the standard deviation was 1.18, the fourth grade was 2.13, the standard deviation was 1.63, the fifth grade was 2.59, the standard deviation was 2.03, and the sixth grade was 2.43. The standard deviation is 1.40. The results of ANOVA showed that there was a statistically significant difference in the number of Chinese medicine names in grade (F=45.385, p=0.000), indicating that the higher the grade, the higher the average number of Chinese medicine names.

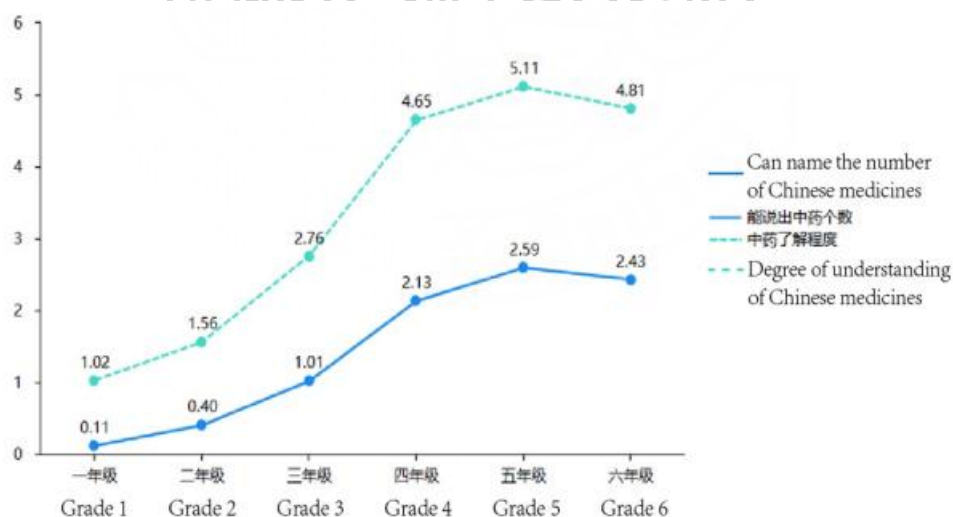
In terms of the understanding degree of Chinese medicine, the mean value of children in grade 1 was 1.02 with standard deviation of 0.90, that of grade 2 was 1.56 with standard deviation of 1.23, that of grade 3 was 2.76 with standard deviation of 2.20, that of grade 4 was 4.65 with standard deviation of 3.14, that of grade 5 was 5.11 with standard deviation of 3.13 with standard deviation of grade 6 was 4.81. The standard deviation is 2.66. The results of ANOVA also showed that grades had statistically significant differences in the degree of understanding of Chinese medicine ($F=41.576$, $p=0.000$), indicating that the higher the grade, the higher the average degree of understanding of Chinese medicine.

It is worth noting that the fifth-grade children scored the highest in the degree of knowledge about Chinese medicine, while the sixth-grade scores decreased slightly. This phenomenon may reflect that the fifth grade is the peak of TCM knowledge education, while the sixth grade may be due to the increase of curriculum pressure or other factors leading to a decrease in attention to TCM knowledge.

To sum up, grade is an important factor affecting children's knowledge of Chinese medicine. With the increase in grades, children showed significant improvement in the number of Chinese medicine names and the degree of understanding of Chinese medicine (Figure 8).

Figure 8

Grade Influences on the Comparison of Chinese Medicine Knowledge of Children



Note. Illustrated by the author.

4.2.2.3 DIFFERENCES IN PARENTAL SUPPORT

In order to explore the influence of parental support on children's knowledge of Chinese medicine, ANOVA was used to compare two variables: whether parents

wanted their children to learn Chinese medicine culture and whether they supported their children to play board games with Chinese medicine culture knowledge (Table 15) (Table 16).

Table 15
Anova Result

3. Do you want your child to learn Chinese medicine culture? (mean \pm standard deviation)			
	Not expected (n=29)	Hope (n=372)	F p
Can tell the number of Chinese medicines	0.52 \pm 1.27	1.28 \pm 1.62	6.1390.014*
Understanding degree of Chinese medicine	1.62 \pm 1.42	3.07 \pm 2.82	7.5220.006**

* $p < 0.05$ ** $p < 0.01$

Note. Compiled and analyzed by the author.

The influence of whether parents want their children to learn Chinese medicine culture on children's knowledge of Chinese medicine was analyzed. The results showed that the mean value and standard deviation of children who did not want their children to learn Chinese medicine were 0.52 and 1.27, respectively. Parents who wanted their children to learn Chinese medicine culture had a mean of 1.28 and a standard deviation of 1.62 on the number of Chinese medicines their children could name. The results of ANOVA showed that the difference was statistically significant ($F=6.139$, $p=0.014$), indicating that whether parents wanted their children to learn Chinese medicine culture had a significant impact on the number of Chinese medicines that children could name. In terms of the understanding degree of Chinese medicine, the mean value and standard deviation of children of parents who do not want their children to learn Chinese medicine culture are 1.62 and 1.42. Parents who wanted their children to learn Chinese medicine culture had a mean of 3.07 and a standard deviation of 2.82. Analysis of variance also showed that the difference was statistically significant ($F=7.522$, $p=0.006$), indicating that parents' supportive attitude had a significant impact on children's understanding of Chinese medicine.

Table 16
Anova Result

4. If there are board games about TCM culture knowledge, will you support your child to play them? (mean ± standard deviation)		F	p
Not supported (n=55)	Support (n=346)		
Can tell the number of Chinese medicines	0.60±1.33	1.32±1.63	9.849 0.002**
Understanding degree of Chinese medicine	1.58±1.82	3.18±2.82	16.6000.000**

* p<0.05 ** p<0.01

Note. Compiled and analyzed by the author.

The influence of parents' support for children to play board games with knowledge of Chinese medicine on children's knowledge of Chinese medicine was analyzed (Table 14). The results showed that parents who did not support their children in playing Chinese medicine cultural knowledge board games had a mean value of 0.60 and a standard deviation of 1.33. The mean and standard deviation of the parents who supported their children in playing the Chinese medicine cultural knowledge board games were 1.32 and 1.63, respectively. The results of ANOVA showed that the difference was statistically significant ($F=9.849$, $p=0.002$), indicating that whether parents supported their children to play board games with knowledge of Chinese medicine culture had a significant impact on the number of Chinese medicine that children could name.

4.2.3 CORRELATION ANALYSIS

Table 17*Pearson Correlation Analysis Results*

	1. How old are you? (Children)	2. What is your gender? (Children)	3. How much do you know about Chinese medicine culture? (Parents)	4. Do you want your child to learn Chinese medicine culture? (Parents)	5. If there are games about TCM knowledge, will you support your child to play them? (Parents)	6. What is the price range of this board game that you can accept? (Parents)
4. Can tell the number of Chinese medicines	0.618**	0.001	0.248**	0.123*	0.155**	0.105*
5. Do you know what the four properties and five taste are?	0.423**	0.143**	0.204**	0.115*	0.102*	0.235**
6. Do you know what native medicine is?	0.227**	0.173**	0.202**	0.043	0.086	0.263**
7. Can you name any Chinese herbal medicine and the part it is used for?	0.477**	0.051	0.235**	0.117*	0.177**	0.196**
8. Can you tell me the efficacy of any kind of Chinese medicine?	0.468**	0.065	0.248**	0.155**	0.233**	0.121*

	1. How old are you? (Children)	2. What is your gender? (Children)	3. How much do you know about Chinese medicine culture? (Parents)	4. Do you want your child to learn Chinese medicine culture? (Parents)	5. If there are games about TCM knowledge, will you support your child to play them? (Parents)	6. What is the price range of this board game that you can accept? (Parents)
9. Can you name the four properties, five taste and normalization of any herb?	0.327**	0.124*	0.154**	0.049	0.093	0.192**
10. Understanding degree of Chinese medicine	0.615**	0.062	0.272**	0.136**	0.200**	0.174**

* p<0.05 ** p<0.01

Note. Compiled and analyzed by the author.

The variable of the degree of understanding of Chinese medicine is summed up from the variables related to Chinese medicine knowledge (Table 17), and the Pearson correlation coefficient between it and other variables is as follows:

There was a significant positive correlation between age and knowledge of Chinese medicine ($r=0.615$, $p<0.01$), indicating that children's knowledge of Chinese medicine was significantly improved with the increase of age.

There was no significant correlation between gender and knowledge of Chinese medicine ($r=0.062$, $p>0.05$), indicating that gender had no significant effect on knowledge of Chinese medicine.

There was a significant positive correlation between parents' understanding of Chinese medicine culture and their understanding of Chinese medicine ($r=0.272$, $p<0.01$), indicating that the higher the parents' understanding of Chinese medicine culture, the higher the children's understanding of Chinese medicine.

There was a significant positive correlation between parents' desire for children to learn Chinese medicine culture and their understanding of Chinese medicine ($r=0.136$, $p<0.01$), indicating that there was a certain positive relationship between parents' desire for children to learn Chinese medicine culture and their children's understanding of Chinese medicine.

There was a significant positive correlation between parents' support for children to play board games of Chinese medicine cultural knowledge and the degree of Chinese medicine understanding ($r=0.200$, $p<0.01$), indicating that the higher the degree of parents' support for Chinese medicine cultural knowledge board games, the higher the degree of children's Chinese medicine understanding.

There was a significant positive correlation between parents' acceptable price range of board games and their understanding of Chinese medicine ($r=0.174$, $p<0.01$), indicating that there was a positive relationship between parents' acceptance of board games price and children's understanding of Chinese medicine.

4.2.4. SUMMARY

Through a questionnaire survey of 401 children aged 7 to 11 and their parents, this study explored children's knowledge of traditional Chinese medicine culture, children's preferences for board games, their expectations for traditional Chinese medicine board games, and parents' opinions and support for the game.

First of all, it can be seen from the results of descriptive analysis that children's grasp of traditional Chinese medicine and cultural knowledge is low. More than half of the children (51.37%) could not name any Chinese medicine, and only 6.73% could name five Chinese medicines. For the basic concept of "four qi and five tastes", 85.54% of children said they did not know. Grade analysis showed that with the increase in grade, children's understanding of Chinese medicine knowledge significantly improved, especially the fourth and fifth-grade children the number of Chinese medicine and Chinese medicine understanding of the performance is better, but in the sixth grade, decreased. This may reflect that the fifth grade is the peak of TCM knowledge education, while the sixth grade is less concerned due to the increase in curriculum pressure and other factors. This indicates that when designing Chinese medicine board games, special attention should be paid to the learning needs of children in lower grades, and consideration should be given to strengthening the consolidation and expansion of Chinese medicine knowledge after the fifth grade.

Secondly, regarding children's preference for board games as forms of entertainment, the data shows that most children (61.35%) play board games on a regular basis. This shows the wide acceptance of board games as a form of entertainment among children. In addition, more than half of the children (53.37 percent) clearly expressed their desire to learn TCM knowledge with friends through board games, and 41.40 percent said they would consider it. This shows that board

games can not only provide entertainment but can also be an effective learning tool, stimulating children's interest in learning through interactive and gamified ways.

Children's specific expectations of TCM board games also provide an important reference for game design. 42.64% of children hope that board games can increase their interaction with friends, 31.17% of children hope to learn more about Chinese medicine through board games, and 9.73% of children hope to learn about the use and efficacy of Chinese herbs. These expectations suggest that successful TCM board games should be both entertaining and educational, helping children better understand and master TCM knowledge through interaction and game mechanics.

Parents' attitudes and support for TCM board games are also crucial. The study found that there was a significant positive correlation between parents' understanding of TCM culture and their support for TCM board games. Most parents (92.77%) want their children to learn Chinese medicine culture, and 86.28% of parents said they support their children to play board games with knowledge of Chinese medicine culture. This finding indicates that parents generally recognize the value of TCM cultural education and are willing to help their children learn TCM knowledge through board games, which are interactive and accessible. Parents' acceptance of the price of board games also indicates that they are willing to pay for high-quality educational products.

In summary, the results of this study show that TCM board games have a high degree of acceptance and expectation among children, and parents also give full support. According to the Chinese medicine knowledge of children in different grades, the design should pay attention to the basic knowledge training of children in lower grades and knowledge consolidation of children in higher grades. Board games should stimulate children's interest in learning through interactive and gamified learning styles while meeting parents' expectations for educational quality and content.

4.3 QUALITATIVE RESEARCH ONLINE/OFFLINE INTERVIEWS

Through interviews with experts in games, traditional Chinese medicine and education, we can obtain their profound understanding and rich experience on a specific knowledge or a particular issue, make the knowledge content in books and literatures vivid and make up for the knowledge information content that is difficult to collect or has not yet been mentioned. The substantial knowledge reserve of experts, valuable experience in the industry for many years accurate, and keen insight into the future of the profession have brought more comprehensive, more real, more profound, and more novel research suggestions and directions for this study.

4.3.1 QUALITATIVE RESEARCH ONLINE INTERVIEWS WITH GAME EXPERTS

The interview is structured around play time, the balance between knowledge transmission and entertainment, play style preferences, game mechanics suggestions, and general suggestions (Table 18). The interviews with the three experts are summarized below.

Table 18
Questions of Game Expert Interview

Game expert interview questions
1. How much play time do you think should be limited for children aged 7-11?
2. In your opinion, when designing this board game, should you focus more on transferring knowledge or entertainment?
3. When designing the UI of this game, which style do you prefer? (Such as ink style, realistic style, cute style, etc.)
4. When designing this children's board game, do you have any suggestions for game mechanics?
5. Do you have any suggestions for this board game?

Note. Compiled and designed by the author.

Question 1 Summary of the interview results: All three experts believe that the duration of games should be limited to 20-30 minutes. This time allows children to get into a state of play and learning, learn knowledge, and stay focused without getting bored. Experts also proposed that different game rules can be established, the standard version and the upgraded version. The standard version is for young children or children who first contact the board game to facilitate their understanding of the rules and the establishment of confidence in the game, while the upgraded version is for older children or players who are very familiar with the game and want to challenge higher difficulties, but it is not appropriate to change the rules too much. Some special mechanics can speed up or slow down the progress of the game, and have an impact on the length of the game, and experts recommend that these game mechanics need to be appropriate.

Question 2 Summary of interview results: Experts say that a balance should be made between knowledge transmission and entertainment, both of which are equally important to children. According to the goal of this study, experts suggest that the proportion should be tilted toward knowledge transmission, but this does not mean that entertainment should be abandoned and traditional Chinese medicine knowledge should be used as the background and content basis of games. Will make the whole game become targeted, thematic, audience, value rich, complete, and broad, and how

to make this boring content become lively and interesting, the two connect naturally, can enable children to continue to in-depth experiences in the game, feel the charm of traditional Chinese medicine culture requires interesting game consoles to make a cornerstone. Experts put forward the method of entertainment first; the attraction of entertainment is the first for children; when the child players are attracted and have expectations for the process of the game, the game is half of the success.

Question 3 Summary of the interview results: People at each stage and in each era have different aesthetic preferences and requirements. Children aged 7-11 have a strong perception of color. Compared with the ink style of Chinese painting, which is more compatible with the theme of Chinese herbal medicine, most children may not like it. They prefer bright, bright, and strong contrast colors, which can attract children's attention and transmit positive energy, such as warm colors such as red, orange and yellow. Soft colors: pink, light blue, light yellow... Bright colors: red, green, blue, etc., these colors can create a dynamic, imaginative, adventurous game atmosphere for them. Cartoon cute images are also one of the popular styles of this age group such as two-headed characters, anthropomorphic animals, and plant images will make them have a strong interest. Therefore, experts recommend giving priority to hand-painted children's illustration styles, such as crayon style, pencil style, watercolor style, collage style, and other children's illustration is a good choice.

Question 4 Summary of interview results: Rolling dice is a common mechanism in most board games, which also shows that the sense of randomness and surprise brought by dice are strongly attractive to most players. Moreover, dice have social properties and can enhance the interaction between players, which is precisely one of the abilities that children at this level need to develop. The establishment of the reward mechanism can stimulate children's sense of achievement and satisfaction but also make the game more interesting, and gain confidence in the game, for example, when completing a small goal or small task to get points, gold coins, titles, and other instant rewards, increase their sense of participation and motivation in the game. Luck is also a part of winning in board games, and putting it in place to introduce some uncertainty into the game will increase the reopening rate of the game. Experts suggest that game mechanics should be kept as simple as possible, especially for the type of learning that requires playing. Too many mechanics can confuse the player in terms of memory and understanding, which can affect the educational effect of the game and the overall experience.

Question 5 Summary of interview results: Experts suggest that when designing the visual transformation of knowledge, it is necessary to make it clear so that knowledge is conveyed in an intuitive and easy-to-understand way, the task objectives of the game need to be set clearly to ensure that the educational objectives of the game can be successfully completed, and the selection of game-related accessories should take into account the material and safety, in addition, it is necessary to consider the possible expansion of the game in the future.

Figure 9

Interviews with Design Experts (Designer Cui, Designer Fang, Designer Kong)



Note. Photographed by the author.

4.3.2 QUALITATIVE RESEARCH TCM EXPERTS INTERVIEWED

OFFLINE/ONLINE

This interview focuses on the basic knowledge of Chinese medicine, enriching the fun of the game, broadening the depth of Chinese medicine knowledge, traditional Chinese medicine diagnosis methods, and overall suggestions (Table 19). The interviews with the three experts are summarized below.

Table 19

Questions of Interviews with TCM Experts

Questions of interviews with Chinese medicine experts
1. What basic knowledge of TCM do you think children should know and master? (Such as sex, classics, traditional Chinese medicine processing technology, ancient doctors, etc.)
2. Do you have any knowledge to share about these 25 traditional Chinese medicines? (For example: interesting facts behind herbs)
3. Do you think that in addition to understanding the sex, taste, classics, processing methods, indications, and effects of medicinal materials, what else should be understood?
4. Chinese medicine emphasizes observation, listening, inquiring and cutting, how is it realized?
5. Do you have any suggestions for this board game?

Note. Compiled and designed by the author.

Question 1 Summary of interview results: The culture of traditional Chinese medicine is broad, profound, and very profound. Children aged 7-11 should not be involved in it too de. Otherwise, they will find it difficult to understand and lose interest. For this age group, it is enough to understand some basic information of Chinese herbal medicine. Most of the medical books in the introduction of herbal medicine are the first to explain the sex and taste, such as “this classic”, “medicinal herbs,” and so on, which shows its importance. In addition, the processing method of traditional Chinese medicine can let children properly understand that the processing of each kind of traditional Chinese medicine is different, and the different expected efficacy will also have different processing methods, which cannot be accurately summarized.

Question 2: Summary of the interview results: Each herbal medicine has a rich cultural history behind it, such as astragalus, which was often used to strengthen the physical strength of soldiers in ancient times; Gynostaphylla is a plant with strong adaptability to the environment, which is often regarded as a symbol of longevity in the folk, and is also used to soak water in southern China. It can be seen that people began to pay attention to the beneficial effects of traditional Chinese medicine on people very early. Forsythia There is a legend in some parts of China, which a village was plagued by a bad disease, and many villagers were helpless until an elderly man brought the seeds of forsythia from afar, planted them near the village, boiled water, and drank them, and soon after the villagers' illness was relieved, and since then forsythia has been known as the “guardian of herbs”. In addition, experts also mentioned that in the face of the same type of patients, each Chinese medicine will be affected by past experience when actually prescribing, and the prescription will be different.

Question 3 Summary of interview results: Experts believe that at the age of 7-11 years old, it is enough to understand these contents, among which the most important are the four Qi and five taste, which is not difficult for children and is a very important concept in traditional Chinese medicine, followed by the concept of classics and processing methods. In addition, experts also put forward that people now pay great attention to maintenance and health regardless of age, if you can integrate some health knowledge and the concept of the same origin of medicine and food is better, however, experts suggest that you can build on these contents to expand and improve, the most traditional Chinese medicine and basic knowledge or focus on the sex and taste classics.

Question 4: Summary of the interview results: Observation, listening, questioning, and cutting are important means of TCM diagnosis. Observation: observation of the patient's state, complexion, tongue coating, etc., external performance can reflect the patient's internal health state; Smell is based on sound and smell; To ask is to inquire through the dialogue with the patient to understand the medical history, symptoms, lifestyle and so on; The diagnosis is to feel the pulse, usually through the wrist to judge the disease, perceive the rise and fall of the pulse

phase to judge the disease, for example, the floating pulse is characterized by gentle pressure can feel the pulse, but the weight is not obvious, which is often related to external sensation (such as: cold). Each expert's method of diagnosis is different; some experts prefer to consult, and some experts are more accustomed to consulting; in short, Chinese medicine can be said to be empirical medicine to a certain extent, relying on long-term clinical observation and practice accumulation.

Question 5 Summary of interview results: Experts suggest strengthening the story background of traditional Chinese medicine to enhance children's interest, not too academic. For example, children playing doctor or patient will greatly enhance children's interest, you can also add some small tasks in the compatibility of herbs, choose the right herbs to treat patients, not only can let children understand the knowledge of herbs. it can also enable them to learn to solve problems in the process of playing, and remember to remind children of toxic herbs.

Figure 10

Interviews with Chinese Medicine Experts (Doctor Jiao, Doctor Jiao, Doctor Han)



Note. Photographed by the author.

4.3.3 QUALITATIVE RESEARCH EDUCATION EXPERTS INTERVIEWED ONLINE

This interview focuses on playing time, the balance between knowledge transmission and entertainment, game application scenarios, broadening the game dimension, and overall suggestions (Table 20). The interviews with the three experts are summarized below.

Table 20

Questions about Interviews with Education Experts

Educational expert interview questions
1. How much play time do you think should be limited for children aged 7-11?
2. In your opinion, when designing this board game, should we focus more on transferring knowledge or entertainment?
3. Do you think this board game is suitable for use in the classroom?
4. Do you think this board game needs to improve students' abilities in addition to their knowledge of Chinese medicine?
5. Do you have any suggestions for this board game?

Note. Compiled and designed by the author.

Question 1: Summary of the interview results: Children aged 7-11 generally focus on 20-30 minutes of attention, experts suggest that the game duration is best controlled within 30 minutes, to ensure that children maintain interest in the game process without feeling tired.

Question 2: Summary of interview results: Experts said that although entertainment is an essential guiding factor in attracting children to participate, the choice between the two should be more inclined to transfer knowledge, to find a balance between entertainment and knowledge, but also to make the game lively and interesting, but also to effectively transfer traditional Chinese medicine knowledge, such as design task challenges, customs clearance, and other forms can make children learn happily in the game. In addition, experts also said that parents usually mention the game will be more sensitive, so in the design of board games, they should pay more attention to the game to convey the content and knowledge. Otherwise, it will cause aversion to parents.

Question 3: Summary of interview results: Experts said that if the game design is reasonable and has real educational value, it can be used in the classroom as a knowledge expansion application. If the effect is good, it can be used as a basis for the development of school-based courses because the game itself can be used as a supplementary teaching tool to help students understand and remember knowledge. Still, the premise is that the rules must be clear. It is convenient for teachers to organize, and secondly, it has the value of continuous use.

Question 4: Summary of interview results: Game design needs to be integrated into the cultivation of other abilities, and the cultivation of teamwork, communication, and problem-solving skills can be reflected in games. It is worth noting that children develop social skills at this stage. Firstly, it is helpful to establish friendships, enhance self-confidence, and contribute to class unity; secondly, it is expected that children can learn to communicate with others. Listening to others and confidently expressing your opinions is a difficult part of textbook knowledge to develop. The importance of teamwork is not only reflected in communication but also in fostering sense of responsibility for a common goal. Experts say that if these abilities can be reflected in the game, it will be a meaningful board game.

Question 5 Summary of interview results: Experts pointed out that when designing this game, the first thing to ensure that the game's rules are simple and straightforward, not too complicated. Complex rules can confuse children, affect their play experience, and even create disgust. In addition, special attention should be paid to the design of visual elements because children in this age group generally have a stronger preference for bright colors and cartoon images. Bright colors and vivid characters can catch their attention and make the game more engaging.

Figure 11

Interviews with Education Experts (Teacher Tan, Teacher Luo, Teacher Xin)



Note. Photographed by the author.

4.3.4 SUMMARY

Experts agree that the best time for game design is 20-30 minutes, because 7-11 years old ear attention is usually in this interval; In terms of game mechanics design, experts believe that it is important to consider the fun and reopening rate of the game, which can be set up different versions, such as standard version and upgraded version; In terms of the balance between knowledge and entertainment, based on the purpose of this study, experts agree that knowledge transfer should be more important, but the first thing is to ensure the fun of the game, so as to attract children's attention, so as to effectively convey knowledge, such as designing challenges, special skills, dice and other game mechanisms; In terms of visual style preference, experts suggest to use more bright and bright colors, cartoon style can more arouse children's high interest,

traditional Chinese medicine theme, because the target group is 7-11 years old children, experts suggest that the design should not be too severe and traditional, lively, cartoon, personification and other elements can better adapt to children's aesthetic; In terms of game mechanism, experts believe that dice, cards, rewards and other mechanisms can increase the interaction and randomness of the game, bring cooperation and communication between players, and cultivate children's social ability, promote team cooperation and cultivate language expression ability. Experts also emphasize that the game's rules should not be complicated so as not to affect the game experience and educational effect. In selecting TCM knowledge, experts suggest that basic knowledge should be the main: sex and taste, classics, and processing methods, which are the most basic and important content of TCM. In terms of whether it has application value in the classroom, experts believe that it can be used as a supplementary tool in the school, and even may become the basis for the development of school-based courses. Finally, experts also propose paying attention to the safety of game accessories, avoiding sharp, environmentally unfriendly materials, etc., and considering the possible expansion of space in the future in design.

4.4 DESIGN STRATEGY AND SKETCH

Based on a literature review, case analysis, preliminary questionnaire survey, and expert interviews, the author determined the scope of the design direction of board games:

In the selection of herbs: *Salvia miltiorrhiza*, *Cornus officinalis*, *Polyporus umbellatus*, *Eucommia ulmoides*, *Bupleurum chinense*, *Corydalis yanhusuo*, *Moschus berezovskii*, *Ziziphus jujuba* Mill.var.spinosa, *Gastrodia elata*, *Astragalus membranaceus*, *Rheum palmatum*, *Fraxinus rhynchophylla*, *Gentiana macrophylla*, *Polygala tenuifolia*, *Physoclaina infundibularis*, *Bergenia scopulosa*, *Fritillaria taipaiensis*, *Asarum heterotropoides*, *Gynostemma pentaphyllum*, *Astragalus complanatus*, *Polygonatum kingianum*, *Forsythia suspensa*, *Scutellaria baicalensis*, *Rubia cordifolia*, *Aconitum carmichaelii*, these 25 kinds of herbs are not only classic in Chinese medicine, but also have regional characteristics. Give game culture depth and educational connotation. Due to the lack of salty medicine and cold medicine in these authentic medicinal materials, to make the design research works more comprehensively cover the four qi and five taste knowledge concepts, since *Monetaria annulus* conforms to both salty and cool, an extra herb is added to the design to supplement the integrity of this concept.

In the selection of game mechanics: Selected from literature review and correlation studies: Dice rolling, hand management, variable player abilities, collection sets, hexagonal grid, simulation, card selection, area control, module layout, plate placement, worker placement, point-to-point movement, betting and betting, pattern recognition, racing, action response, Variable layout, take moves, storytelling, reasoning, Multi-purpose cards, Instant, Roll rotation and movement, Link, Card drive

Motion, deck construction, open drafting, role play, 29 mechanisms, through qualitative research and case studies combined with the above design of the research work of the game mechanism to select the initial scope: dice, set collection, luck, question and answer, area control, hand management;

In terms of time setting, according to the attention span of children aged 7-11, the duration of a single game is 20-30min;

In terms of the number of players: In order to meet the needs of individual players and meet the social needs of multiplayer games to enhance interaction, the number of people is set to 1-6 people;

In the choice of game themes: children, family, education, plants, medicine, science, plants;

In the game's desktop requirements, in order to meet the needs of school or family or going out, the game's desktop requirements are designed to be portable or portable.

4.4.1 DESIGN STRATEGY BASED ON OCTAGONAL BEHAVIOR FRAMEWORK

Based on the theoretical research on the analysis framework of octagon behavior in Chapter 2 literature review, it is known that there are multiple core driving forces behind any human behavior, and the game element is an effective way to guide and stimulate these core drivers. Centering on children's need to learn Chinese herbal medicine, this framework provides more scientific theoretical support for children's Chinese herbal medicine design. In the design of the strategy, several factors need to be considered, such as Knowledge presentation, game mechanism, reward mechanism, challenge and task, etc. Since the target population is 7-11 years old, compared with adults, their cognitive ability and thinking mode have certain limitations, so the design needs to make appropriate choices according to the characteristics of the target population to avoid overly pursuing comprehensiveness and weakening the core effect of the overall design. Based on this, according to the octagonal behavioral framework, the author designs three different strategies, which differ in the design emphasis but stay within the core goal of the design direction.

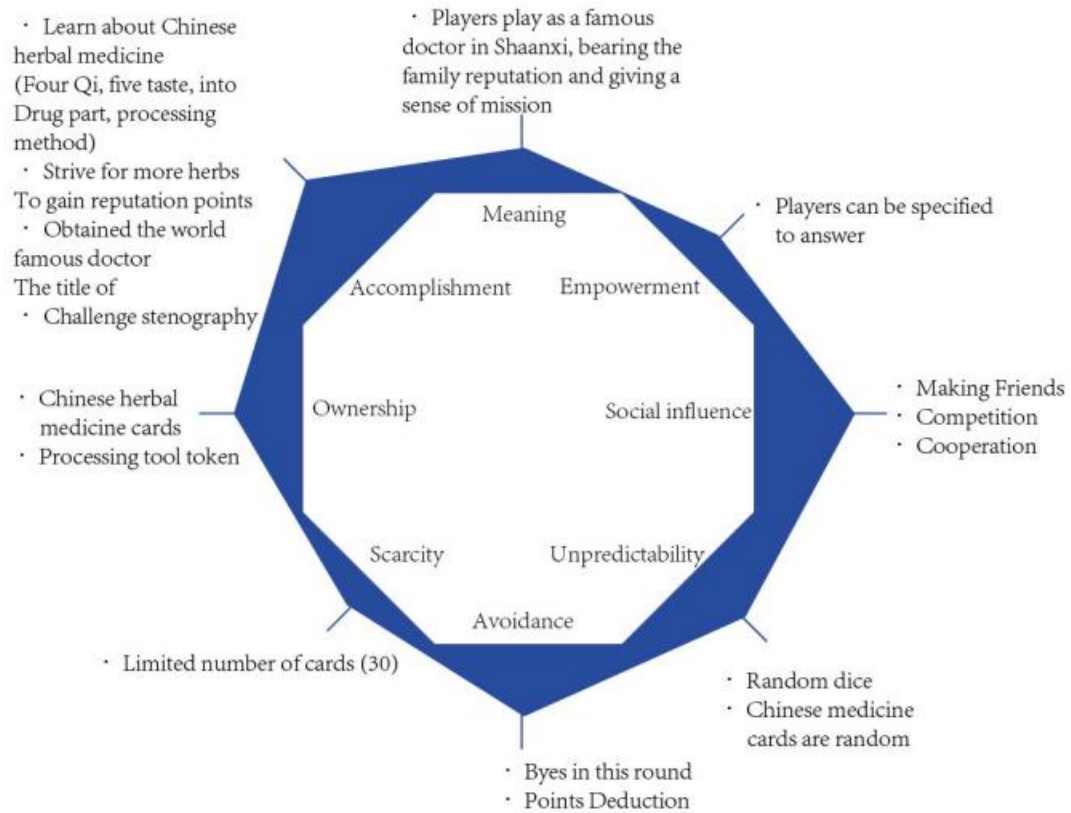
The third version of the design was self-tested after the complete scheme architecture and production. Some potential problems were found, immediately modified, and optimized, laying a solid foundation for the subsequent expert testing.

4.4.2 DESIGN STRATEGY SCHEME OF THE FIRST VERSION

The first version of the program strategy is based on the "octagonal behavior model" design, focusing on the construction of achievement, ownership, and social and unknown elements, aiming to effectively mobilize the enthusiasm and participation of players (Figure 12).

Figure 12

The First Edition is Based on the Octagonal Behavior Model Design Strategy



Note. Illustrated by the author.

(1) Sketch and self-test

In this scenario, the author first sketched a prototype of the game (Figure 13), then designed the sketch (Figure 14), and finally conducted several rounds of repeated tests with three board game enthusiasts (Figure 15), with the purpose of testing whether the game flow is smooth, whether there are cognitive errors in design, and whether there is fun and playability (Table 21).

Figure 13

Preliminary Sketch

玩家人数: 4-6

Step 1.

Player: A
B
C
DImage of
Chinese
medicine

摆放桌面 Put on the table

Place token

放置token

玩家依次A/B/C/D

Players can choose A/B/C/D

Step 2. 洗牌

Shuffle the cards



27张卡牌

打乱顺序

27 cards in random order

Step 4
开始游戏

Start the game

Roll the dice

① 掷骰子

② 抽牌
Draw a cardHeads
正Backs
反Answer the question
according to the dice icon按照骰子指示图标
回答问题
5秒之内
可看答案

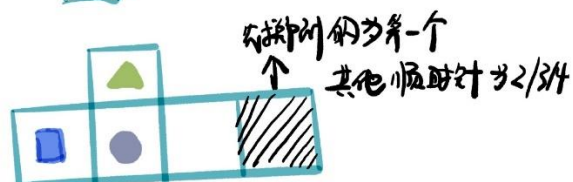
回答对放在自己面前, 1卡牌1分

回答错放入废牌堆

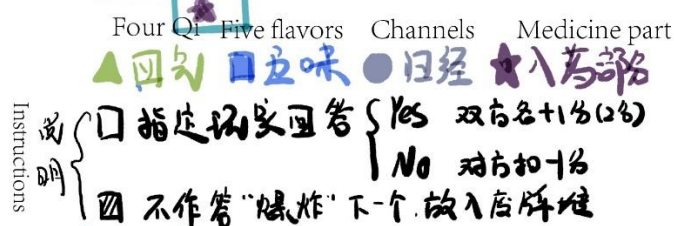
抽牌时骰子图标对, 牌反骰子图标不对, 点对者过
骰子, 以便抽取卡牌.

1. The first player to roll becomes the starting player
2. Other players are arranged in a clockwise direction
3. If the answer is correct, the card is placed in front of the player, and 1 card is scored 1 point


Step 3 决定先后 Determine the order of priority




The first player to roll becomes the starting player
Other players are arranged in a clockwise direction



- ③ a. 抽卡或后, 结算
每牌1分, 翻如者最多名胜
b. 版图可翻转, 高阶玩法=无提示
c. 胜者推进一格格子

 Specified player answers:
yes, both sides +1 point; no,
both sides deduct 1 point

 "Nothing happened",
put into the discard pile

- a. After the card is drawn, settle
b. The board can be turned over,
c. The winner advances one grid on the list

Note. Illustrated by the author.

Figure 14
Sketch Design



Figure 15

The First Version of the Game is Actually Tested



Note. Photographed by the author.

Table 21

The First Version of the Game Design Self-Testing Feedback

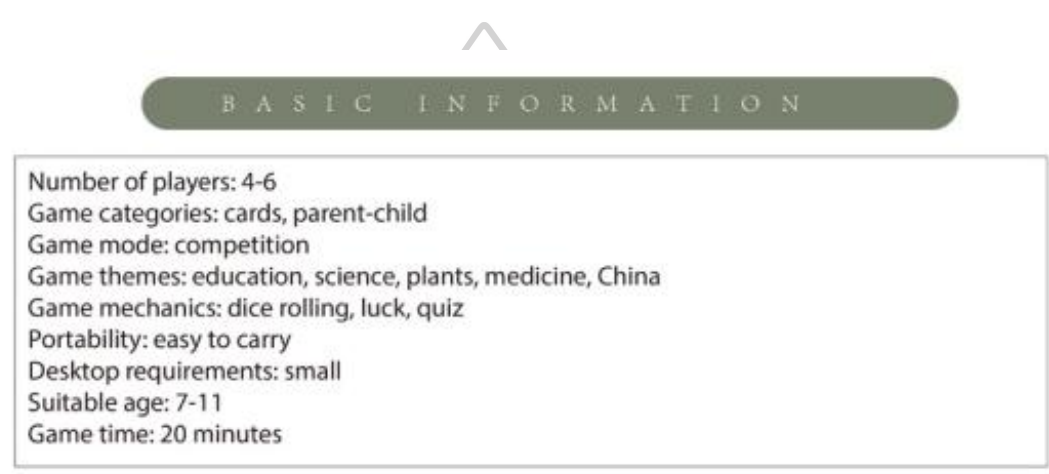
Fluency	Interactivity	Interestingness	Knowledge learning	Strategy	Improvement
Basically smooth, no obvious stall	The interaction is low, only in certain parts of the communication will be more focused on their own game progress	The interest is low, and there is no obvious excitement	Knowledge learning is strong, quickly drawing cards and answering questions can stimulate the player's desire to memorize and compete.	Low strategy	The processing tool needs to be named to prevent confusion.

Note. Compiled and analyzed by the author.

(2) Optimization of the first version

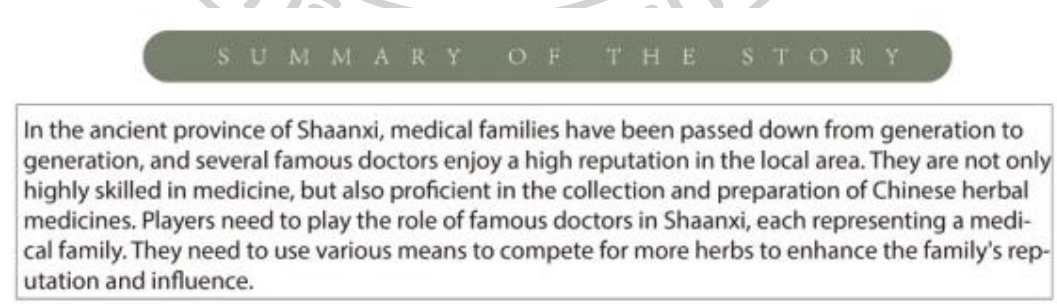
Through self-testing of the first version of the game plan and collecting feedback information, some specific details of the game were adjusted: a text explanation of the concoction method was added, and the following information was improved: basic game information (Figure 16), story outline (Figure 17), game image explanation (Figure 18), game accessories (Figure 19), initial game settings (Figure 20), game rules (Figure 21-22), etc.

Figure 16
First Edition Solution - Basic Information



Note. Illustrated by the author.

Figure 17
First Edition Proposal - Story Synopsis



Note. Illustrated by the author.

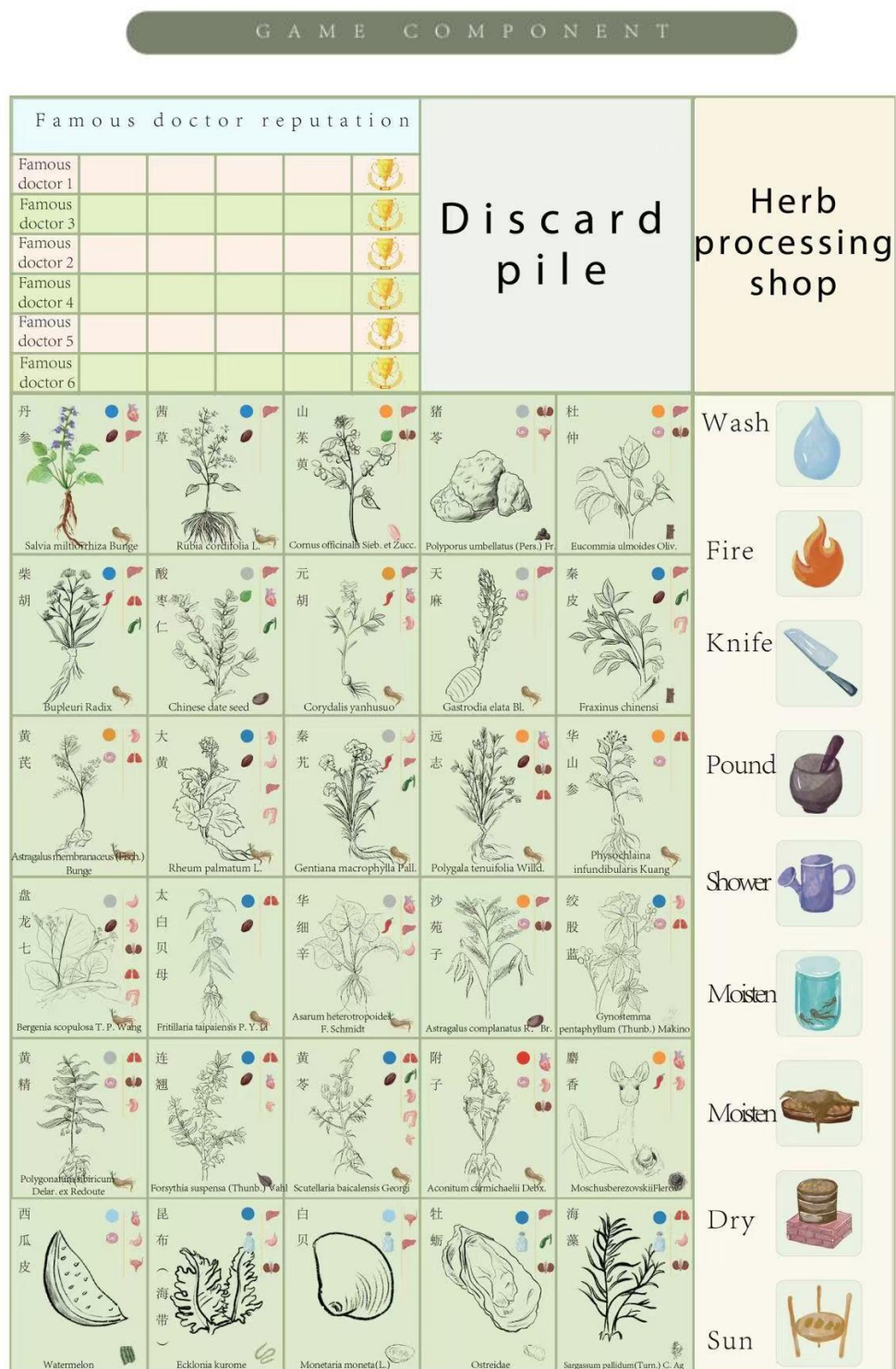
Figure 18*First Edition Solution - Image Interpretation*

REFER TO EXPLANATORY OF

Four Qi	 Warm	 Hot	 Neutral	 Cool	 Cold					
Five flavors	 Sour	 Salty	 Bitter	 Sweet	 Spicy					
Meridians	 Bladder	 Large Intestine	 Gallbladder	 Lung	 Liver	 Spleen	 Kidney	 Stomach	 Small Intestine	 Heart
Medicinal part	 root	 rhizome	 pulp	 Whole plant	 Ripe fruit	 Bark	 Musk	 Shell	 Seed	 Dry sclerotium
	 Skin									

Note. Illustrated by the author.

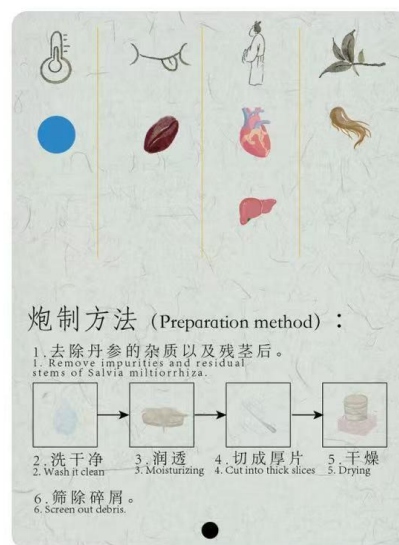
Figure 19
First Edition Solution - Game Accessories



A public board and crafting tool

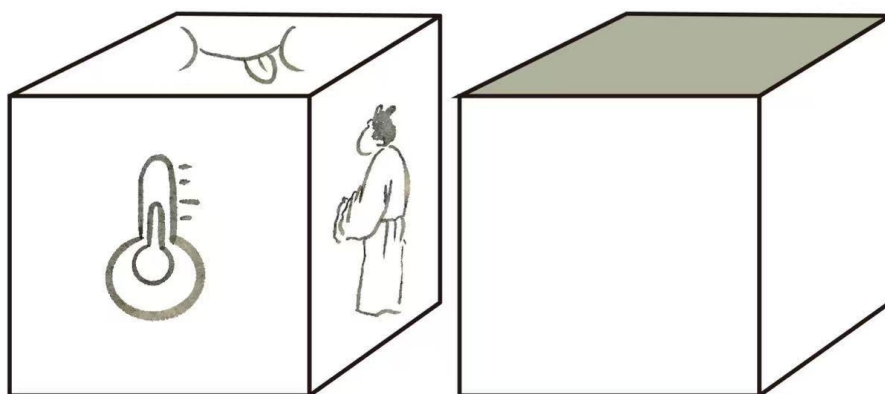


front

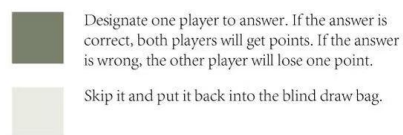
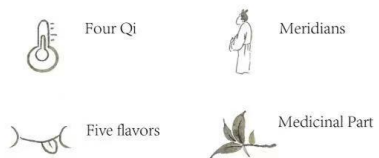


Reverse

30 community cards



A dice



Note. Illustrated by the author.

Figure 20*First Edition Solution - Initial Setup*

INITIAL GAME SETTINGS

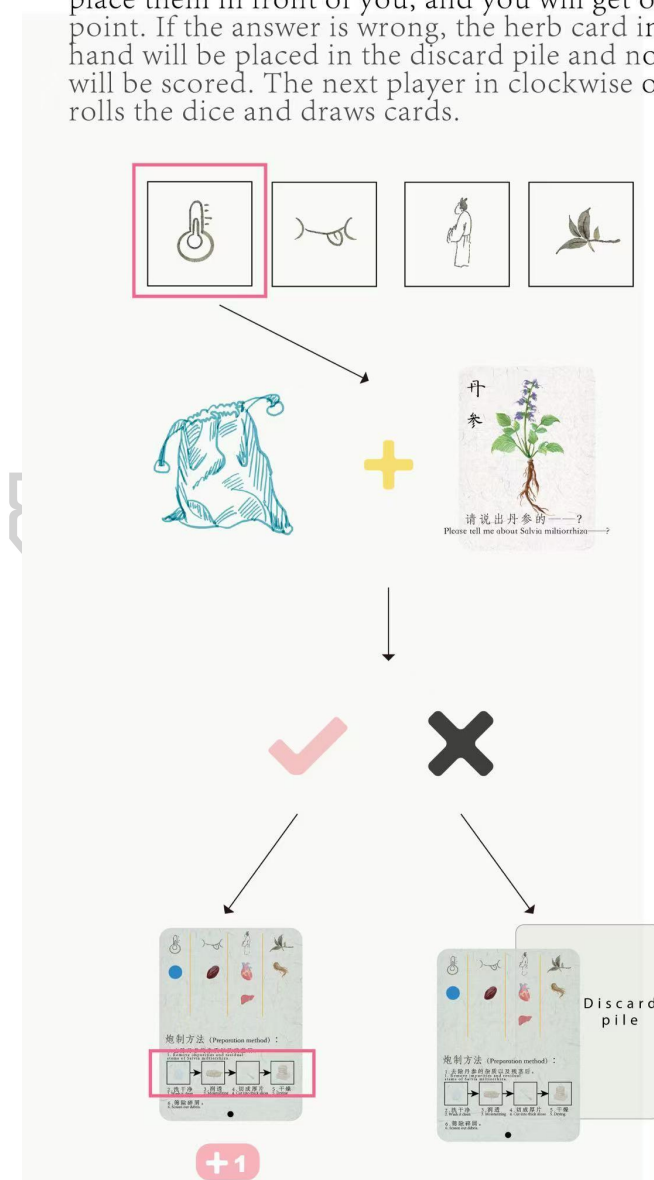
Famous doctor reputation						Discard pile	Herb processing shop	
Famous doctor 1								
Famous doctor 3								
Famous doctor 2								
Famous doctor 4								
Famous doctor 5								
Famous doctor 6								
<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>丹参</p> <p><i>Salvia miltiorrhiza</i> Burge</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>茜草</p> <p><i>Rubia cordifolia</i> L.</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>山茱萸</p> <p><i>Cornus officinalis</i> Sieb. et Zucc.</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>猪苓</p> <p><i>Polyporus umbellatus</i> (Pers.) Fr.</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>杜仲</p> <p><i>Eucommia ulmoides</i> Oliv.</p> </div> </div>	Wash			
<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>柴胡</p> <p><i>Bupleuri Radix</i></p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>酸枣仁</p> <p>Chinese date seed</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>元胡</p> <p><i>Corydalis yanhusuo</i></p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>天麻</p> <p><i>Gastrodia elata</i> Bl.</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>秦皮</p> <p><i>Fraxinus chinensis</i></p> </div> </div>	Fire			
<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>黄芪</p> <p><i>Astragalus membranaceus</i> (Hoffm.) Burge</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>大黄</p> <p><i>Rheum palmatum</i> L.</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>秦艽</p> <p><i>Gentiana macrophylla</i> Pall.</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>远志</p> <p><i>Polygala tenuifolia</i> Willd.</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>华山参</p> <p><i>Physoclaina infundibularis</i> Kuang</p> </div> </div>	Pound			
<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>盘龙七</p> <p><i>Bergenia scopulosa</i> T. P. Wang</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>太白贝母</p> <p><i>Fritillaria taipaiensis</i> P. Y. Li</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>华细辛</p> <p><i>Asarum heterotropoides</i> F. Schmidt</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>沙苑子</p> <p><i>Astragalus complanatus</i> R. Br.</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>绞股蓝</p> <p><i>Gynostemma pentaphyllum</i> (Thunb.) Makino</p> </div> </div>	Shower			
<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>黄精</p> <p><i>Polygonatum chinensis</i> Delar. ex Redoute</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>连翘</p> <p><i>Forsythia suspensa</i> (Thunb.) Vahl</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>黄芩</p> <p><i>Scutellaria baicalensis</i> Georgi</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>附子</p> <p><i>Aconitum carmichaeli</i> Debx.</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>麝香</p> <p><i>Moschus moschiferus</i> Pleske</p> </div> </div>	Moisten			
<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>西瓜皮</p> <p>Watermelon</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>昆布 (海带)</p> <p><i>Ecklonia kurome</i></p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>白贝</p> <p><i>Monetaria moneta</i> (L.)</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>牡蛎</p> <p>Ostreidae</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="margin-left: 10px;"> <p>海藻</p> <p><i>Sargassum pallidum</i> (Turn.) C. Ag.</p> </div> </div>	Dry			
					Sun			

Note. Illustrated by the author.

Figure 21*First Edition Plan - Rules of the Game*

START THE GAME

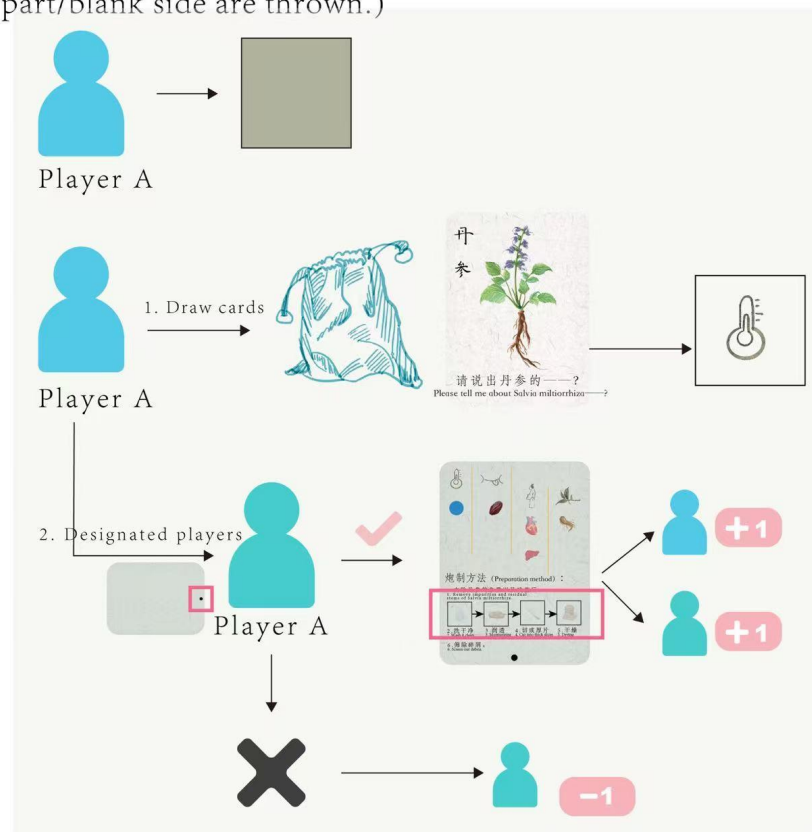
(1) When the dice rolls the instructions for the four properties/five flavors/meridians/medicinal ingredients, the player needs to answer the question on the dice. For example, if the player rolls the "four properties" and the herb card drawn is "Danshen", the player needs to answer what the four in Danshen is. After answering, turn the card over and check whether the answer is correct. If it is correct, you can prepare the herbs according to the text prompts and place them in front of you, and you will get one point. If the answer is wrong, the herb card in your hand will be placed in the discard pile and no points will be scored. The next player in clockwise order rolls the dice and draws cards.



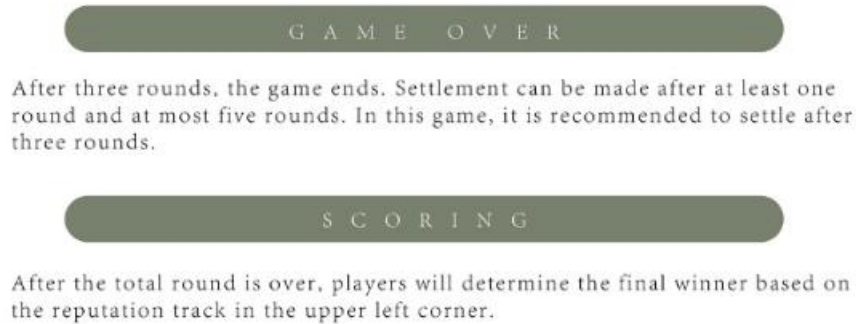
(2) When the blank side is thrown, the player does not need to draw a card and the round is a bye. No



(3) When the green side is thrown, the player draws a card, rolls the dice again, and designates any player on the field to answer. For example: Player A throws the green side, the card drawn by Player A is "Danshen", and the dice rolled again is "Five Flavors", and Player B is designated to answer. Player B needs to answer the five flavors of Danshen. After Player B answers, Player A turns the herb card over to check whether Player B's answer is correct. If the answer is correct, the two players cooperate to prepare the herbs according to the text prompts, and turn the dot on the card towards Player B. Both players score one point. If Player B answers incorrectly, the herbs will not be prepared and the dot will be facing Player A. The role of the dot is indicated in the final settlement score. (If Player A throws the blank side again, this round is a bye, and the herb card is returned to the blind draw bag. Both players do not score; if the green side is thrown again, they can throw again until the four properties/five flavors/channels/medicinal part/blank side are thrown.)

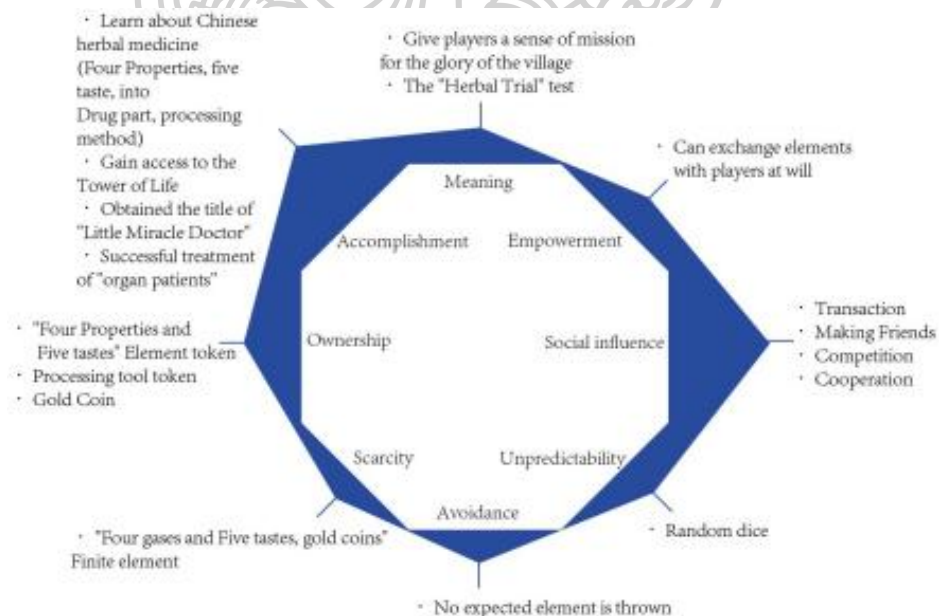


Note. Illustrated by the author.

Figure 22*First Edition Plan - Rules of the Game**Note.* Illustrated by the author.

4.4.3 THE SECOND EDITION DESIGN STRATEGY SCHEME

The second edition of the scheme strategy is based on the “octagonal behavior model” design, focusing on the construction of achievement, social, and ownership elements, aiming to effectively mobilize the enthusiasm and participation of players (Figure 23).

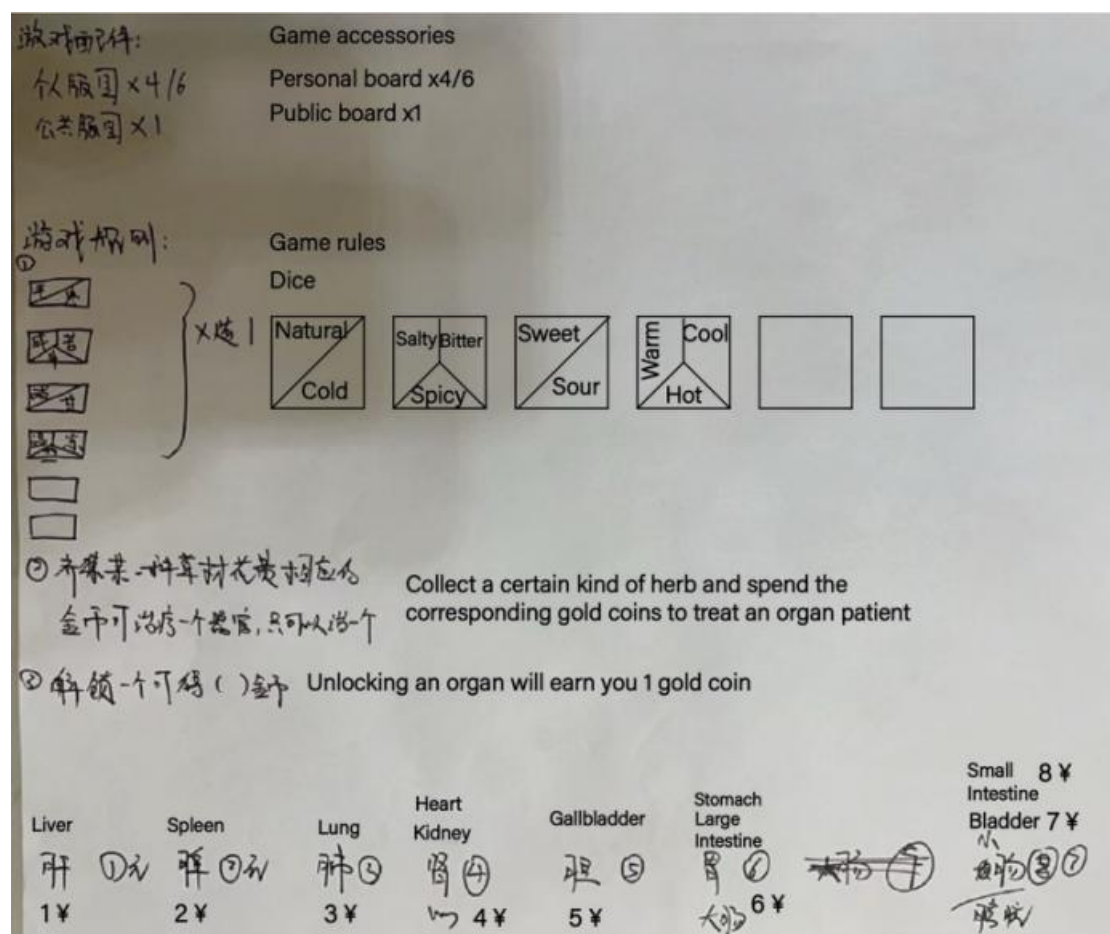
Figure 23*The Second Edition is Based on Octagonal Behavior Model Design Strategy**Note.* Illustrated by the author.

First, sketch and self-test feedback.

Through drawing the prototype of the game sketch (see Figure 24), the design of the sketch (see Figure 25), and multiple tests with three board game enthusiasts (see Figure 26), some obvious problems in the game have been tested: unreasonable gold Settings have led to obvious delays in the game, and players have basically no communication in the game, etc. The self-testing feedback is shown in Table 22.

Figure 24

Preliminary Sketch



Note. Designed and Photographed by the author.

Figure 25
Sketch Design



Note. Illustrated by the author.

Figure 26
The Second Version of the Game is Actually Tested



Note. Photographed by the author.

Table 22*The Second Version of the Game Design Self-Testing Feedback*

Fluency	Interactivity	Interestingness	Knowledge learning	Strategy	Improvement
Caton is strong, because the setting of gold coins is too small, resulting in the game is not smooth, there will be fewer gold coins as you play, and the initial player has a great advantage	The interaction is low, there is little communication between players, and they are all focused on their own herbal construction	Fun is high, and dice can cause significant emotional changes in players	Knowledge learning is strong, especially for the four Qi and five tastes of herbal medicine and normalization	The strategy is strong, because of the different elements of herbs, players need to consider how to collect herbs faster for healing organs	Increase the initial gold per player, adjust the game mechanics, and reduce the initial player advantage

Note. Compiled and analyzed by the author.

Second, optimization of the second edition.

Through self-testing of the second version of the game plan and collecting feedback information, the game rules have been changed: the amount of gold has been changed, and each “organ patient” can be rewarded with two gold coins. At the end of a single round of the game, players can exchange the necessary elements to enhance social interaction and cooperation between players, and improve: game basic information (Figure 27), story outline (Figure 28), game image explanation (Figure 29), game accessories (Figure 30), game initial Settings (Figure 31), game rules (Figure 32-34) and other information.

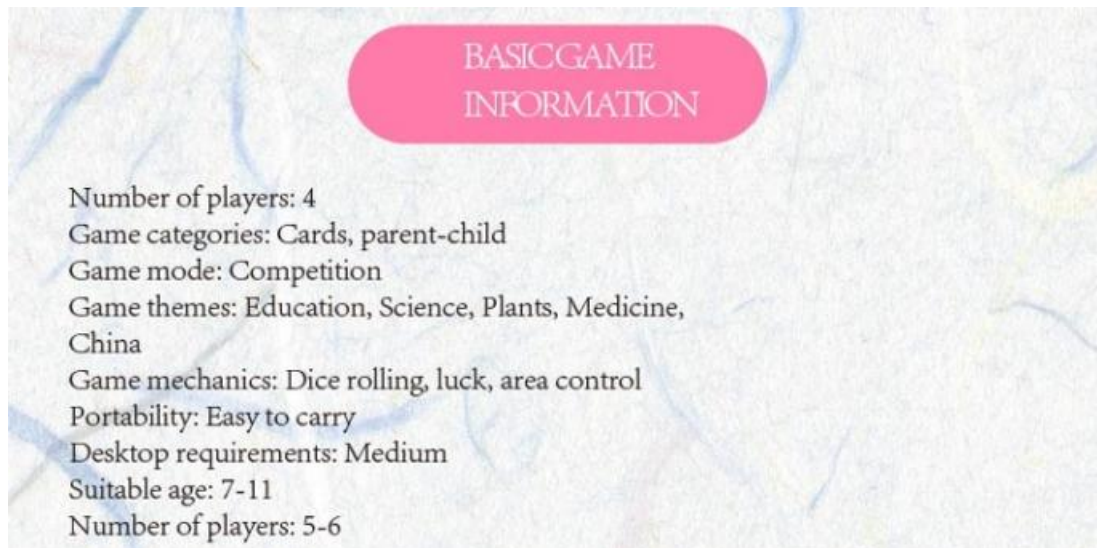
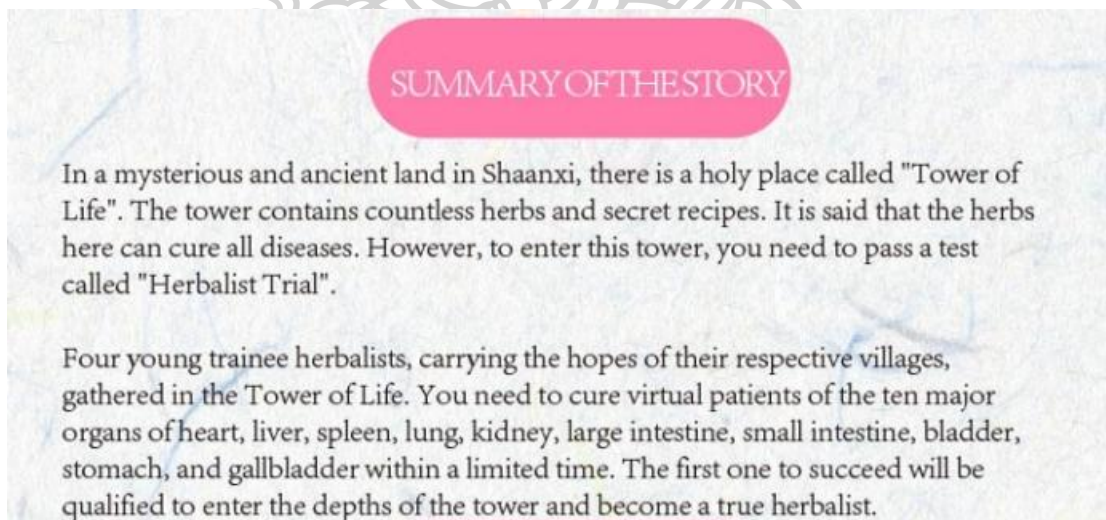



























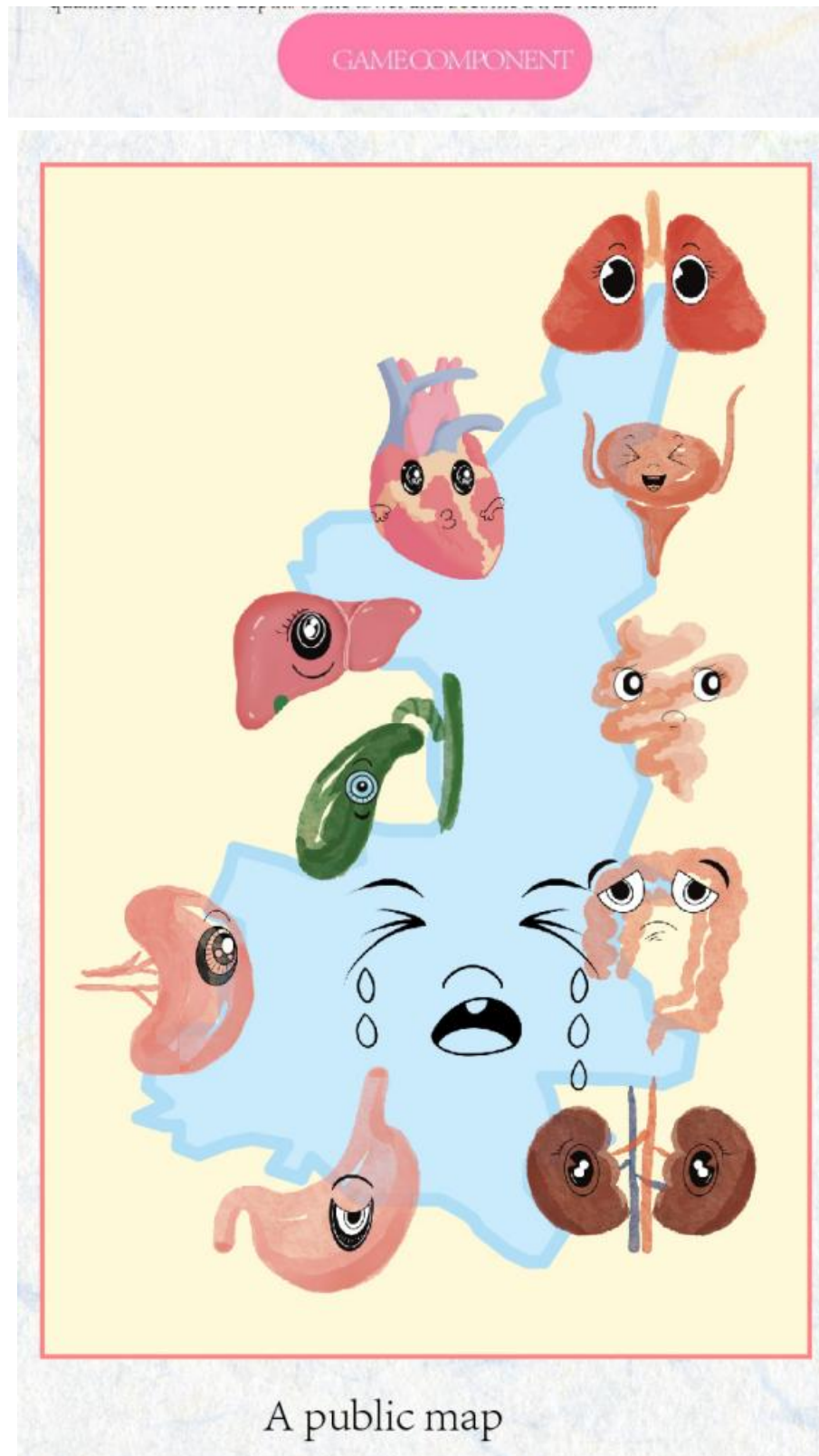
Figure 27*Second Edition Solution - Basic Information**Note. Illustrated by the author.***Figure 28***Second Edition Proposal - Story Synopsis**Note. Illustrated by the author.*

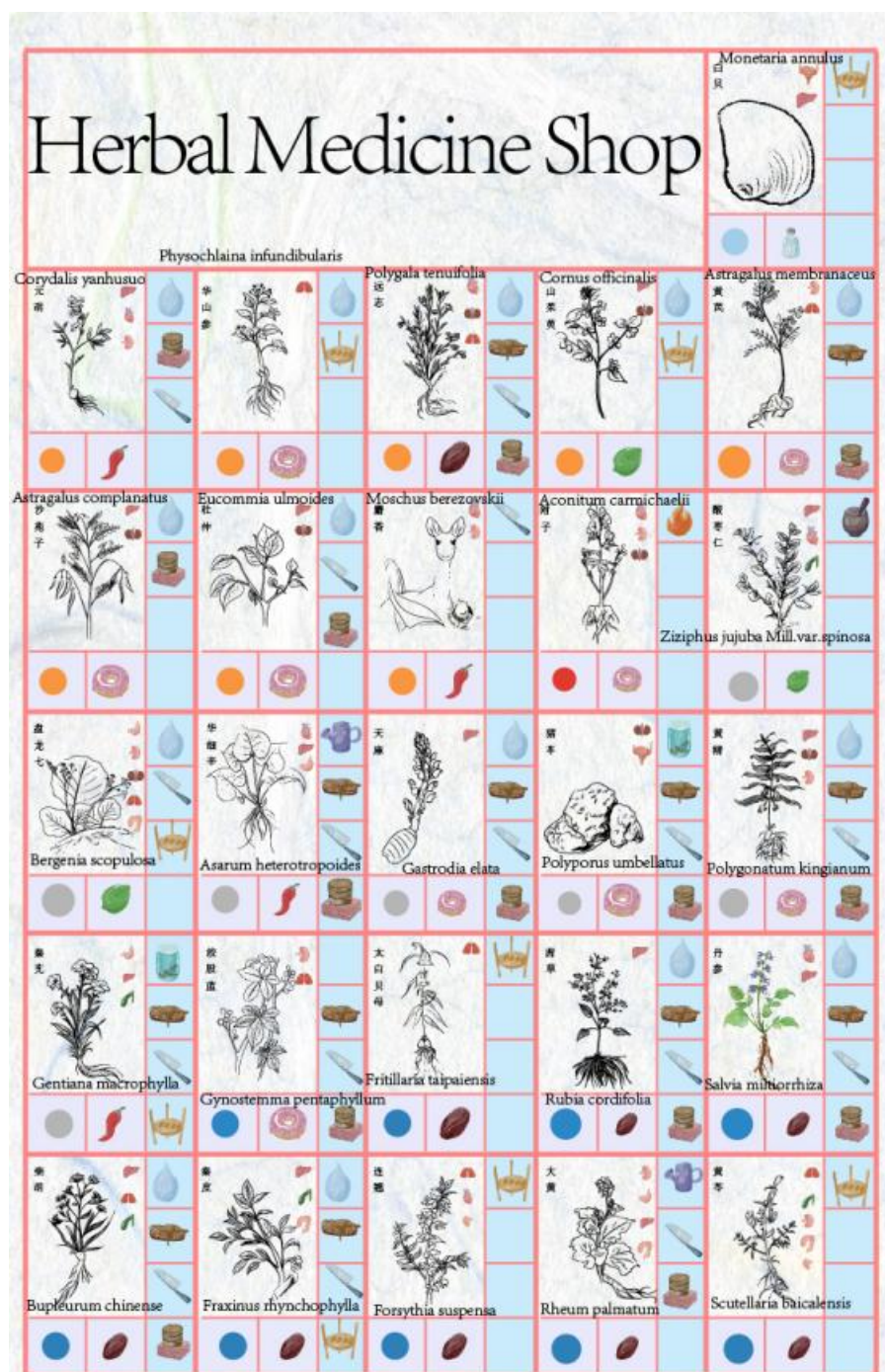
Figure 29*Second Edition Solution - Image Interpretation*

REFER TO EXPLANATORY OF										
Four Qi										
	Warm	Hot	Neutral	Cool	Cold					
Five flavors										
	Sour	Salty	Bitter	Sweet	Spicy					
Meridians										
	Bladder	Large Intestine	Gallbladder	Lung	Liver	Spleen	Kidney	Stomach	Small Intestine	Heart
Medicinal part										
	root	rhizome	pulp	Whole plant	Ripe fruit	Bark	Musk	Shell	Seed	Dry sclerotium
										
	Skin									

Note. Illustrated by the author.

Figure 30
Second Edition Solution - Game Accessories





Four personal maps



Note. Illustrated by the author.

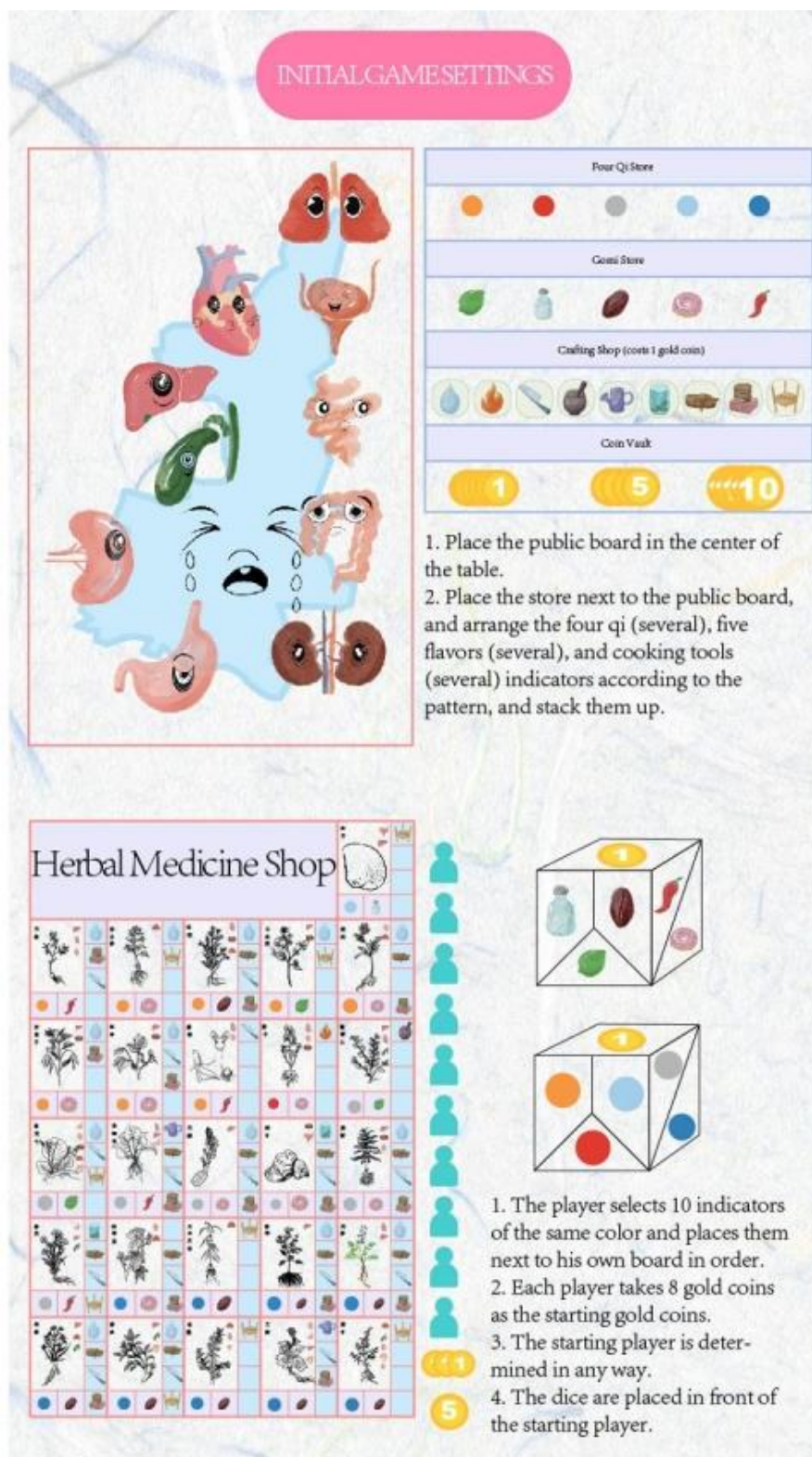
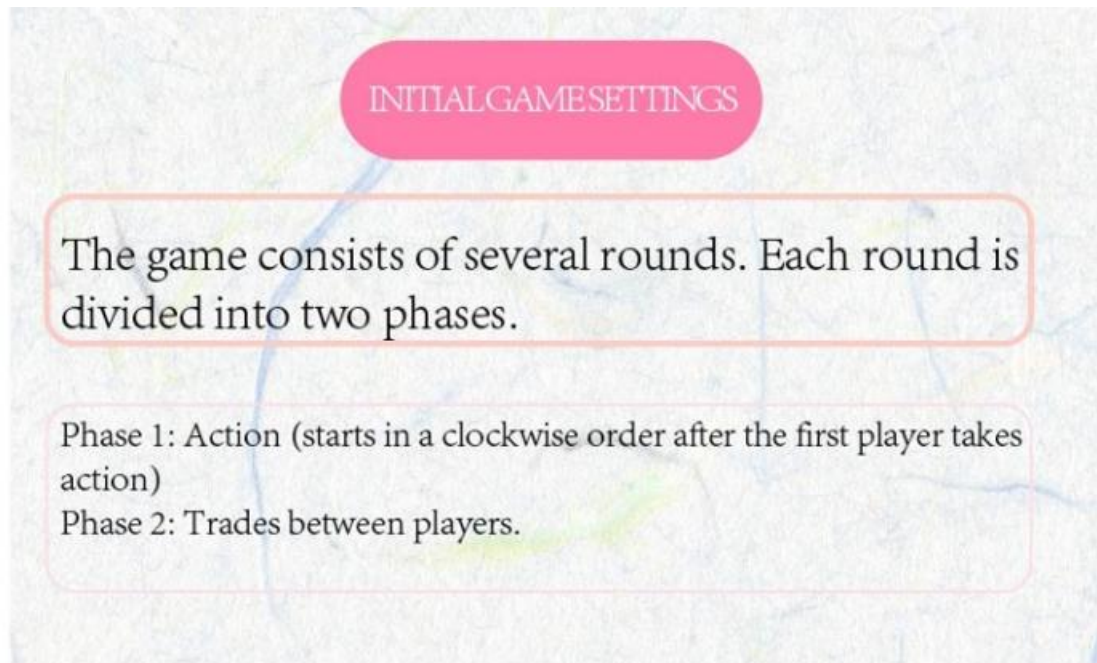
Figure 31*Second Edition Solution - Initial Setup**Note.* Illustrated by the author.

Figure 32

Second Edition Plan - Rules of the Game



Note. Illustrated by the author.

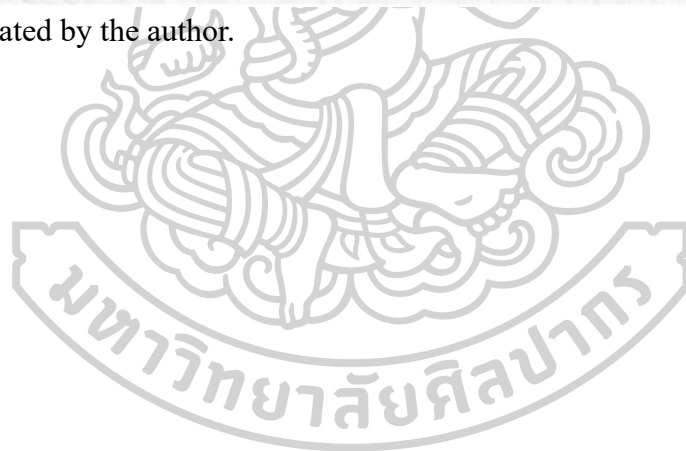


Figure 33*Second Edition Plan - Rules of the Game*

Phase 1: Action

Basic Action

(1) Collect herbs to synthesize elements/earn gold coins

The first player rolls the dice (side A: flat, cold; side B: salty, bitter, sour; side C: warm, cool, hot; side D: spicy, sweet; side E: add one gold coin; side F: add one gold coin). Players can only choose one element on the side they roll. For example, if player 1 rolls side A, side A is flat or cold, player 1 can only choose cold or flat elements.

If a player rolls side E/F, he can take a gold coin from the gold coin vault.



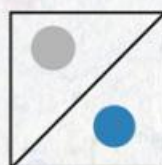
Choose one of
salty/bitter/sour



Spicy/Sweet
Choose one



Choose one of
warm/cool/hot



Neutral/Cold
Choose one



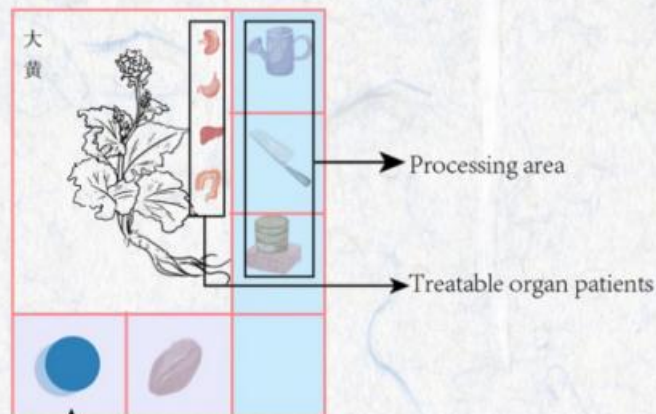
Gold coin plus
one



Gold coin plus
one

(2) Manage herbs

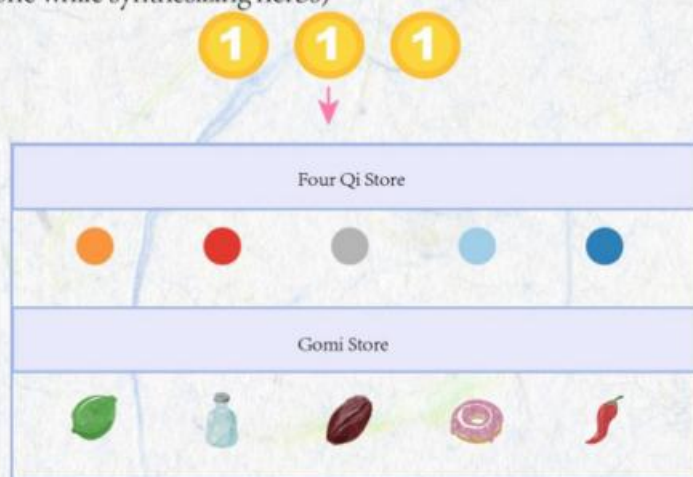
After making their selection, players must take an element from the store and place it on their own board. For example, if player 1 rolls side A and chooses a cold element, they must take a cold element from the Four Qi store and place it on the corresponding cold herbal board (personal board). The cold herbs on the board are madder, salvia miltiorrhiza, bupleurum, qinpi, suspensa, rhubarb, and phellodendron. Player 1 can choose any one to place.



For example: Choose rhubarb as the herb you want to synthesize, and place the cold element according to the instructions on the board.

(3) Purchase the required elements

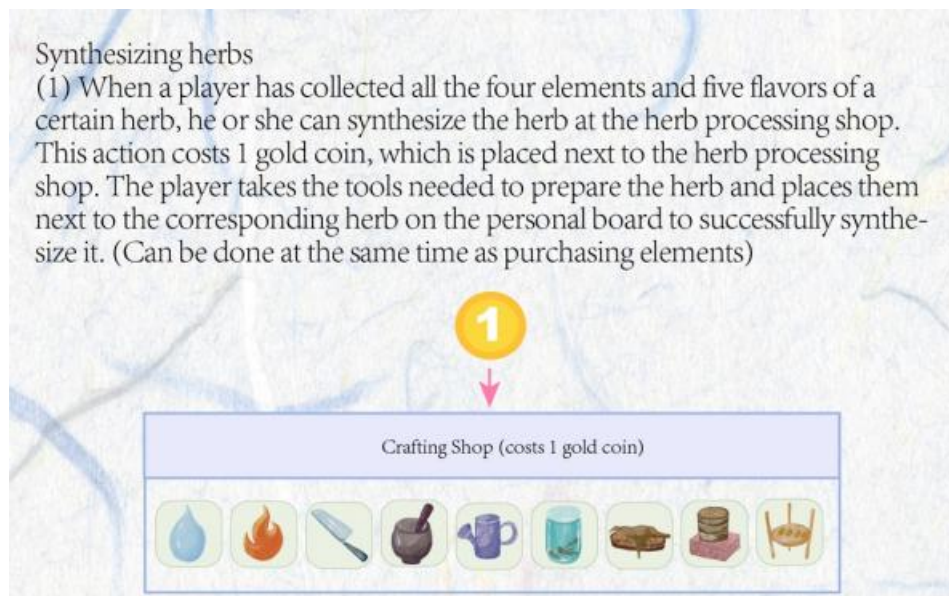
Players can purchase the required elements directly from the store, which costs 3 gold coins. You can only purchase one element at a time. (This can be done while synthesizing herbs)



Note. Illustrated by the author.

Figure 34

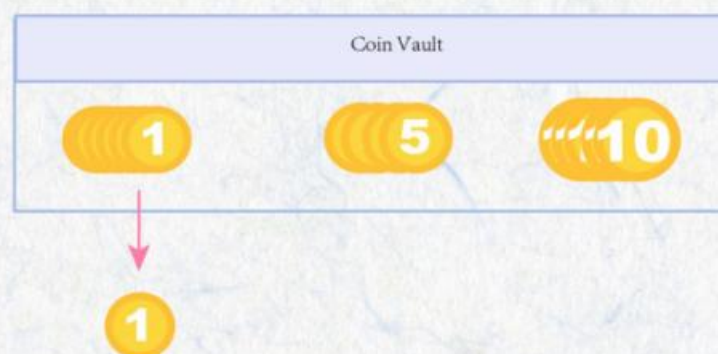
Second Edition Plan - Rules of the Game



Treatment

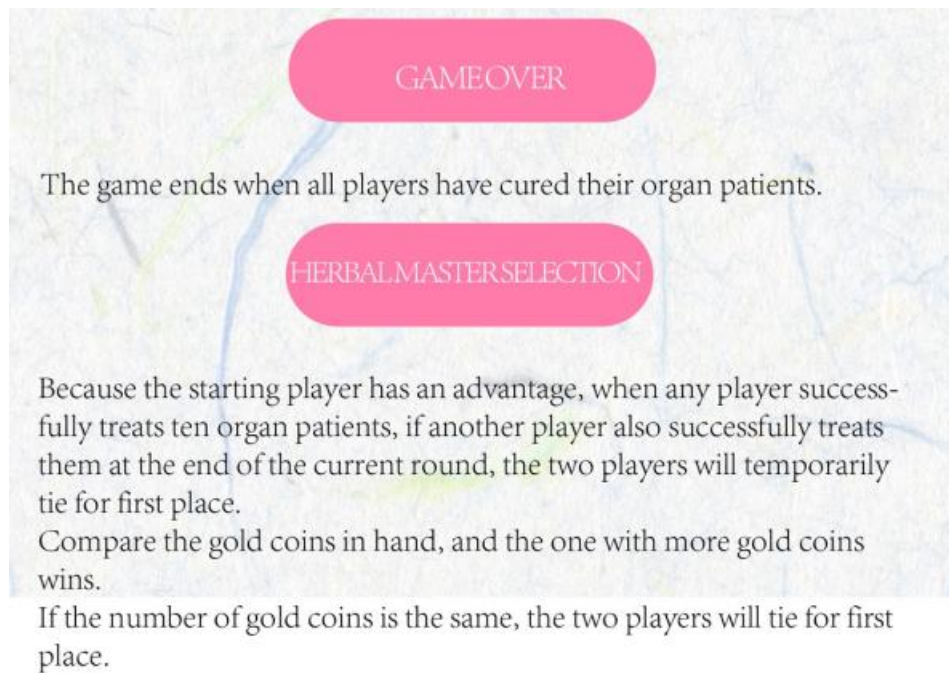
(1) When a player successfully synthesizes a certain herb, they can perform treatment. The player selects the treatment part according to the prompt in the upper right corner of the herb on the personal board. Each herb may be able to treat 1-5 parts, but the player can only choose one to treat and place his representative token on the selected organ. After using the herb for treatment, this herb cannot be used again.

(2) After successfully treating an organ, you can get 1 gold coin from the gold coin library.

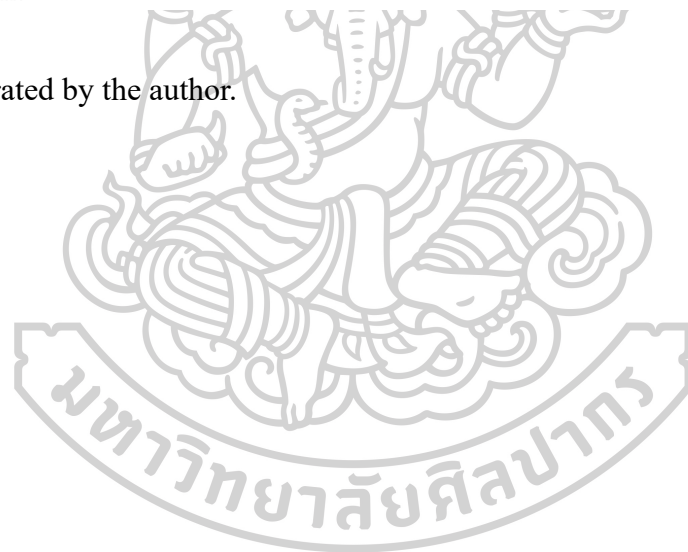


Phase 2: Player Trading

When a round ends, players can choose to trade with any other player. Players can choose to exchange their own elements, or spend 2 gold coins to buy. Players can negotiate among themselves.◦



Note. Illustrated by the author.

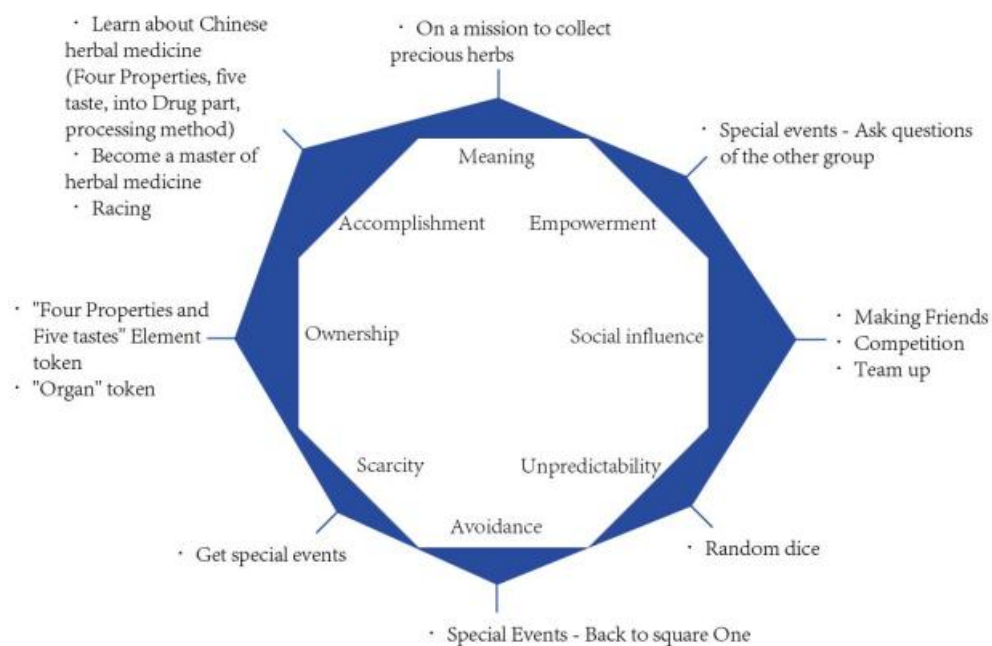


4.4.4 THIRD EDITION DESIGN STRATEGY SCHEME

The third edition of the scheme strategy is based on the “octagonal behavior model” design, focusing on the construction of the elements of accomplishment, sociability and ownership, aiming to effectively mobilize the enthusiasm and participation of players (Figure 35).

Figure 35

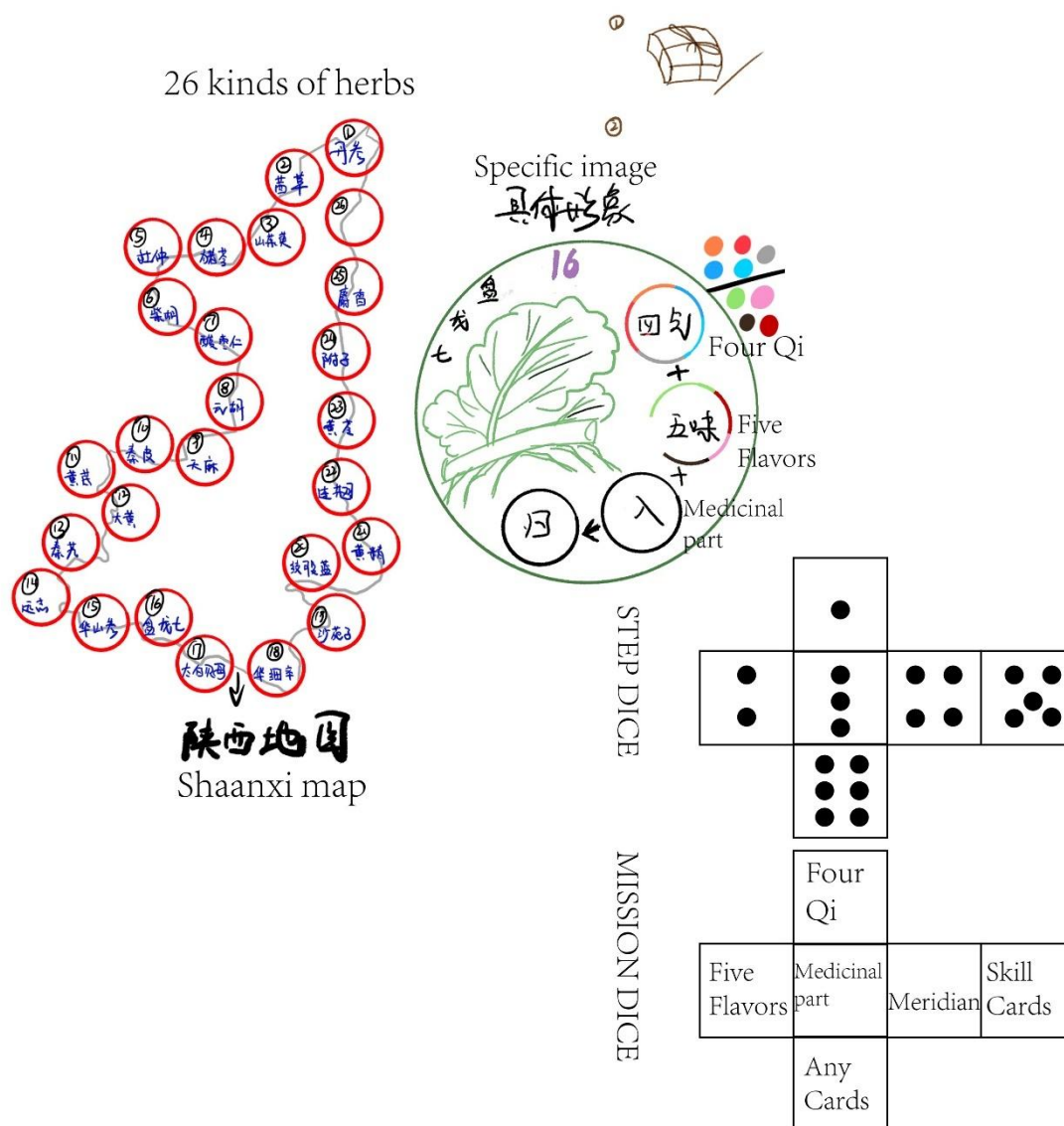
The Third Edition is Based on Octagonal Behavior Model Design Strategy



Note. Illustrated by the author.

First, sketch and self-test feedback.

The author of this scheme first drew a preliminary sketch (Figure 36), then made a sketch design (Figure 37), and finally tested with three board game enthusiasts for many times (Figure 38). The feedback results were good in terms of game fluency, interaction, and fun, while the results were medium in terms of knowledge learning dimension, and the game strategy was low (Table 23).



Note. Illustrated by the author.

Figure 37
Sketch Design



Note. Illustrated by the author.

Figure 38
The Second Version of the Game is Actually Tested



Note. Photographed by the author.

Table 23*Third Edition Game Design Self-Assessment Feedback*

Fluency	Interactivity	Interest	Knowledge learning	Strategy	Improvement
The game is smooth, with almost no lag	Highly interactive, with two-on-two teaming, more cooperation and communication within the team	Highly interesting, the mode of one person rolling the dice and one person completing the task makes the players highly focused and joyful	Medium knowledge learning	Low strategy	Increase the number of dice rolls per group, reduce the game time, and use puzzles to make the game more convenient

Note. Compiled and analyzed by the author.

Second, optimization of the third edition.

Through self-testing of the third version of the game plan and collecting feedback information, the following changes have been made to the game details: adjusting the public map of the elements placed on the two groups of players, adding an additional number of dice rolls for each group of players, adding random events in the public map, and improving: Game basic information (Figure 39), story outline (Figure 40), game image explanation (Figure 41), game accessories (Figure 42), game initial Settings (Figure 43), game rules (Figure 44-46) and other information.

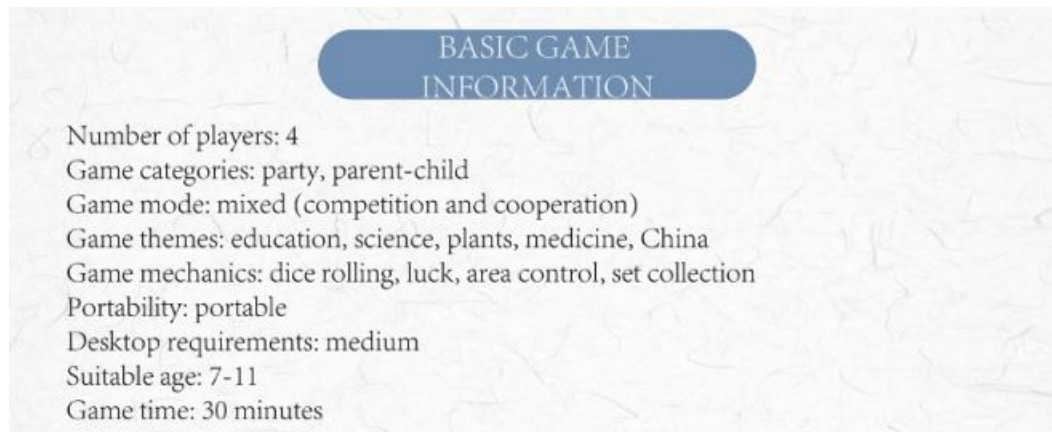































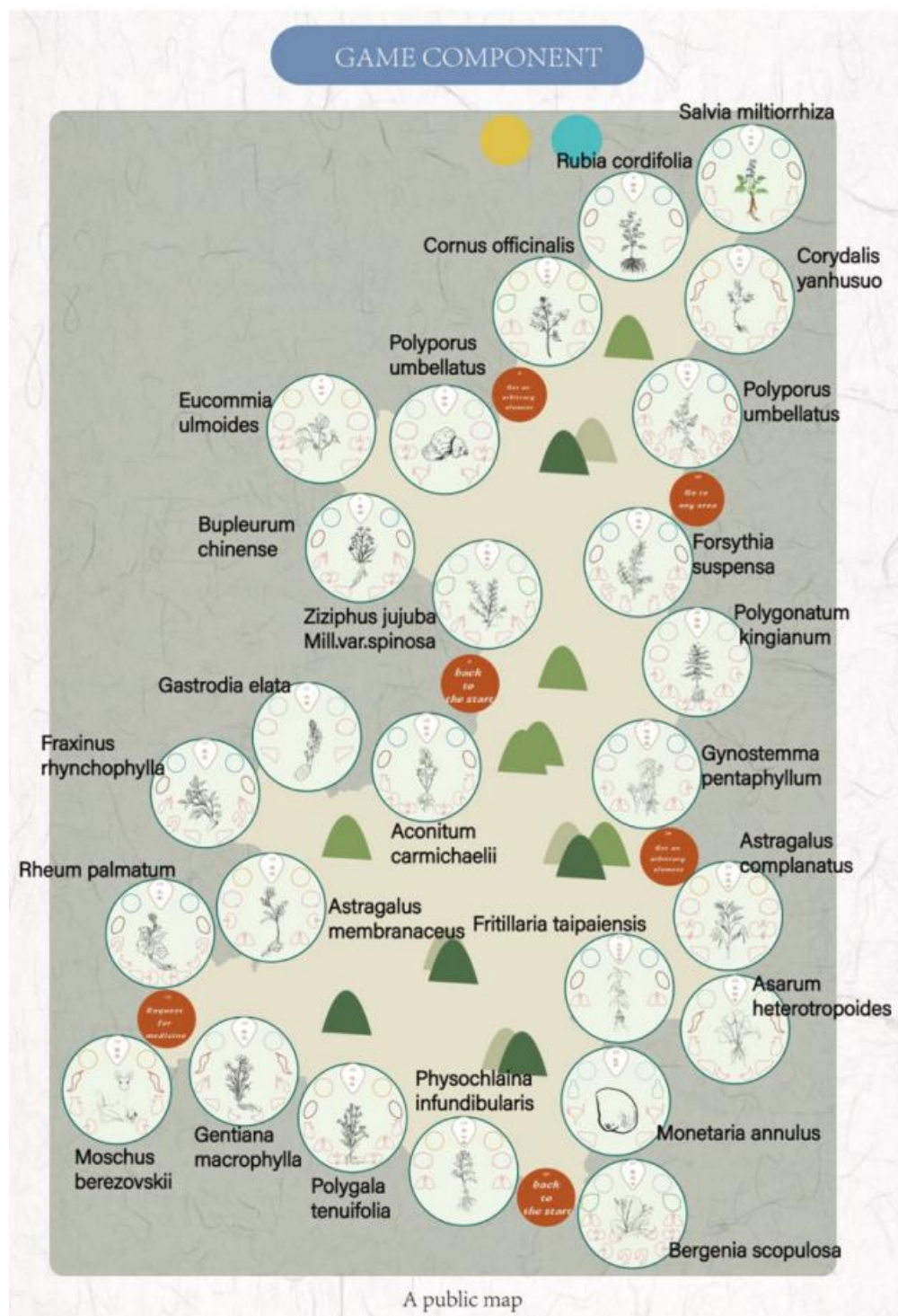
Figure 39*First Edition Solution – Basic Information**Note.* Illustrated by the author.**Figure 40***Third Edition Proposal - Story Synopsis**Note.* Illustrated by the author.

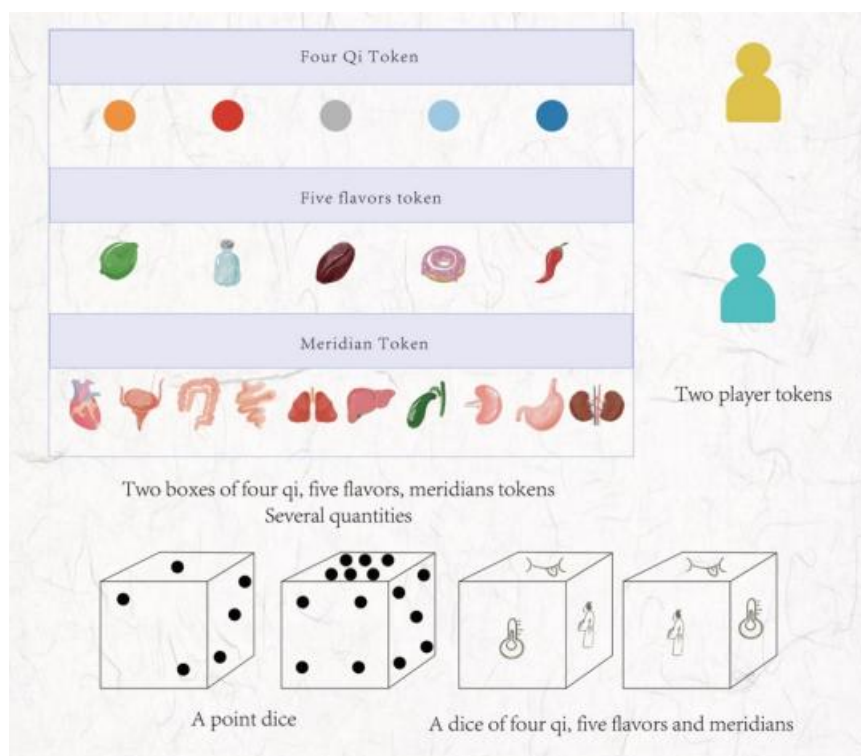
Figure 41*Third Edition Solution – Image Interpretation*

REFER TO EXPLANATORY OF										
Four Qi										
	Warm	Hot	Neutral	Cool	Cold					
Five flavors										
	Sour	Salty	Bitter	Sweet	Spicy					
Meridians										
	Bladder	Large Intestine	Gallbladder	Lung	Liver	Spleen	Kidney	Stomach	Small Intestine	Heart
Medicinal part										
	root	rhizome	pulp	Whole plant	Ripe fruit	Bark	Musk	Shell	Seed	Dry sclerotium
										
	Skin									

Note. Illustrated by the author.

Figure 42
Third Edition Solution - Game Accessories





Note. Illustrated by the author.

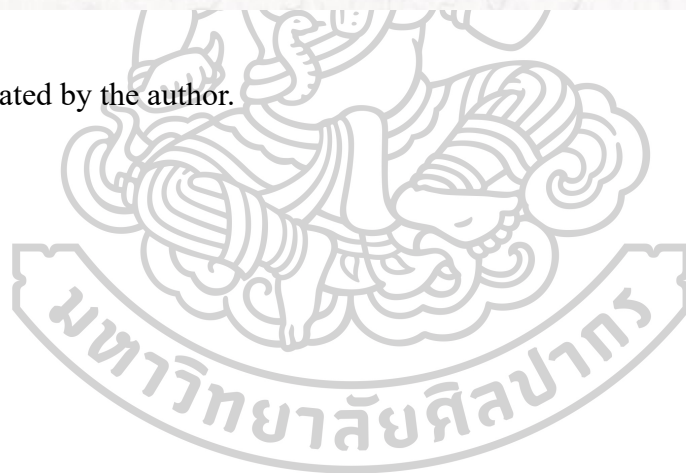
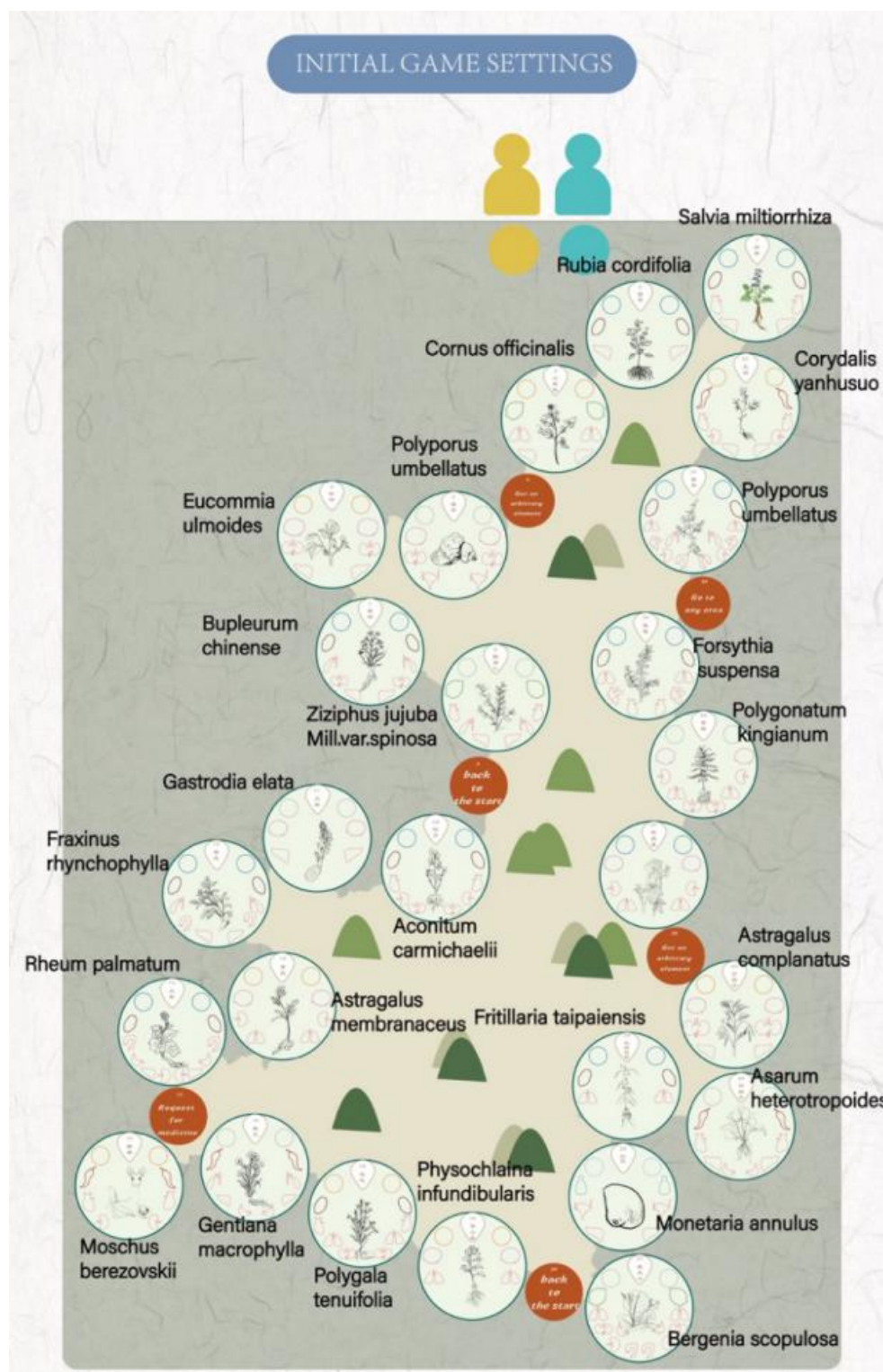
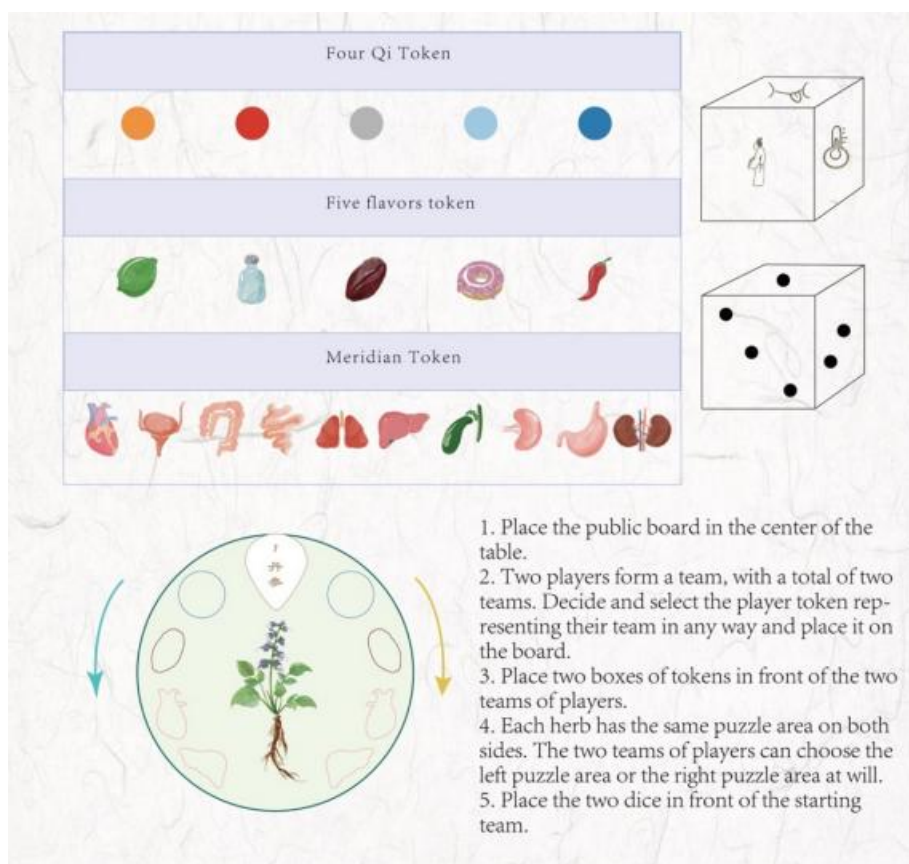


Figure 43*Third Edition Plan - Initial Setup*



Note. Illustrated by the author.

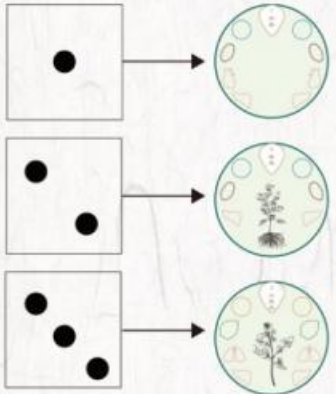


Figure 44*Third Edition Plan - Rules of the Game-1*

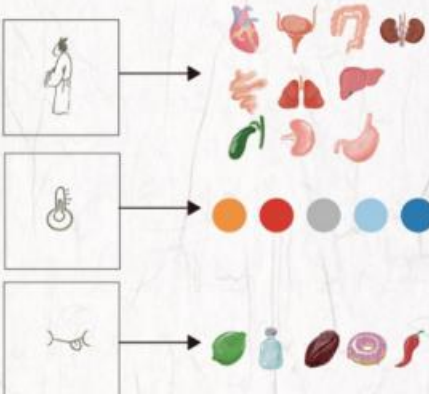
START THE GAME

This game consists of several rounds.
Each round consists of two groups taking actions in turn.

Basic actions
Each group has three actions.
First action: roll the dice
Second action: roll the element dice
Third action: roll the element sieve again
First action: roll the dice
In a team, one player rolls the dice first, and the other player takes the player token and moves it on the public board according to the dice points.
Second action
Any player rolls the herb element dice, and the other player needs to find the element corresponding to the herb from the element token box of his team and put it on the public board.
Third action
Roll the element dice again, which is the same as the second action. **If the same element is rolled twice, the second time is considered invalid and the player can only perform element synthesis on the current herb.**



1. For example, if group A rolls 1, the players in this group can move their player indicators forward to "Salvia miltiorrhiza". If they roll 2, they can move it to Rubia cordifolia. If they roll 3, they can move it to Cornus officinalis... and so on.

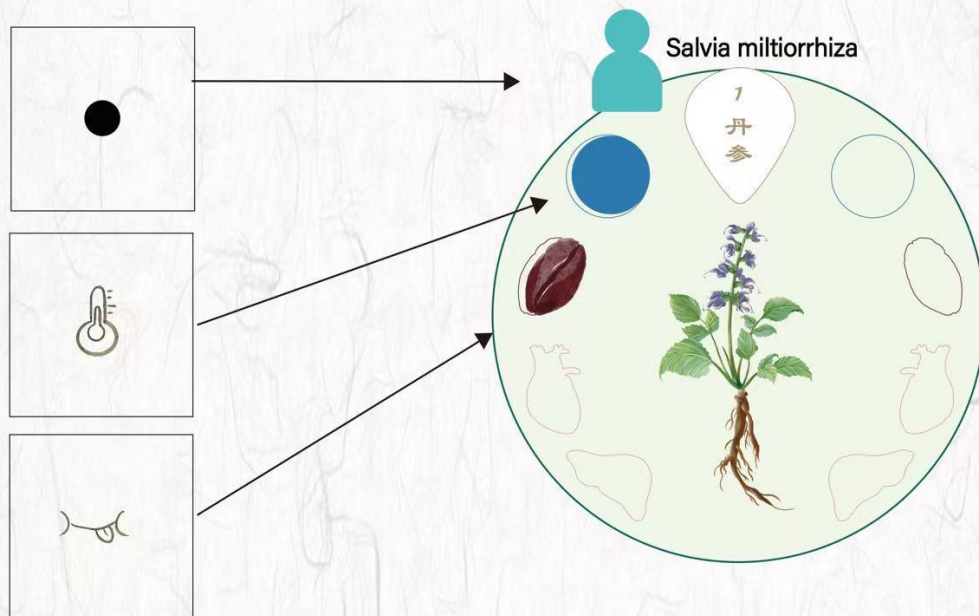


2. If group A rolls the meridian side/four qi side/five flavor side of the element dice, the players in this group can take it from their own element box.

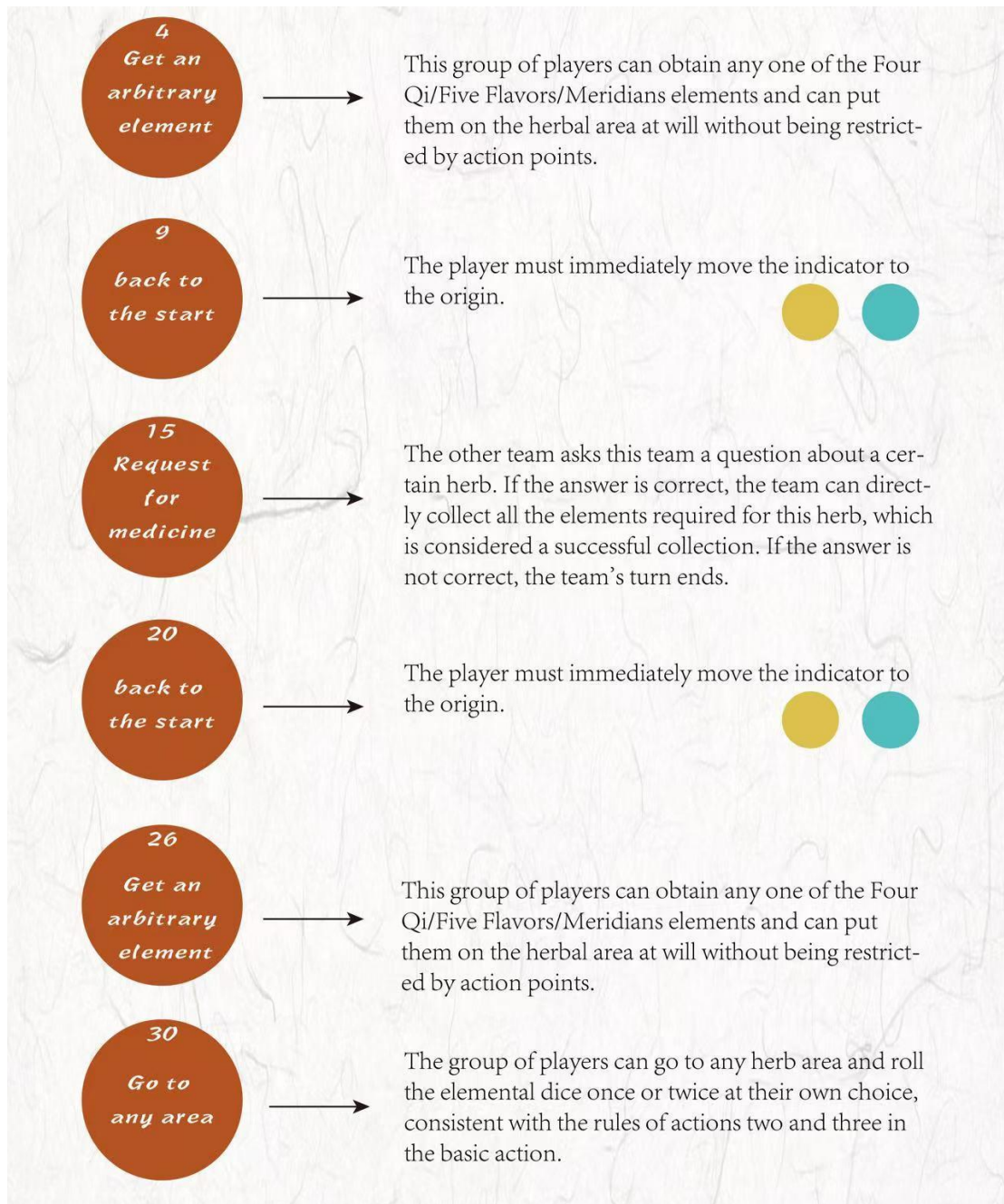
Note. Illustrated by the author.

Figure 45*Third Edition Plan - Rules of the Game-2*

3. For example, if Group A rolls 1, they will take a step forward to the "Danshen" herb collection area. If the element screen rolls the "Four Qi" side for the first time, the players in Group A can take the four Qi corresponding to "Danshen", which is cold; if they roll the "Five Flavors" side for the second time, they can take the corresponding five flavors, which is bitter, and put them on the board. If they roll the meridian side for the second time, they will take the token of the meridian element and put it on the board, which is "heart and liver"; if they still roll the "Four Qi" side for the second time, the second action will be invalid, and they can only take and put the "Four Qi" together once.

**Random Events**

"4, 9, 15, 20, 26, 30" on the board are some random events. When a random event is triggered, except for "30", the player does not need to perform the basic action of action 2 and action 3.



Note. Illustrated by the author.

Figure 46*Third Edition Plan - Rules of the Game-3*

Note. Illustrated by the author.

4.5 EXPERT INQUIRY AND PROTOTYPE DRAWING

4.5.1 EXPERT SUGGESTIONS

After repeated self-testing and optimization of the above three versions, the author invited game experts, education experts, design experts, and table enthusiasts to participate in the test, in order to ensure that the final meet the theoretical expectations and be recognized in practical application (Figure 47). The test conducted a multi-dimensional evaluation from the aspects of game mechanism, entertainment, education, portability, user experience, adaptability, interactivity, culture, scalability, persistence of learning effect, and security, and finally jointly selected the second version of the scheme as the final scheme. The expert evaluation suggestions are summarized as follows:

(1) Game mechanics and entertainment

In terms of mechanism, experts give a high degree of affirmation to the element dice, which greatly provides fun and randomness for the game, increases the unknown of each turn, and effectively avoids a single-game experience. Through the combination of different herbal elements to treat organ patients, this resource management mechanism not only enhances the strategy of the game but also adds to the antagonism of the game and the competition between players. Experts believe that the core mechanics of dice bring entertainment to the game, full of unknowns and random, is the key to attracting children's attention. However, experts recommend adding card mechanics and designing some interesting special skills to make the game more fun and playable.

(2) Educational

Experts believe that the vivid hand-painted herbal images, the visual transformation of the four qi and five taste and processing methods can make children

know and understand Chinese herbal medicine well, and the game mechanism of combining the four qi and five taste synthetic herbs to treat organ patients can make children intuitively understand and remember the relevant knowledge of Chinese herbal medicine in the application situation, and the knowledge transmission and visual representation of experts have been recognized.

(3) Portability

Experts suggest simplifying the number of tokens; too many tokens will make players dazzled, may produce boring emotions, and is not easy to receive, affecting the reopening rate of the game; you can reduce the token processing tools, the processing process on the map, processing results using the pot said.

(4) Experience

Experts believe that the visual design is beautiful and intuitive, and the cute style of the organ is also friendly to children; experts praised the design and color of the game.

(5) Adaptability

Experts believe the game can be widely used in families and schools, and board game fans can be used in many scenarios. It is recommended that an expanded version of the game be added in the future to adapt to different age groups.

(6) Interactivity

The trading link in the game brings strong interaction, cooperation, and competition; the two modes coexist, providing players with various experiences and cultivating children's communication and social skills.

(7) Cultural

Board game fans believe that integrating the cultural background of traditional Chinese medicine into board games is a novel theme direction so that children can learn traditional knowledge and culture in the process of games and use the media of board games to make children better accept the inheritance of traditional Chinese medicine knowledge and culture.

(8) Scalability

Experts believe that the acquisition of gold coins can be appropriately added in the game, or the way of integrating card questions and answers can add fun to the game and increase the learning path of knowledge. In the future, the game can also be expanded through the form of cards, and it can also be designed according to the authentic medicinal herbs in different regions to enhance the dimension of knowledge and the influence of traditional Chinese medicine culture.

(9) Learning effect

Experts pointed out that the repeated interaction of the game can give children a deep memory of the knowledge of Chinese herbal medicine. After multiple games, children can deepen their cognition and understanding of herbal medicine and the learning effect is reflected.

(10) Security

Experts believe there are no sharp or too-small accessories in the game's design, reducing the risk of being swallowed by mistake, scratches, etc. Experts also emphasize that the material design of the game must be environmentally friendly and non-toxic to ensure the safety of children.

Figure 47

Expert Test and Evaluation



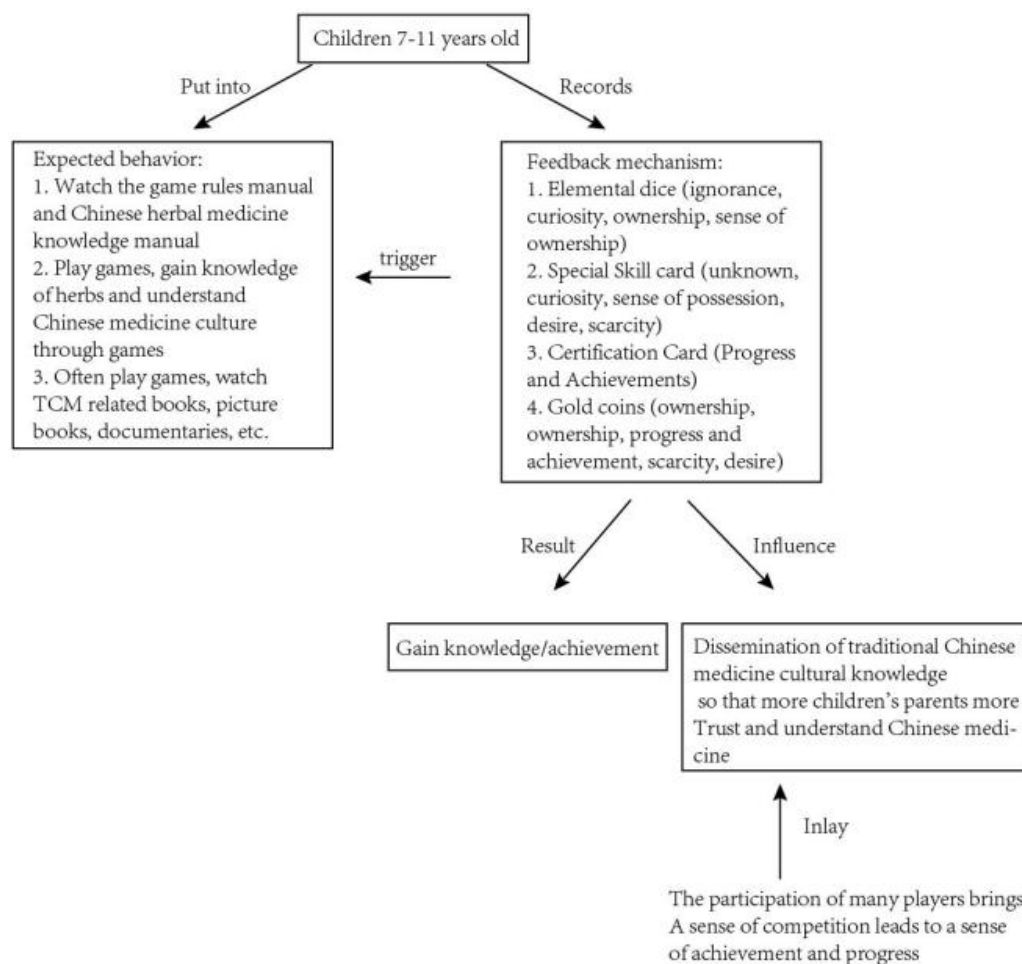
Note. Photographed by the author.

4.5.2 I AM A LITTLE MIRACLE DOCTOR PROTOTYPE DESIGN

4.5.2.1 GAME DESIGN FRAMEWORK

Qualitative research such as questionnaire survey, correlation study and expert interview was conducted for children aged 7-11 and their parents in the early stage to collect their feedback on Chinese herbal medicine knowledge and attitudes towards board games, and these needs and suggestions were integrated into the game design. Considering user characteristics, expected behavior, feedback mechanism and game objectives, it aims to make children easily learn and master Chinese herbal medicine knowledge in the game process through fun and clever design(Figure 48).

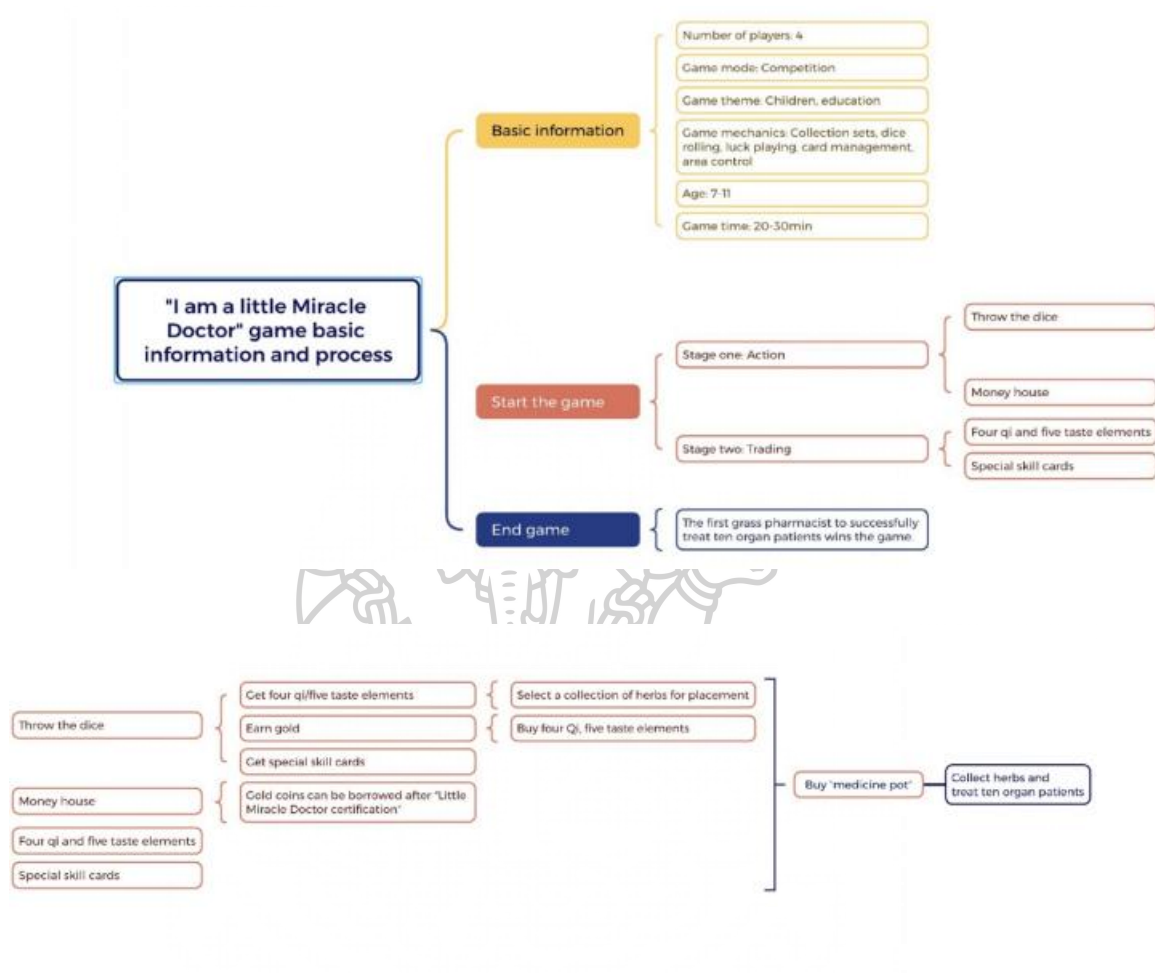
Figure 48
Game Design Framework



Note. Illustrated by the author.

4.5.2.2 DESIGN OF BASIC GAME INFORMATION

The winning condition of the game is that the “grass pharmacist” who successfully treats the “ten organ patients” first can obtain the title of “little God Doctor”. The game is mainly divided into two stages: The first stage is the action stage, in which rolling dice can collect four gas and five taste elements. Dice skills are divided into three kinds: the first kind is direct access to a certain (four gas, five tastes) element; the second skill is direct access to gold; the third skill is a “special skill card” the player randomly obtains a certain skill by drawing cards. At this stage, players can also go to the “bank” through the “little miracle doctor certification” to obtain gold loans; gold coins can only be used for the “four Qi, five taste elements” purchase; each round can only buy one element, the price is two gold coins. The second stage is the trading stage, where players exchange elements or special skill cards. The basic information and flow chart of the game are as follows (Figure 49):

Figure 49*Basic Information and Flow Chart of the Game**Note.* Illustrated by the author.

4.5.2.3 VISUAL IMAGE DESIGN OF CHINESE HERBAL MEDICINE

In terms of the visual image design of traditional Chinese medicine, the author finally chose the illustration style of children's picture books to cater to the aesthetic interests and preferences of children aged 7-11 after various considerations. Fun and affinity are the characteristics of the illustration style of children's picture books, aiming to attract children's attention and enhance the interaction and entertainment of the game, the author studied different illustration styles, including watercolor style, pencil style, American style, etc. Each style has its own unique visual effects and textures: Picture book style has strong style characteristics of warm and soft, high color saturation and full of childlike interest, which can stimulate children's imagination; Watercolor wind to the fluidity and layer of color, can present a good dreamlike soft visual effect; Pencil style pays attention to hand-painted texture, fine lines, more suitable for expressing details and texture. In order to ensure that the final

design style can truly meet the visual preferences of children, the author draws four styles (Table 24) and conducts an in-depth survey for the target group through online access. The survey results show that children aged 7-11 generally show a strong love for picture book style, and they prefer bright colors, clean and simple shapes; Watercolor style is more favored by some parents of children, but parents unanimously respect their children's preferences. For children, watercolor style is not bright enough. Although pencil style is delicate, it lacks the bright and full color impact of picture book style.

Table 24

Four Kinds of Painting Style Display

Watercolor style



American style



Pencil style for children's illustration



Children's picture book style









Note. Illustrated by the author.



Based on the feedback of the survey results, the author finally selected the children's picture book style as the final design style of the game, which not only

satisfies the children's visual preference, but also creates a visual sense of vitality and fun through bright colors and soft textures. The 26 herbal designs are shown in Table 25.



Table 25
Herbs Drawn

Serial number	Name of herb	Rough sketch	Final visual image
A1	Monetaria annulus		
Note: "Monetaria annulus" is used as one of the elements of the player's personal map page and is located in the first row and fifth column of the personal map.			
Serial number	Name of herb	Rough sketch	Final visual image
A2	Corydalis yanhusuo		
Note: "Corydalis yanhusuo" is used as one of the elements of the player's personal map page and is located in the first column of the second row of the personal map.			
Serial number	Name of herb	Rough sketch	Final visual image
A3	Physochlaina infundibularis		



Note: "Physochlaina infundibularis" is used as one of the elements of the player's personal map page and is located in the second row and second column of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A4	Polygala tenuifolia		



Note: “Polygala tenuifolia” is used as one of the elements of the player’s personal map page and is located in the second row and third column of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A5	Cornus officinalis		



Note: The “Cornus officinalis” is used as one of the elements of the player’s personal layout page and is located in the second row and fourth column of the personal layout.

Serial number	Name of herb	Rough sketch	Final visual image
A6	Astragalus membranaceus		



Note: “Astragalus membranaceus “ is used as one of the elements of the player’s personal map page and is located in the second row and fifth column of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A7	Astragalus complanatus		



Note: “Astragalus complanatus” is used as one of the elements of the player’s personal layout page and is located in the first column of the third row of the personal layout.

Serial number	Name of herb	Rough sketch	Final visual image
A8	Eucommia ulmoides		



Note: “Eucommia ulmoides” is used for one of the elements of the player’s personal map page and is located in the third row and second column of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A9	Moschus berezovskii		



Note: “Moschus berezovskii” is used as one of the elements of the player’s personal map, and is located in the third row and third column of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A10	Aconitum carmichaelii		



Note: “Aconitum carmichaelii” is used as one of the elements of the player’s personal map page and is located in the third row and fourth column of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A11	Ziziphus jujuba Mill. var. spinosa		

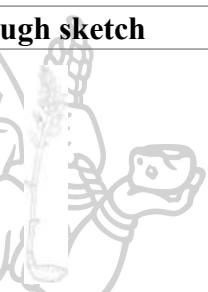

Note: “Ziziphus jujuba Mill. var. spinosa” is used as one of the elements of the player’s personal layout page and is located in the third row and fifth column of the personal layout.

Serial number	Name of herb	Rough sketch	Final visual image
A12	Bergenia scopulas		



Note: “Bergenia scopulas” is used as one of the elements of the player’s personal map page and is located in the first column of the fourth row of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A13	Asarum heterotropoides		



Note: The “Asarum heterotropoides” is used as one of the elements of the player’s personal map page and is located in the second column of the fourth row of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A14	Gastrodia elata		



Note: “Gastrodia elata” is used as one of the elements of the player’s personal map page and is located in the fourth row and third column of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A15	Polyporus umbellatus		



Note: “Polyporus umbellatus” is used as one of the elements of the player’s personal map page and is located in the fourth row and fourth column of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A16	Polygonatum kingianum		



Note: “Polygonatum kingianum” is used as one of the elements of the player’s personal map page and is located in the fourth row and fifth column of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A17	Gentiana macrophylla		



Note: “Gentiana macrophylla” is used as one of the elements of the player’s personal map page and is located in the first column of the fifth row of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A18	Gynostemma pentaphyllum		

Note: “Gynostemma pentaphyllum” is used as one of the elements of the player’s personal map page and is located in the second column of the fifth row of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A19	Fritillaria taipaiensis		



Note: “Fritillaria taipaiensis” is used as one of the elements of the player’s personal map page and is located in the fifth row and third column of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A20	Rubia cordifolia		



Note: “Rubia cordifolia” is used as one of the elements of the player’s personal map page and is located in the fifth row and fourth column of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A21	Salvia miltiorrhiza		



Note: “Salvia miltiorrhiza” is used as one of the elements of the player’s personal map page and is located in the fifth row and fifth column of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A22	Bupleurum chinense		



Note: “Bupleurum chinense” is used as one of the elements of the player’s personal map page and is located in the first column of the sixth row of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A23	Fraxinus rhynchophylla		



Note: “Fraxinus rhynchophylla” is used as one of the elements of the player’s personal map page and is located in the second column of the sixth row of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A24	Forsythia suspensa		

Note: The “Forsythia suspensa” is used as one of the elements of the player’s personal layout page and is located in the sixth row and third column of the personal layout.

Serial number	Name of herb	Rough sketch	Final visual image
A25	Rheum palmatum		

Note: “Rheum palmatum” is used as one of the elements of the player’s personal map page and is located in the sixth row and fourth column of the personal map.

Serial number	Name of herb	Rough sketch	Final visual image
A26	Scutellaria baicalensis		


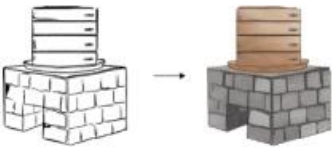


Note: “Scutellaria baicalensis” is used as one of the elements of the player’s personal map page and is located in the sixth row and fifth column of the personal map.


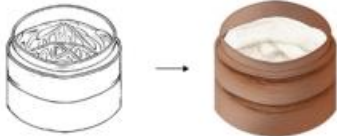
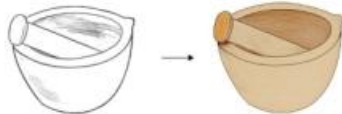

Note. All of the above pictures are illustrated by the author.

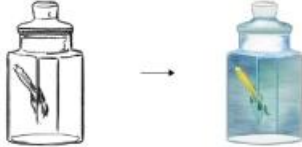


4.5.2.4 IMAGE DESIGN OF CHINESE MEDICINE PROCESSING TOOLS

The processing tools of 26 kinds of herbs were summarized as: washing, drying, cutting (slicing, slicing), drying, spraying, moistening, grinding, processing, soaking, steaming and ramming, a total of 11 kinds. Based on the in-depth understanding of the processing tools in Chapter 2 and the dynamic capture of the use process, the visual image was transformed (Table 26).

Table 26
Introduction and Image Design of 11 Kinds of Processing Tools

Processing method/Serial number	Processing method introduction	Sketch and final visual image
ablution	It refers to the original drug placed in clean water to wash the sediment impurities on the surface of the drug.	
desiccation	The process of removing moisture from wet materials by gasification.	
Slice, segment, silk	After washing and softening the medicinal materials, according to the texture of soft and hard or individual size, thickness, etc., with a machine or artificial cut to make sheet processing process.	
sun-dry	Place the medicinal materials or preparations in a dry place with air circulation and air dry naturally. The drying method can remove	

Processing method/Serial number	Processing method introduction	Sketch and final visual image
	water and improve the quality and stability of medicinal materials, and is often used in the preliminary treatment of various Chinese medicinal materials.	
spray	A method of softening medicine by spraying or drenching it with water.	
embellish	Cover with wet cloth, wet sack and other wet things, often spray an appropriate amount of water, keep moist state, so that the external water of the medicinal materials slowly penetrates into the internal tissue, to achieve the same internal and external humidity, easy to cut.	
levigate	The medicine is mashed or ground into powder.	
Stir-fry high heat	over The Stir-fry over high heat needs to fire so hard that the drug is bloated and soft.	

Processing method/Serial number	Processing method introduction	Sketch and final visual image
steep	To reduce the intensity or toxicity or irritation of the original drug by soaking.	
steamed	The method of putting the purified medicine with or without excipients (steaming) into the steaming container and heating it with steam or isolated water to a certain extent is called steaming.	
mash	It refers to the use of stone mortar or machine to grind medicinal materials into powder	

Note. Illustrated by the author.

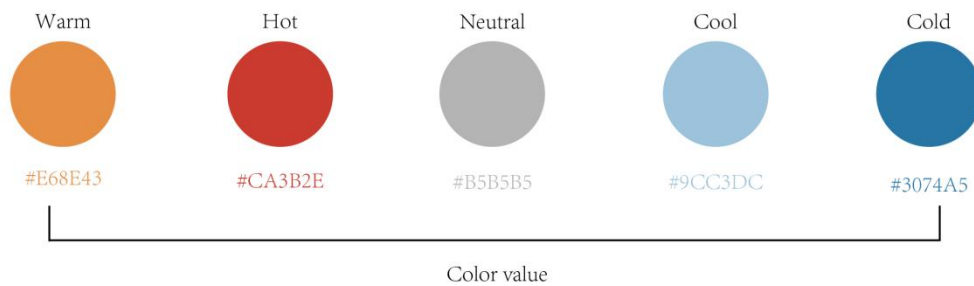
4.5.2.5 FOUR PROPERTIES, FIVE TASTE AND CHANNEL IMAGE DESIGN

Based on the collation and induction of the second literature review, the understanding and analysis of the knowledge of the four Qi and five tastes and classics are transformed in the following visual images:

(1) Four Properties

The four qi refer to the four attributes of human medicine: warm, hot, cold, and calm. The cold and hot attributes of herbal medicine are not obvious, so they are called flat drugs. Based on the analysis of the theoretical knowledge of color in Chapter 2, warm is used as orange, hot is used as red, flat is used as gray, cool is used as light blue, cold is used as dark blue, and the depth of color represents the degree of warm and cold of the drug so that children can feel the four Properties attributes more intuitively (Figure 50).

Figure 50
Four Properties Visual Image Token



Note. Illustrated by the author.

(2) Five flavors

Five tastes refer to the five tastes of medicine, namely: sour, salty, bitter, sweet, and Xin. In order to make the player more intuitive memory and understanding, the visual transformation of common food-related images in daily life is adopted: lime represents sour taste, salt pot represents salty taste, coffee represents bitter taste, candy represents sweet taste, and chili represents spicy taste. Through these specific food images to represent these tastes, not only can make the player feel intimate, but also can use these images to deepen the understanding and memory of the “five tastes” (Figure 51).

Figure 51
Five Flavors Visual Image Token



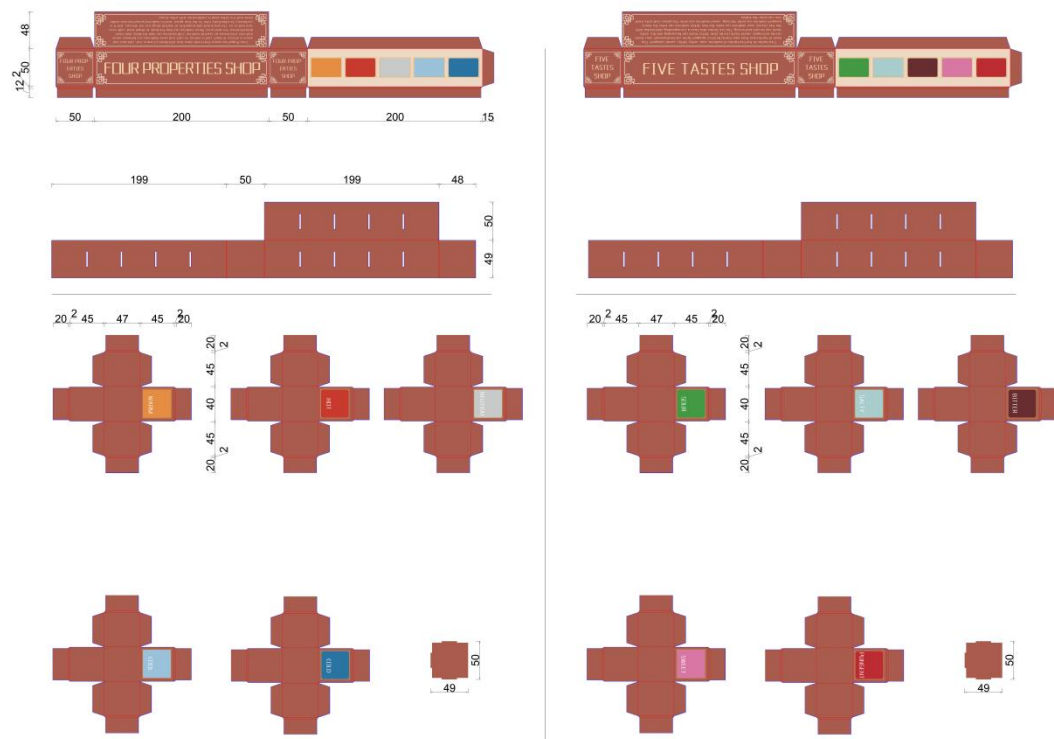
Note. Illustrated by the author.

(3) “Four properties and five tastes” token reception

As there are more tokens of four gases and five tastes, a storage box with four gases and five tastes is designed, which is inspired by the Chinese medicine cabinet (Figure 52). The box is a rectangular box composed of five small drawer boxes, which is easy for players to take and store, greatly saving the table space and improving the portability of the game. Meanwhile, the top surface of the box indicates the attributes of the box: “Four Properties store” and “Five Taste store”, the knowledge text description of four gases and five tastes is marked on the back side of the box, in order to be able to notice in the process of the player’s game and strengthen the player’s understanding of the concept of four gases and five tastes. In the color design, the color of the Chinese medicine cabinet is directly extracted, so that the player can be more involved in the scene of the Chinese medicine environment simulated by the game.

Figure 52

“Four Properties and Five Flavors” Token Storage Box



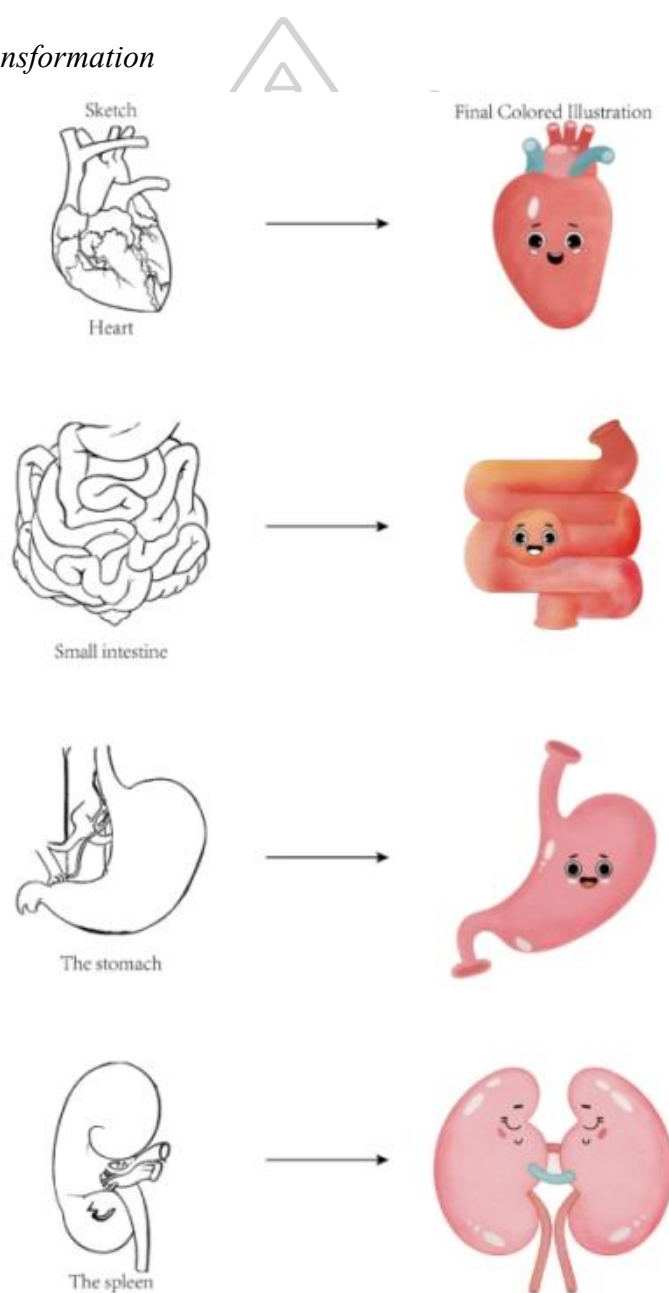
Note. Illustrated by the author.

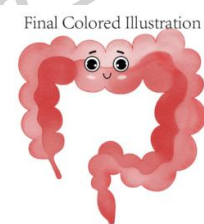
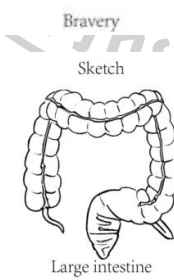
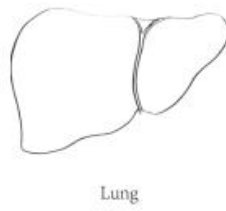
(3) Sutras

Based on the summary of the meridian parts of 26 herbs in Chapter 2, the organs involved in the game are heart, small intestine, stomach, spleen, lung, liver, kidney, gallbladder, large intestine and bladder. In this study, the visual transformation of anthropomorphic cartoon is adopted in the image design of these ten organs, and cartoon expressions are added to the organs, aiming to increase the fun of the game, and reduce the discomfort that may be brought to children by excessive realistic and realistic organs (Figure 53). There are two functions of the ten organs in the game: one is presented on the public map as an “organ patient,” and the other is presented on the personal map as a reminder of a certain herbal sutra.

Figure 53

Organ Vision Transformation





Note. Illustrated by the author.

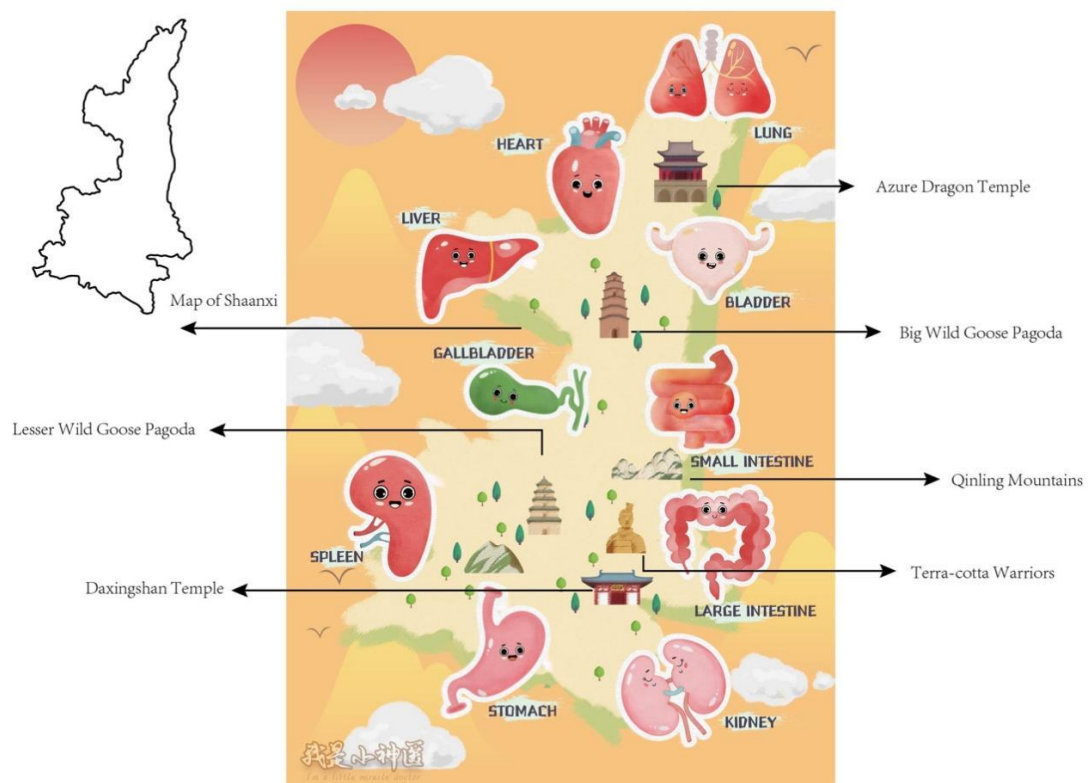
4.5.2.6 GAME LAYOUT DESIGN

(1) “I AM A LITTLE MIRACLE DOCTOR” PUBLIC MAP

The public map of the game is mainly composed of three parts: Ten organs, an outline of the map of Shaanxi Province, and the famous historical and cultural elements of Shaanxi Province. The ten organs are arranged according to the human organs from top to bottom on the map. When the player successfully collects a certain herb, the “organ patient” can be treated. Using the map of Shaanxi as a link to “organ patients”, it aims to integrate the knowledge concept of “Shaanxi characteristic authentic medicinal materials” into the public map. The famous historical and cultural elements of Shaanxi Province (Big Wild Goose Pagoda, Little Wild Goose Pagoda, Daxingshan Temple, Qinglong Temple, Qinling Mountains, Terracotta Warriors) are used to immerse players in the game, but also as a presentation of other knowledge expansion (Figure 54).

Figure 54

“I am a Little Miracle Doctor” Public Map



Note. Illustrated by the author.

(2) “I am a Little Miracle Doctor” personal map

The personal map consists of 27 areas, and the largest area (A0) is the name of the personal map -- Herbal Shop; The remaining 26 regions (A1-A26) are composed of 26 kinds of Chinese herbs and their knowledge information. Since there is only one kind of cool herbs and salty herbs (white shell), they are arranged in the fifth column of the first row for convenience of viewing. The order of the remaining herbs is warm, hot, flat, cold, which is arranged according to the degree of warmth to cold of the herbal properties (Figure 55).

The information in each herb box is: herb name (Chinese and Pinyin, English); Herbal image and medicinal parts (the lower part of the herbal image is its medicinal part, if it is only a single herbal image, it is the whole plant can be medicinal); The four qi (herb box and herb name color are consistent with the color of the four qi of the herb, so that players can easily find the herbs corresponding to the four qi in the game), the five flavor (vertically arranged right below the “four qi”), the channel (located on the right side of the herb), and the processing method (the process of processing a herb and its tools are located right below the herb), (Figure 56).

After the player collects all the “four qi” and “five taste” elements of an herb, it is considered a successful synthesis. This link uses the game mechanism of collection in sets. When the player collects all the herbs that can cure the “ten organ patients”, the game can be won. The purpose is to keep the player’s focus on the “four gases” and “five tastes” of herbal medicine through repetition to achieve the memory of knowledge.

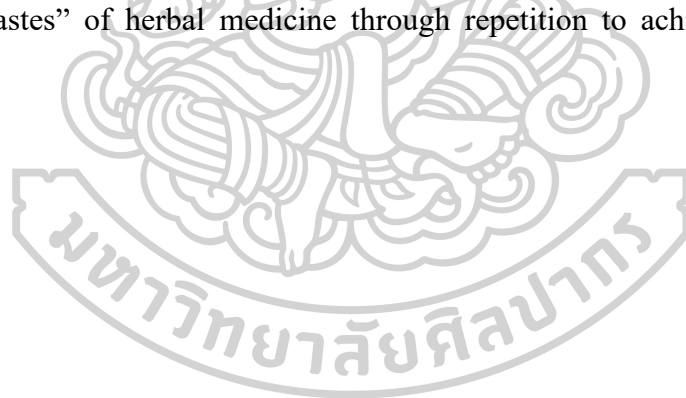
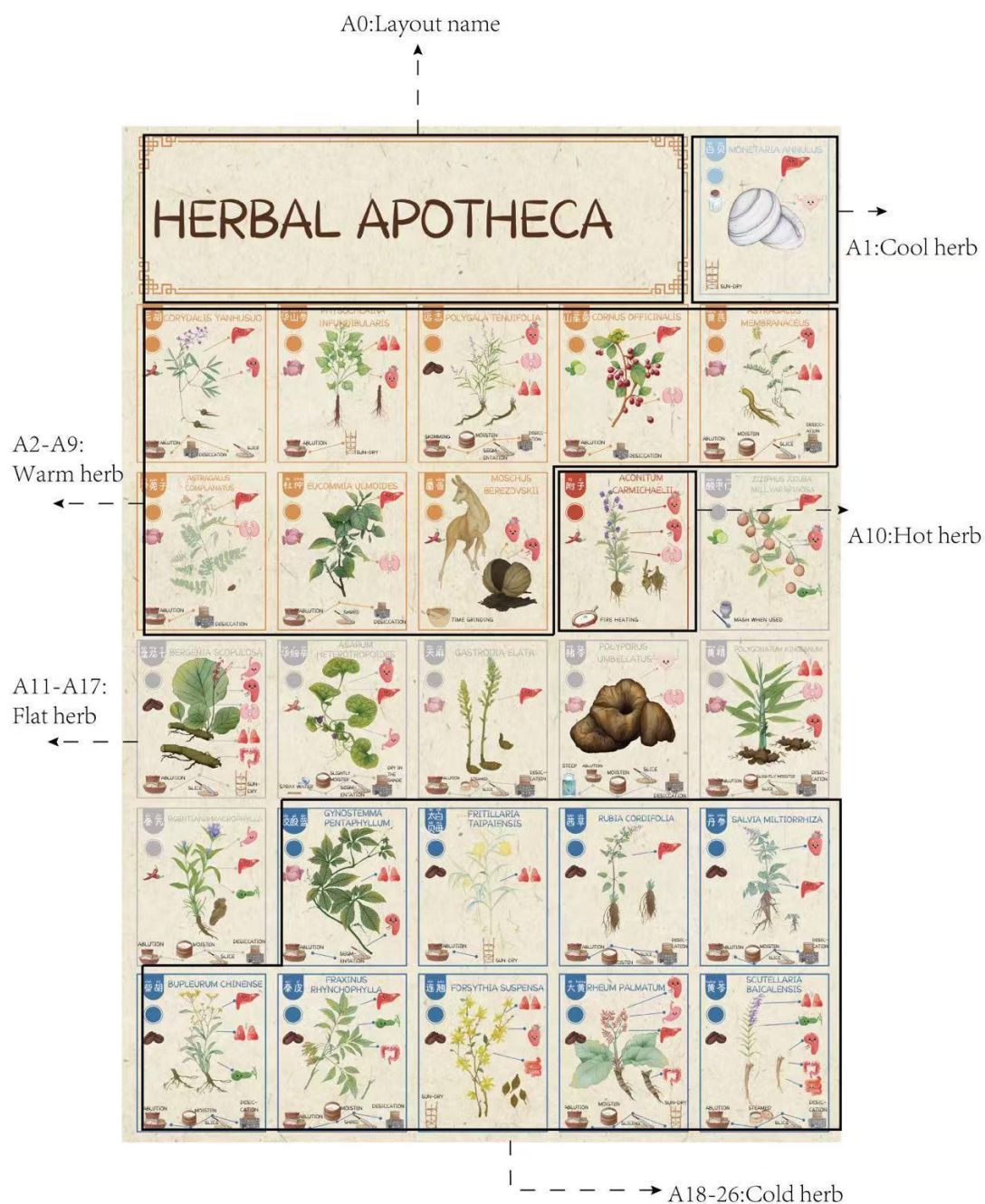


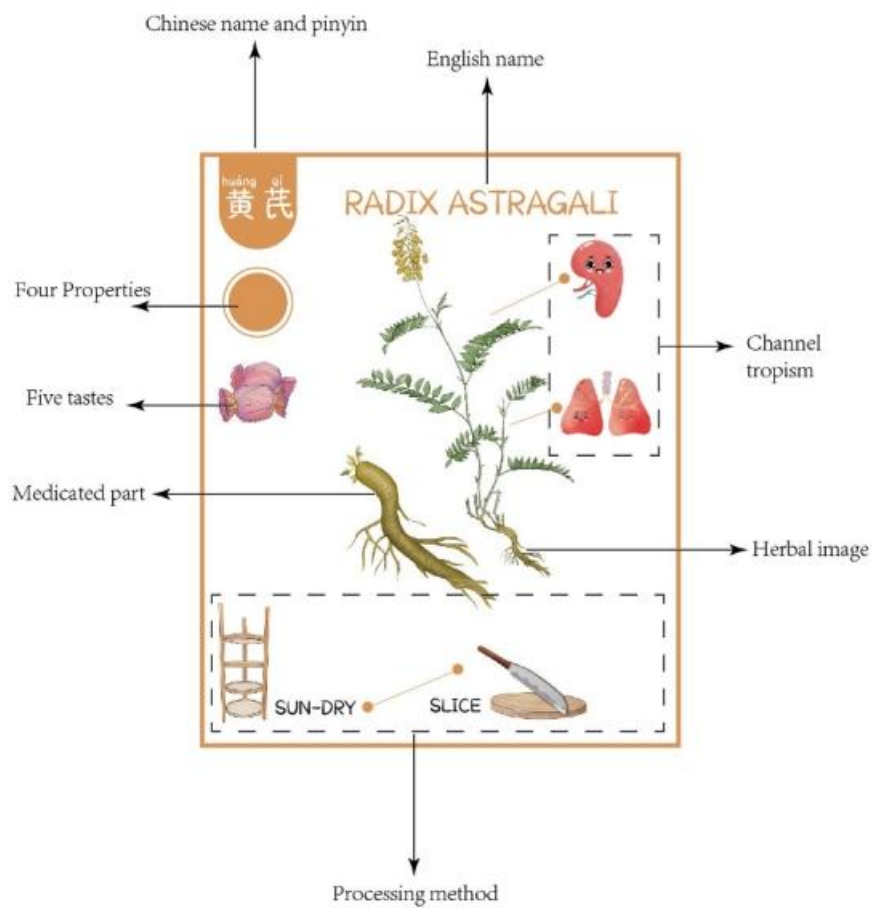
Figure 55
Personal Map



Note. Illustrated by the author

Figure 56

Individual herbal frame - take radix astragali as an example

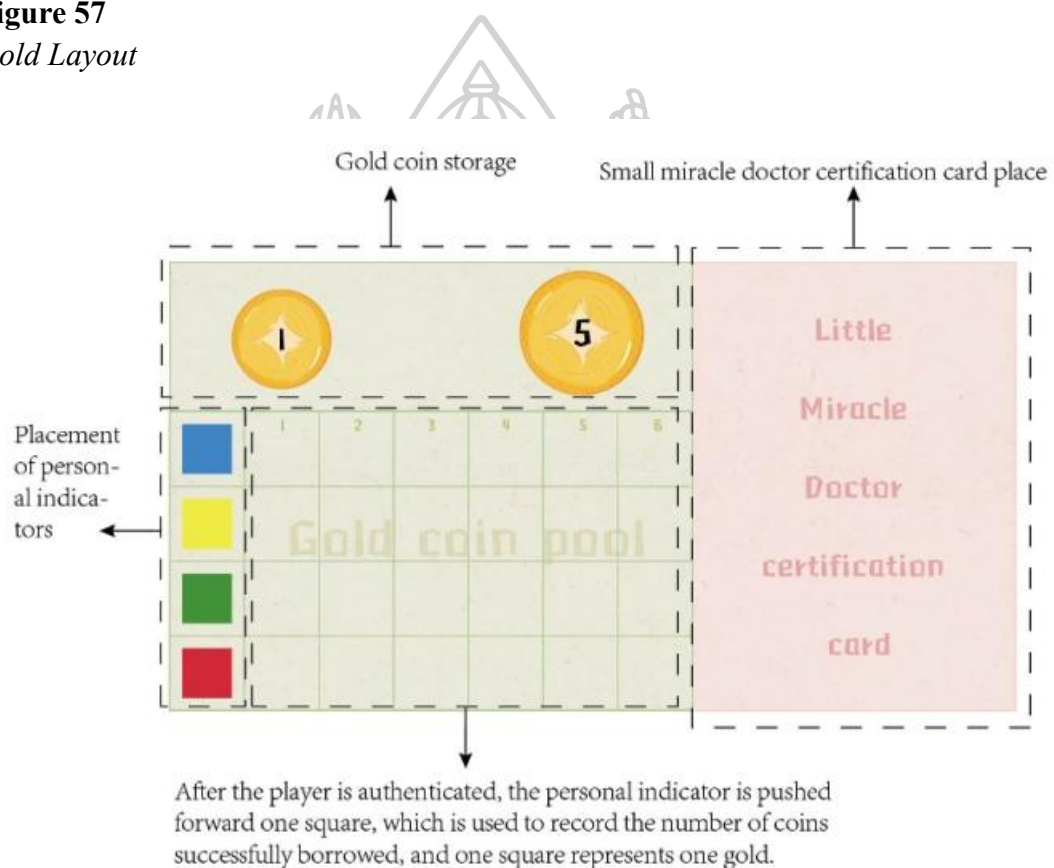


Note. Illustrated by the author

(2) “I am a Little Miracle Doctor” gold coin map

The gold layout is used for the collection of gold coins in the game, the player’s borrowing of gold coins, and the placement of the Doctor’s certificate card (Figure 57). At the beginning of the game, each player can take 8 gold coins from the gold coin library. When the player gets gold coins, he can take them directly from the gold coin library during the game. When the player needs to borrow gold coins, he must first draw a card from the “Little Miracle Doctor Certification” card library, and if he answers correctly, he can take a gold coin of 1 face value. Push your player pointer one space forward, and the player needs to pay it off before the game ends.

Figure 57
Gold Layout



Note. Illustrated by the author.

4.5.2.7 GAME CARD DESIGN

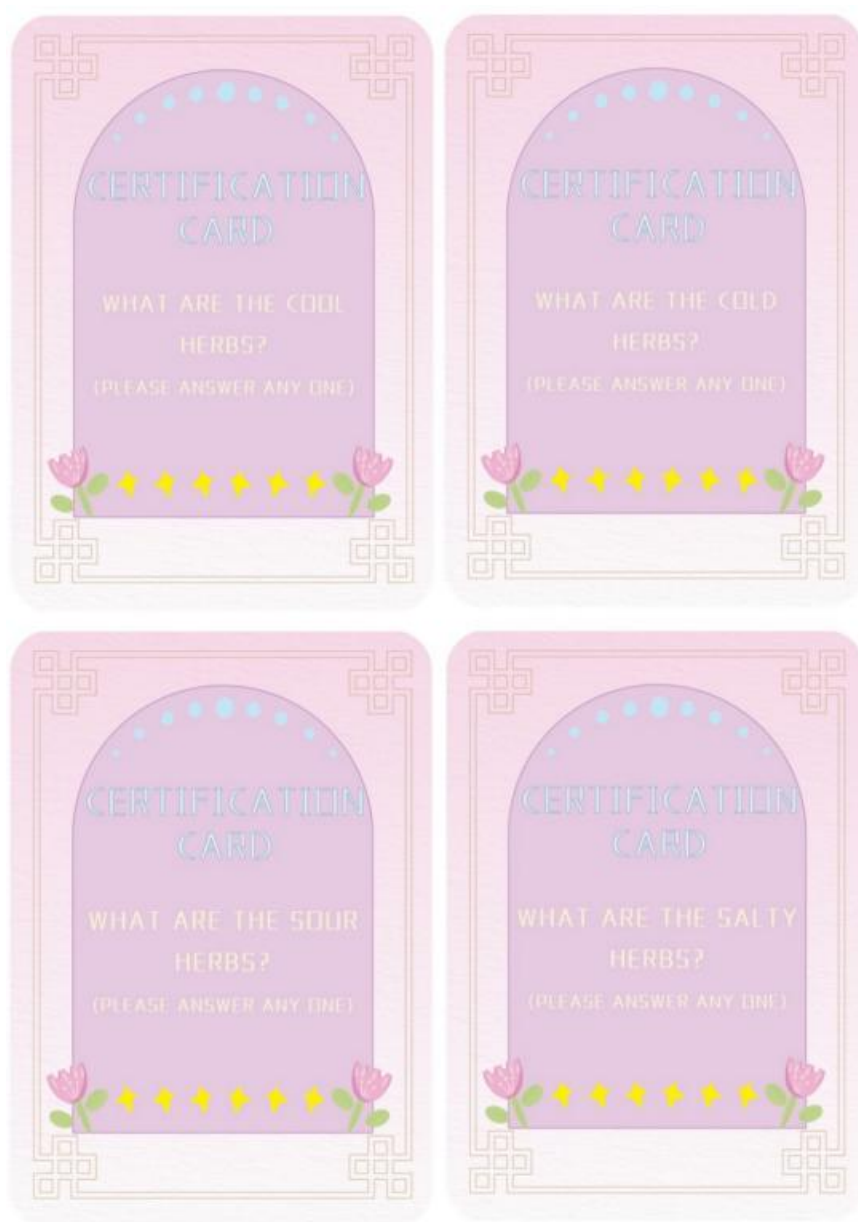
(1) Little Miracle Doctor certification card

The role of the little Miracle Doctor certification card (Figure 58) is that when the player is not enough gold in the process of the game, he can borrow gold coins by answering the questions on the card and win the game faster. There are 10 kinds of questions on the “Little Miracle Doctor certification card”: Please answer any warm herbal medicine; Please answer any one of the hot herbs; Please answer any one of the neutral herbs; Please answer any cold herb; Please answer any one of the cool herbs; Please answer any sour herb; Please answer any salty herb; Please answer any bitter herb; Please answer any sweet herb; Please answer any one of these herbs. By asking questions, players can quickly respond and answer, deepening players’ understanding and memory of “Four Properties” and “Five Tastes” herbs.

Figure 58

Little Miracle Doctor Certification Card







Note. Illustrated by the author.

(2) Special Skill cards

Special skill cards are obtained by rolling dice at random, and there are six skills in the cards: you can obtain any one of the “four gases” elements; One “five taste” element can be obtained at will; Get another chance to roll the dice; Poison card (can destroy any “organ patient” that a player has successfully treated); Antidote card (resistant to a player’s “poison”); Nothing happened (Figure 59) .

This part uses the hand card management mechanism. When the player does not want to use the “special skill card” in the current round, the card can stay in the hand, but each player cannot have more than two cards and must discard a card placed in the special skill card library.

Figure 59

Special Skill Cards



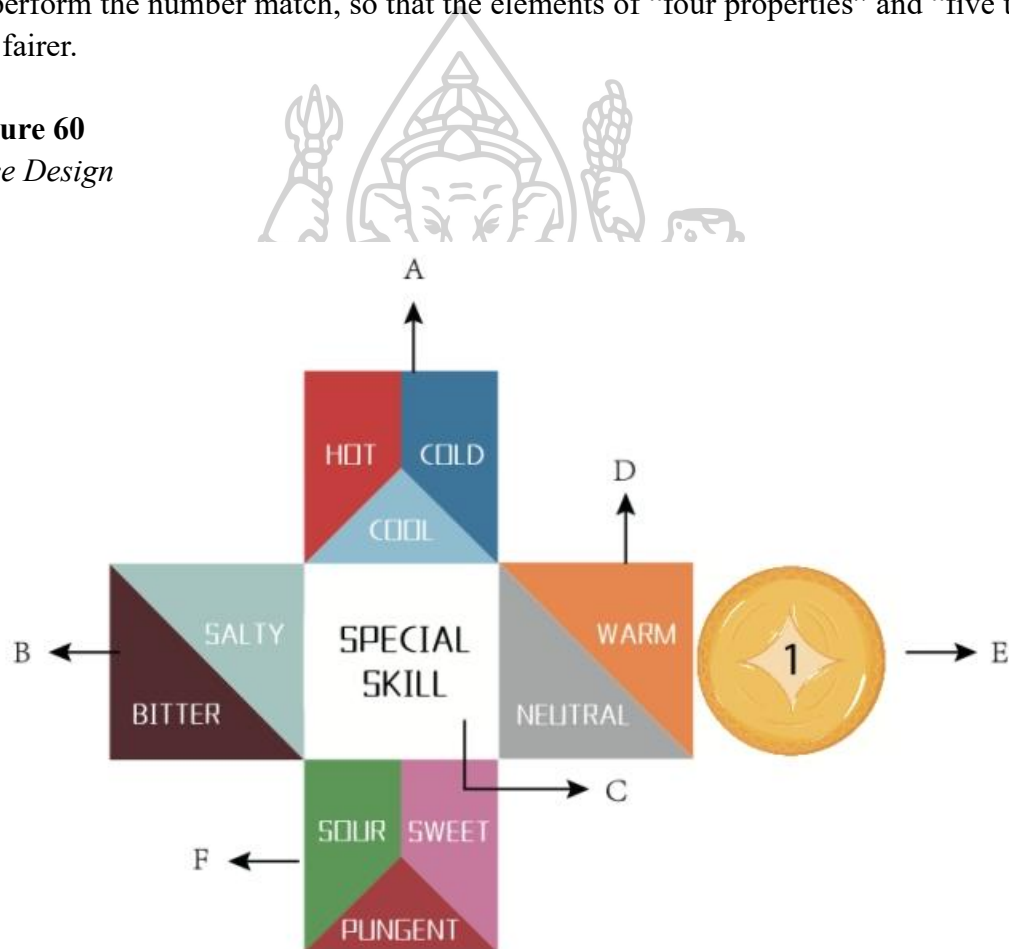


Note. Illustrated by the author.

4.5.2.8 DICE DESIGN

The die has six sides, each of which has a different effect on the skill (Figure 60). Side A: Select an element (“hot” element, “cool” element, “cold” element); B side: Select an element to obtain (“salty” element, “bitter” element); Side C: Draw a special skill card; D side: Select an element to obtain (“warm” element, “neutral” element); E side: Select an element to obtain (“sour” element, “sweet” element, “spicy” element); F side: Get gold coins with face value of one. The dice mechanism is set up to add randomness and fun to the game, no matter which side the player throws, they can only choose one element, because the number of “four gas and five taste” elements of 26 Chinese herbs is inconsistent, so take “three choices one” “two choices one” way to perform the number match, so that the elements of “four properties” and “five taste” are fairer.

Figure 60
Dice Design



Note. Illustrated by the author.

4.5.2.9 DESIGN AND SIZE OF GAME ACCESSORIES

(1) Token

Four Properties element tokens: Select a 20mm diameter circle in shape and size, which is easy for players to take and store. According to the four-qi analysis and the required arrangement quantity of 26 kinds of herbs, it was set as follows: 32 warm elements, 4 hot elements, 4 cool elements, 36 cold elements, and 28 flat elements.

Five flavor elements token: Choose a 20mm x 20mm square in shape and size.

Pot tokens: Select a circle with a diameter of 20mm in size and shape (Figure 61), and the number is 50. When the player collects all the “Four Properties” and “Five tastes” of a certain herb, the player needs to purchase the pot first (1 gold coin) and place the “pot” Token on an herb panel as a successful synthesis of herbs.

Figure 61

“Pot” Image Design

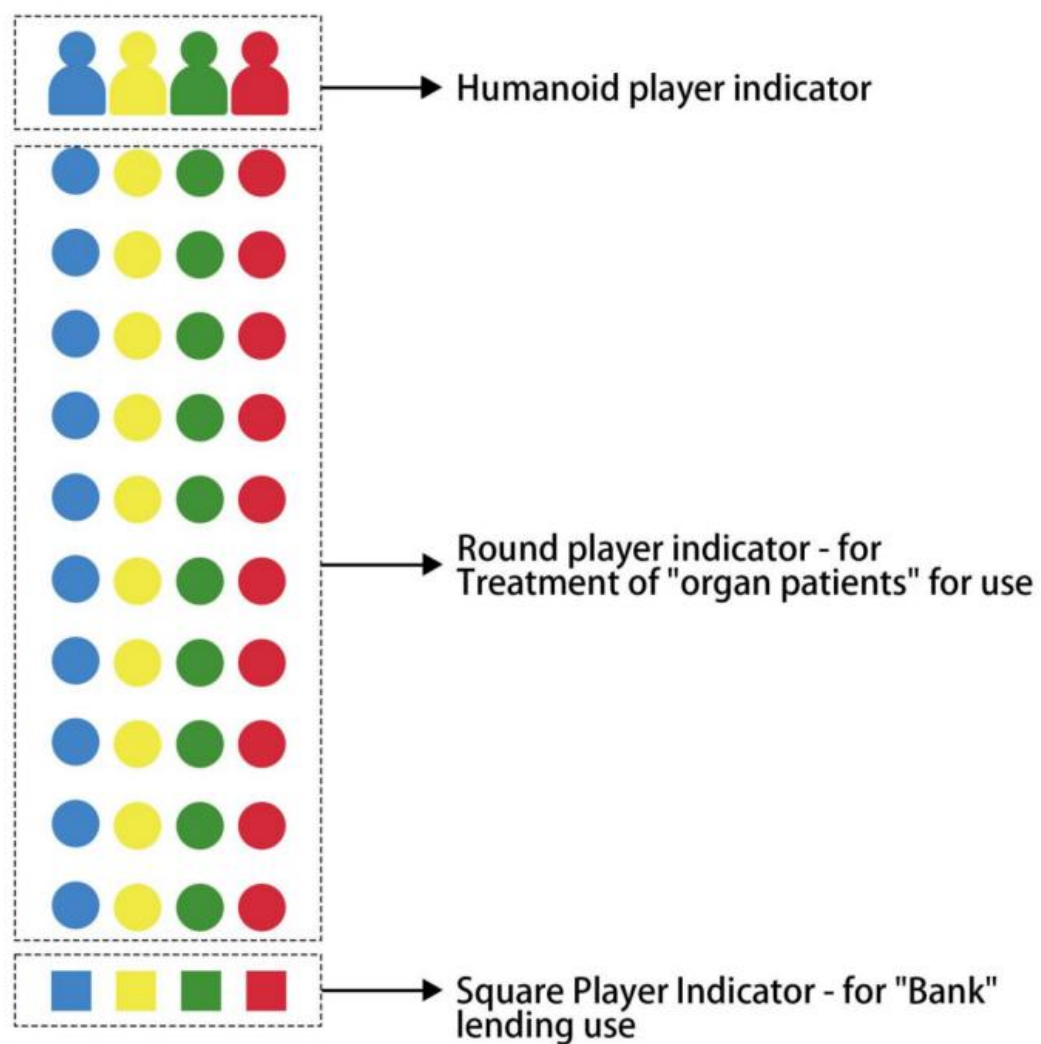


Note. Illustrated by the author.

Player personal indicators (Figure 62): Player personal indicators have four colors, red, blue, green, yellow, representing four players, each color indicator is divided into three types: Humanoid pieces, round pieces, square pieces, human pieces (1) are placed in front of the player, round pieces (10) are used to synthesize herbs and placed on the “organ patient” module to be healed, square pieces are used to be placed on the gold map.

Figure 62

Player Pointer



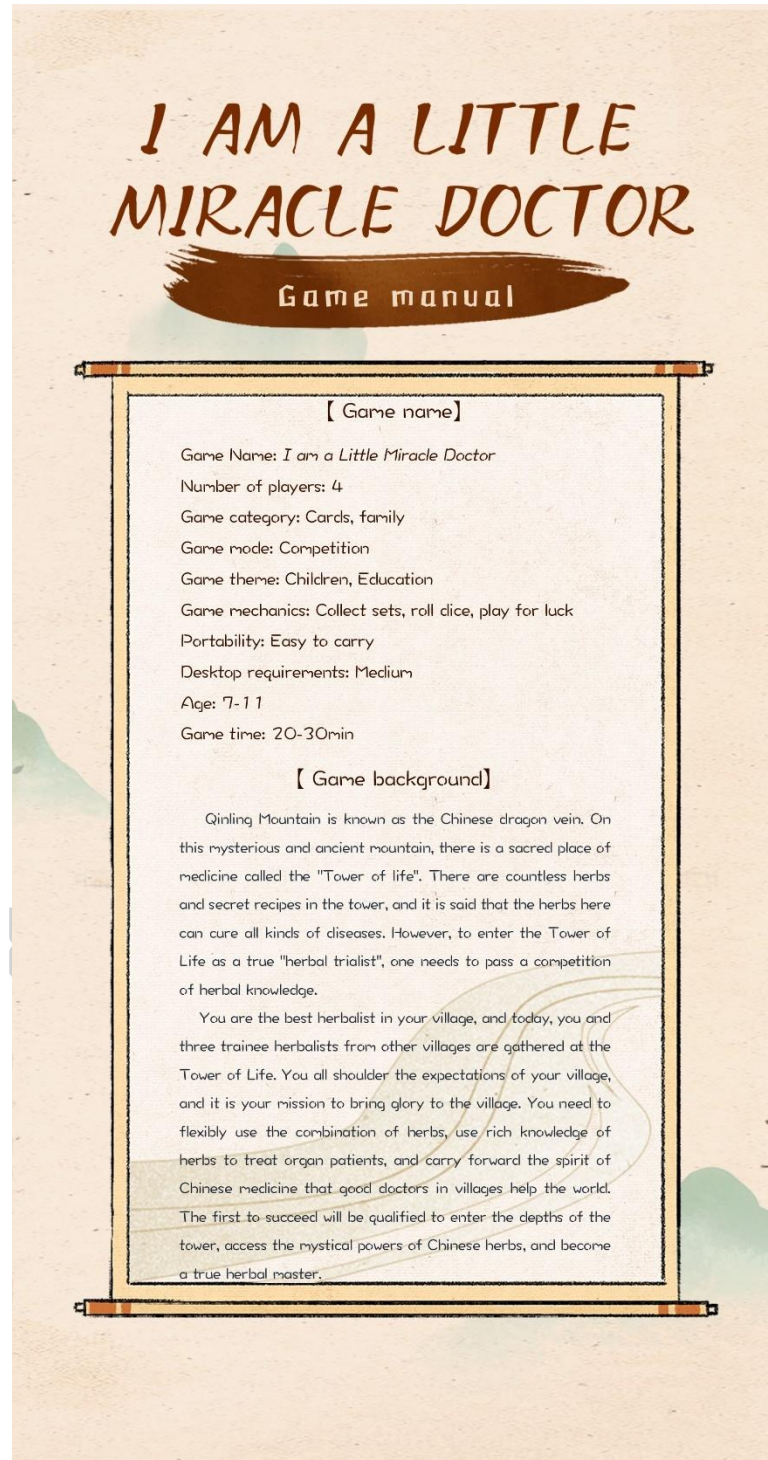
Note. Illustrated by the author.

(2) Game manual and Chinese herbal medicine knowledge manual

The game manual explains the game rules of “I am a Little Doctor” in detail and is bound in five folds (Figures 63-74); the Chinese herbal medicine knowledge manual details the relevant knowledge of Chinese herbal medicine (four properties and five flavors, processing methods, classic prescriptions, authentic medicinal materials, etc.) and a detailed introduction to 26 kinds of herbs. (Display: Figures 75-77) (Details: Appendix 5).

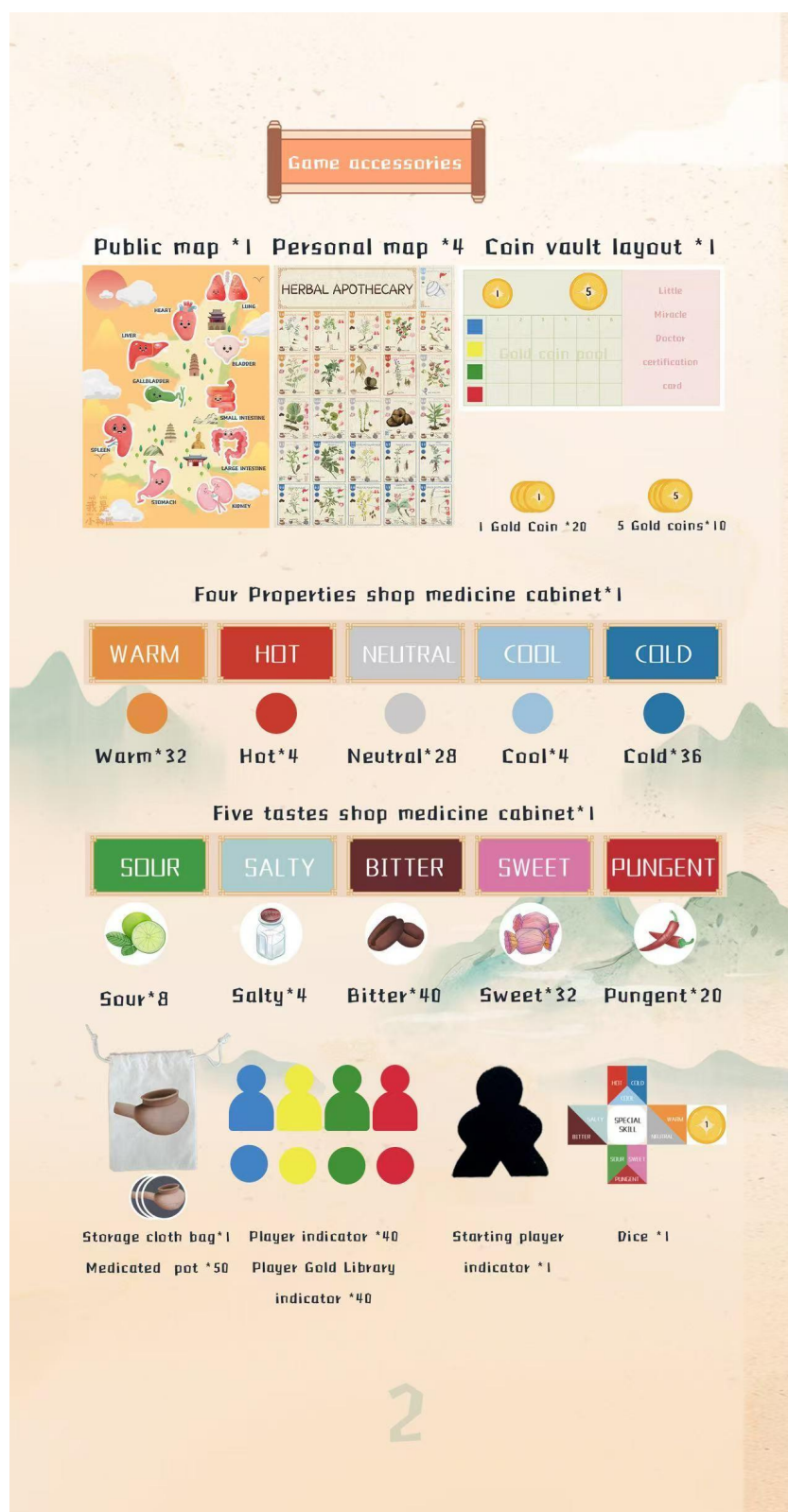


Figure 63
Game Instructions – Front-1



Note. Illustrated by the author.

Figure 64
Game Instructions – Front-2



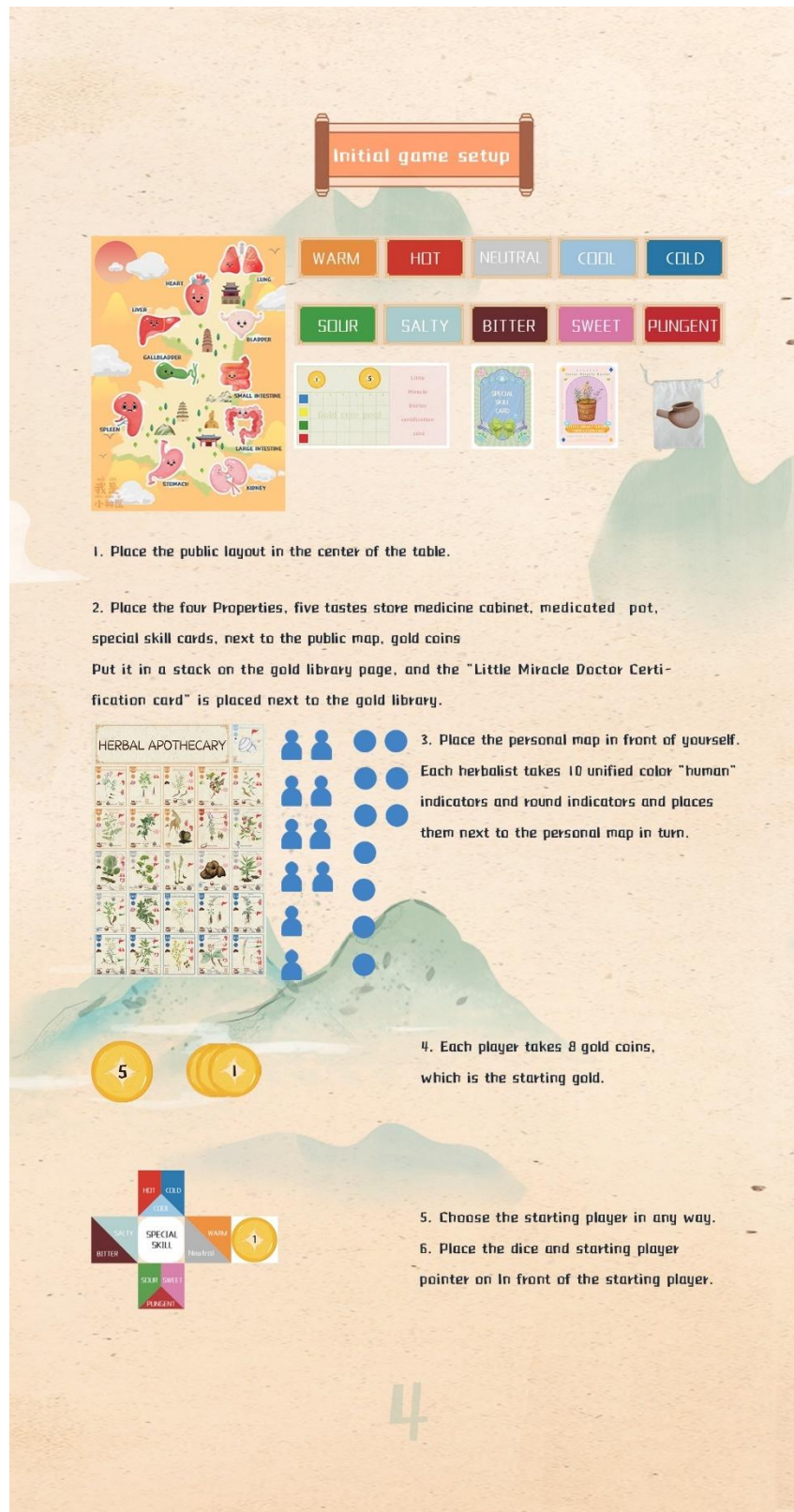
Note. Illustrated by the author.

Figure 65
Game Instructions – Front-3



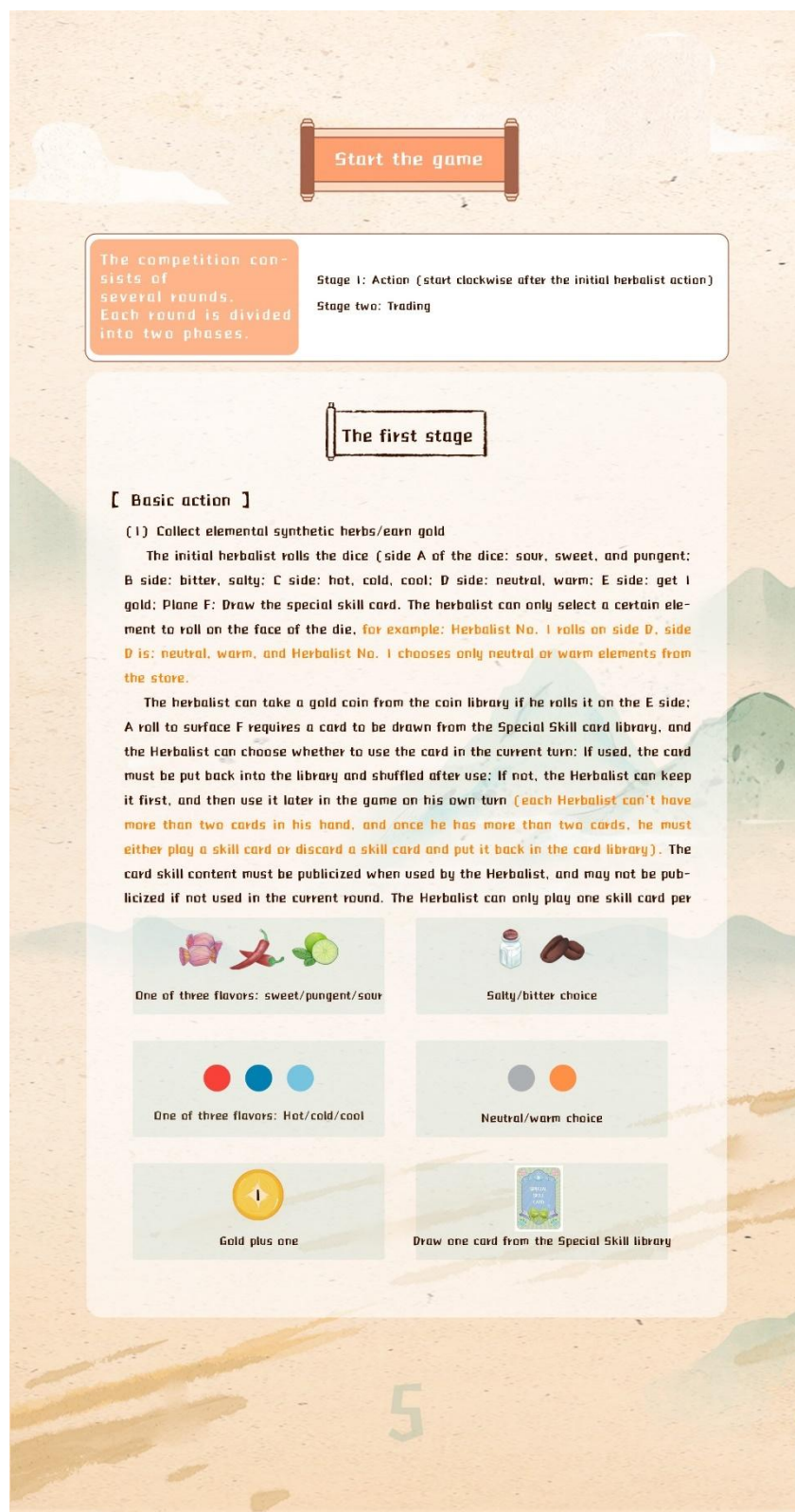
Note. Illustrated by the author.

Figure 66
Game Instructions – Front-4



Note. Illustrated by the author.

Figure 67
Game Instructions – Front-5



Note. Illustrated by the author.

Figure 68
Game Instructions – Back-1



Note. Illustrated by the author.

Figure 69
Game Instructions – Back-2

(4) Treatment of organ patients

After the herbalist successfully synthesizes a certain herb, he can treat the organ patient. The herbalist chooses the treatment site according to the tips on the top right of the herbs on the personal map. Each herb may treat multiple organ patients, but the herbalist may only choose one of them for treatment and place his representative indicator on the selected organ patient map. After treatment with this herb, this herb cannot be synthesized or used again.



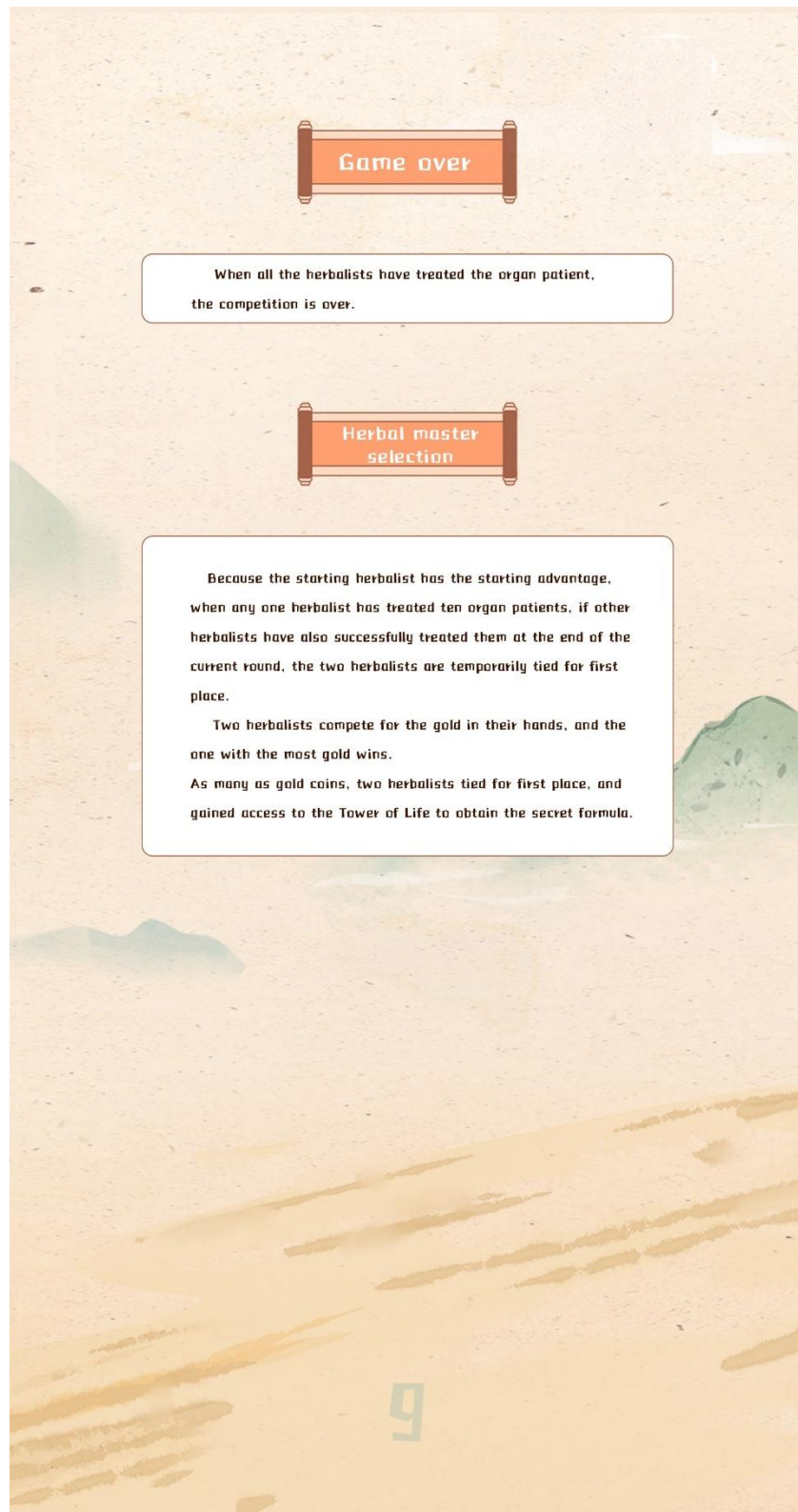
Note. Illustrated by the author.

Figure 70
Game Instructions – Back-3



Note. Illustrated by the author.

Figure 71
Game Instructions – Back-4



Note. Illustrated by the author.

Figure 72
Game Instructions – Back-5



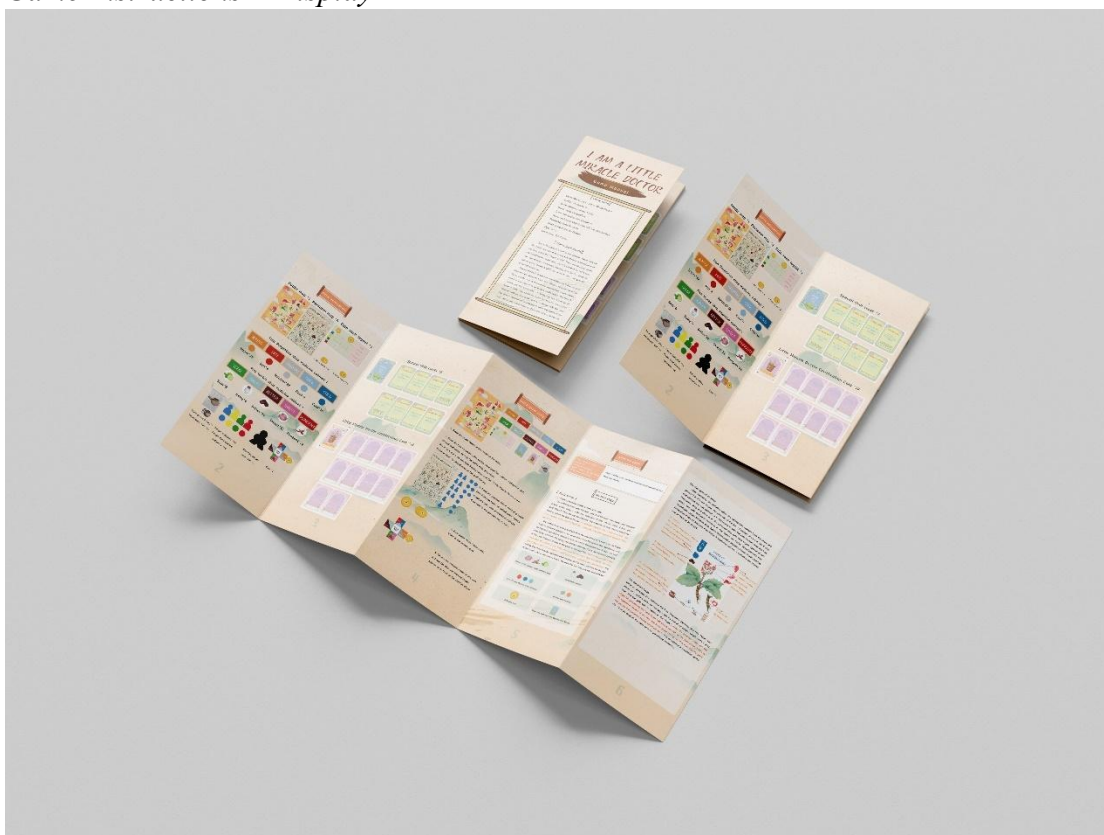
Note. Illustrated by the author.

Figure 73
Game Instructions – Display-1



Note. Illustrated by the author.

Figure 74
Game Instructions – Display-2



Note. Illustrated by the author.

Figure 75
Chinese Herbal Medicine Knowledge Handbook-1



Note. Illustrated by the author.

Figure 76
Chinese Herbal Medicine Knowledge Handbook-2



Note. Illustrated by the author.

Figure 77
Chinese Herbal Medicine Knowledge Handbook-3



Note. Illustrated by the author.

4.5.2.10 GAME PACKAGING DESIGN

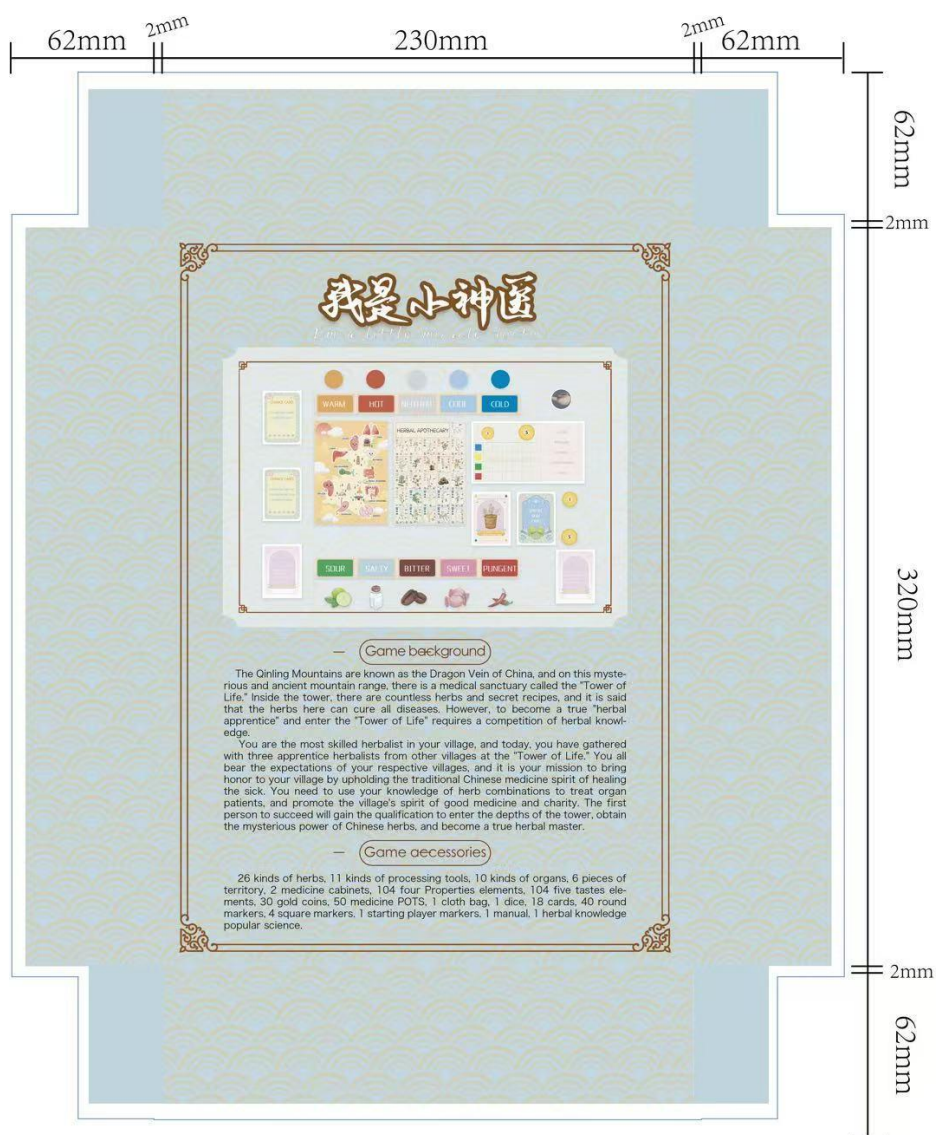
The overall packaging of the game “I am a Little Miracle Doctor” uses a box with a heaven and earth cover, which is easy for players to take and ensures that the internal space is wide enough for players to put away. The front packaging design (Figure 78) contains four pieces of information: the name of the game, the length of the game, the number of players, and the age at which the game can be played. The reverse package (Figure 79) contains four pieces of information: game name, game accessories picture display, game background, and game accessories text display.

The illustration of the front packaging box is based on the background of the game: “Qinling Mountain is known as the Chinese dragon vein, and on this mysterious and ancient mountain, there is a sacred place of medicine known as the” Tower of Life “. There are countless herbs and secret recipes in the tower, and it is said that the herbs here can cure all kinds of diseases. However, to enter the Tower of Life as a true “herbal trialist”, one needs to pass a competition of herbal knowledge. You are the best herbalist in your village, and today, you and three trainee herbalists from other villages are gathered at the Tower of Life. You all shoulder the expectations of your village, and it is your mission to bring glory to the village. You need to use the combination of herbs flexibly, use rich knowledge of herbs to treat organ patients and carry forward the spirit of Chinese medicine that good doctors in villages help the world. The first to succeed will be entitled to enter the tower’s depths, access the mystical powers of Chinese herbs, and become a true herbal master.” Based on the keywords in the story’s background: Tower of Life, four herbalists, village, Qinling Mountains, create theme illustrations as the cover of the game box.



Figure 78*Knife layout on the front of the packaging box**Note.* Illustrated by the author.

Figure 79
Knife layout on the back of the packaging box



Note. Illustrated by the author.

4.5.3 PROTOTYPE DISPLAY

Game accessories include board game packaging box (Figure 80), small miracle doctor certification card (Figure 81), special skill card (Figure 82), dice (Figure 83), Four Properties element medicine cabinet, five-taste element medicine cabinet, medicine pot, public map, personal map, gold coin map, gold coin, and other accessories (Figure 84).

Figure 80

Board Game Packaging Box



Note. Illustrated by the author.

Figure 81*Small Miracle Doctor Certification Card**Note. Illustrated by the author.***Figure 82***Special skill card**Note. Illustrated by the author.*

Figure 83
Dice



Note. Illustrated by the author.

Figure 84
Gaming accessories



Note. Illustrated by the author.

4.6 GAME TESTING AND FEEDBACK DATA ANALYSIS

Based on the design of the game prototype, the main purpose of this test is to understand the actual effect of the board game “I am a Little Miracle Doctor” in education, evaluate the students’ grasp of the knowledge of Chinese herbal medicine, and whether the game design can effectively help students learn the knowledge of herbal medicine. At the same time, through focus group interviews, students’ opinions and suggestions on the fun, difficulty, and educational value of games were collected. The goal is to evaluate students’ learning effect on Chinese herbal medicine through this test, conduct questionnaire tests before and after games to analyze students’ improvement and understanding of herbal medicine knowledge, observe students’ behavior in the game, analyze the fun, rationality, interaction, cooperation, and education of the game mechanism, and collect possible problems in the game. This data is analyzed to facilitate the final design and production of the game.

4.6.1 PREPARATION AND PROCESS OF GAME TEST

(1) Game test preparation

First, the researchers contacted the relevant person in charge of a primary school in Shaanxi and introduced the purpose and significance of this study in detail. After the school agreed, two tests were conducted according to the school schedule. The school randomly selected 52 students to participate in the test. 24 children participated in the first test, and 28 children participated in the second. The duration of each test was 2 hours.

Secondly, to ensure the accuracy of the test data of this study, the researchers contacted the person in charge of an educational institution in Shaanxi. They conducted a third game test in the institution after obtaining permission. This test recruited 12 people and lasted for 2 hours.

Finally, the test population was all children aged 7-11, and the duration of each test was two hours to ensure that data collection was carried out under the same conditions, thereby improving the objectivity and reference value of the test results. The structure of all test participants was host, recorder, and game test player (Table 27).

Table 27
Game test information

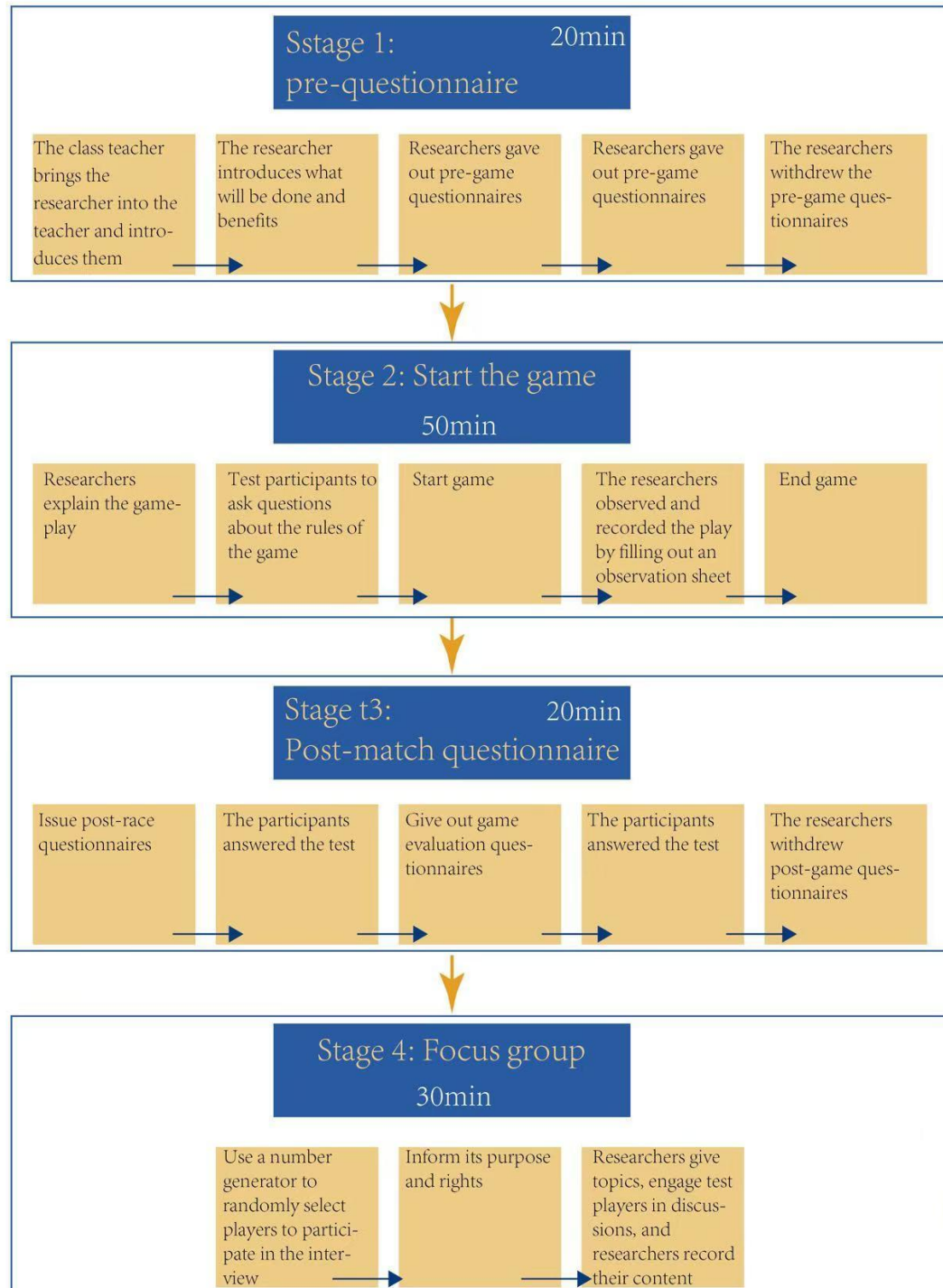
Test run	Test site	Test item	Number of people tested	Test duration	Participant	Test date/time
The first match	A primary school in Shaanxi	I AM A LITTLE MIRACLE DOCTOR BoardGame	There were 24 participants in 6 groups with 4 participants in each group	2H	One presenter, three recorders	2024.9.12 16:00-18:00
The second match	A primary school in Shaanxi	I AM A LITTLE MIRACLE DOCTOR BoardGame	There were 28 participants in 7 groups with 4 participants in each group	2H	One presenter, three recorders	2024.9.13 16:00-18:00
The third match	An off-campus educational institution (Classroom) in Shaanxi	I AM A MIRACLE DOCTOR LITTLE BoardGame	There were 12 people in 3 groups, 4 people in each group	1.5H	One presenter, two recorders	2024.9.14 12:00-14:00

Note. Compiled and analyzed by the author.

(2) Game testing process

Each game test of “I am a Little Doctor” is divided into four stages (Figure 85): pre-test stage, game test, post-test stage, and focus group interview. The overall test duration is about 2 hours.

Figure 85
Test flow chart



Note. Illustrated by the author.

Pre-test stage: First, the school teacher/institution teacher brings the children who will participate in the test into the classroom and guides the students to sit in groups of four. The teacher briefly introduces the purpose and process of this test, informs the students of their rights, and clarifies that they have the right to withdraw or adjust their participation methods at any time during the test. Secondly, the researchers distributed paper questionnaires on-site and guided students in answering them (Figure 86). Finally, the questionnaires are collected after the students have finished answering.

Figure 86

Students Fill Out the Questionnaire Before the Game Test



Note. Photographed by the author.

Game testing phase: First, the researchers explained the rules of the board game “I am a Little Doctor” to the players (Figure 87) and started the game after confirming that the children had a clear understanding of the game. Secondly, while the children were playing the game (Figure 88), three recorders observed and recorded the students’ performance in the game (Figure 89), including teamwork, decision-making process, reaction to game mechanics, whether the students could apply herbal knowledge during the game, and how they thought strategically through the game.

Figure 87
Game Rules Explanation



Note. Photographed by the author.

Figure 88
Children Playing Games



Note. Photographed by the author.

Figure 89*Records the Children's Performance During the Game**Note.* Photographed by the author.

Post-test stage: First, the researchers distributed questionnaires with the same content as the pre-test questionnaires to the children for another test. The children's answers were collected after they were answered, aiming to evaluate the impact of the game on the students' knowledge improvement (Figure 90). Secondly, the game satisfaction questionnaire was distributed to the children to collect their evaluation of the game, aiming to evaluate whether the "I am a Little Doctor" board game is accepted and loved by children.

Figure 90*Children Filling Out the Questionnaire**Note.* Photographed by the author.

Focus group interview: The children were selected through a random number generator to participate in the focus group interview (Figure 91). After the first game test in a primary school in Shaanxi, six numbers (7, 11, 8, 15, 3) were generated using a random number generator, and the players corresponding to the numbers were organized into groups of six for focus group interviews; the second test was also conducted in a primary school in Shaanxi, and six numbers (25, 30, 50, 45, 32) were generated using a random number generator, and the players corresponding to the numbers were organized into groups of six for focus group interviews; the third game test was conducted in an educational institution in Shaanxi. Due to the small number of people in this test, four groups of numbers (56, 58, 60, 53) were generated using a random number generator, and the players corresponding to the numbers were organized into groups of four for focus group interviews.

Figure 91

Focus Group Interview



Note. Photographed by the author.

4.6.2 GAME TEST RESULTS

4.6.2.1 QUESTIONNAIRE AND SATISFACTION ANALYSIS BEFORE AND AFTER THE COMPETITION

Table 28

Basic Indicators of Board Game Satisfaction Questionnaire

Name	Sample size	Minimum value	Maximum value	Mean value	Standard deviation	The median is
1.Do you like this Chinese medicine board game?	64	2.000	5.000	4.453	0.733	5.000
2.Do you find this board game difficult?	64	1.000	5.000	2.922	0.822	3.000
3.Did you gain any knowledge about Chinese medicine while playing?	64	2.000	5.000	4.281	0.863	4.500
4.Do you find this board game interesting?	64	2.000	5.000	4.359	0.824	5.000
5.Will you want to play this board game again?	64	3.000	5.000	4.484	0.713	5.000
6.Would you recommend this board game to your friends?	64	1.000	5.000	4.234	1.020	5.000
7.Are you satisfied with the art of this board game?	64	1.000	5.000	4.438	0.871	5.000
8.Do you think the lessons learned from this board game will be useful to you?	64	2.000	5.000	4.313	0.794	4.000
9.Would you give me a score for this board game?	64	2.000	5.000	4.313	0.753	4.000

Note. Compiled and analyzed by the author.

Table 28 shows the satisfaction assessment of 64 participants with Chinese medicine board games. The results showed that respondents generally reported

positive feedback on board games, with multiple metrics averaging close to or above 4 points. For example, “Do you like this Chinese medicine board game?” With a mean of 4.453 (standard deviation 0.733), the majority of respondents have a high preference for board games. “Will you want to play this board game again?” The average value was the highest at 4.484, reflecting a strong willingness to repeat play. In addition, board games also scored high in “art satisfaction,” with an average of 4.438, indicating that the visual effects are well received. On the other hand, “Do you find this board game difficult?” The average value of the game was 2.922, indicating that the difficulty of the game was moderate and did not cause excessive learning pressure on the respondents. Overall, the data reflected positive reviews of the board game, including interesting content, useful knowledge, and a high willingness to recommend it.

Table 29

Basic indicators of pre-test questionnaires

Name	Sample size	Minimum value	Maximum value	Mean value	Standard deviation	The median is
Q4. Can you name five herbs?	64	0.000	5.000	3.125	1.303	3.000
Q5. What is authentic herbal medicine?	64	0.000	1.000	0.516	0.504	1.000
Q6. What do you mean by the four qi and five tastes?	64	1.000	9.000	5.031	2.070	5.000
Q7. Please select the sutra of Yuanhu	64	0.000	1.000	0.359	0.484	0.000
Q8. Please select the medicinal properties and taste of forsythia?	64	0.000	1.000	0.359	0.484	0.000
Q9. Please tell us the efficacy of Chinese ginseng.	64	0.000	1.000	0.188	0.393	0.000
Q10. Where can I put Gastrodia into medicine?	64	0.000	1.000	0.375	0.488	0.000
Q11. What is the processing method of Cornus officinalis?	64	0.000	1.000	0.391	0.492	0.000
Q12. What is Qin Medicine?	64	0.000	2.000	0.484	0.534	0.000
Q13. What medicine	64	0.000	1.000	0.234	0.427	0.000

Name	Sample size	Minimum value	Maximum value	Mean value	Standard deviation	The median is
can I use for weakness?						
Q14. What kind of herb is this?	64	0.000	2.000	0.531	0.534	1.000

Note. Compiled and analyzed by the author.

Table 29 shows the respondents' knowledge of TCM in the pre-test. "Q4. Can you name five herbs?" The data indicates the number of herbs answered, "Q6. What do the four qi and five taste refer to?" The data of the remaining questions are expressed as 0= "wrong answer" and 1= "correct answer".

The five questions with the highest accuracy were: "Can you name five herbs?" (Average 3.125/5, indicating that respondents could correctly name more than 3 herbs), "What do the four qi and five tastes refer to?" (Average 5.031/9), "May I ask what is authentic medicinal materials?" (Average 0.516), "What kind of herb is this?" (Average 0.531), and "What is Qin medicine?" (Average: 0.484). The high scores of these questions indicate that most respondents are relatively familiar with basic and common-sense knowledge of Chinese medicine.

In contrast, the scores of other specific knowledge points were generally low, and the two questions with the lowest accuracy were "The efficacy of Chinese ginseng" (average 0.188) and "What medicine can be used for body weakness?" (Average value: 0.234), reflecting the respondents' weak knowledge of the specific application and efficacy of traditional Chinese medicine.

Table 30

Pearson Correlation in Board Game Satisfaction Questionnaire

	Mean	Standard deviation	Age	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Age	8.828	1.486	1									
Q1	4.453	0.733	0.175	1								
Q2	3.078	0.822	-0.301*	-0.244	1							
Q3	4.281	0.863	0.001	0.122	-0.300*	1						
Q4	4.359	0.824	0.038	0.488*	-0.089	0.213	1					
Q5	4.484	0.713	-0.010	0.181	-0.391*	0.240	0.186	1				

	Mean	Standard deviation	Age	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Q6	4.234	1.020	-0.046	0.217	-0.041	0.014	0.352*	0.300*	1			
Q7	4.438	0.871	0.120	0.256*	-0.292*	0.256*	0.463*	0.114	0.169	1		
Q8	4.313	0.794	-0.008	0.271*	-0.232	0.055	0.384*	0.093	0.241	0.212	1	
Q9	4.313	0.753	0.219	0.343*	-0.271*	0.131	0.149	0.423*	0.110	0.296*	0.179	1

* p<0.05 ** p<0.01

Note. Compiled and analyzed by the author.

The data in Table 30 show Pearson correlation for each index of the board game satisfaction questionnaire. First, age and question 2 (“Do you find this board game difficult?”) There was a significant negative correlation ($r = -0.301$, $p < 0.05$), indicating that older respondents thought games were relatively easier. Question 1 (“Do you like this Chinese medicine board game?”) and question 4 (“Do you find this board game interesting?”) The correlation was strong ($r = 0.488$, $p < 0.01$), indicating that the degree of preference was closely related to the perception of fun.

Table 31

Analysis Results of Pre-test and Post-test Paired T-test

name	Pairing (mean standard deviation)		±Difference (pairing 1-t pairing 2)		p
	Pair 1	Pair 2			
Pretest 4 paired with posttest 4	3.125±1.303	3.344±1.312	-0.219	-4.2000.000**	
Pre-test 5 paired with post-test 5	0.516±0.504	0.547±0.502	-0.031	-1.4260.159	
Pre-test 6 pairs post-test 6	5.031±2.070	5.500±2.008	-0.469	-7.4560.000**	
Pre-test 7 paired with post-test 7	0.359±0.484	0.453±0.502	-0.094	-2.5530.013*	
Pretest 8 paired with posttest 8	0.359±0.484	0.391±0.492	-0.031	-1.4260.159	
Pre-test 9 paired with post-test 9	0.188±0.393	0.203±0.406	-0.016	-1.0000.321	
Pre-test 10 and post-test 10	0.375±0.488	0.391±0.492	-0.016	-1.0000.321	
Pre-test 11 pairs post-test 11	0.391±0.492	0.422±0.498	-0.031	-1.4260.159	
Pre-test 12 pairs post-test 12	0.484±0.534	0.500±0.504	-0.016	-0.5740.568	
Pretest 13 paired with posttest 13	0.234±0.427	0.281±0.453	-0.047	-1.7600.083	
Pre-test 14 and post-test 14	0.531±0.534	0.547±0.502	-0.016	-0.5740.568	

* p<0.05 ** p<0.01

Note. Compiled and analyzed by the author.

Table 31 shows the pre-test and post-test paired T-test analysis results to evaluate the effect of board games on respondents' learning of TCM knowledge. From the results, the mean difference of "pre-test 4 to post-test 4" (Chinese herb names) was -0.219, and the T-value was -4.200, $p < 0.01$, showing a significant improvement, indicating that board games were effective in helping respondents remember more Chinese herb names. Similarly, the average difference between "pre-test 6 to post-test 6" (four gases and five tastes) was -0.469, and the T-value was -7.456, $p < 0.01$, indicating that the respondents had significantly improved their knowledge of the four gases and five tastes.

In addition, the average difference between "pre-test 7 to post-test 7" (the warp normalization of Yuan Hu) was -0.094, and the t value was -2.553, $p < 0.05$, indicating that the warp normalization knowledge had also been significantly improved. However, for others, such as the "preparation method" (pre-test 11-post-test 11) and "drug use for physical weakness" (pre-test 13-post-test 13), the P-value did not reach a significant level, indicating that the learning effect of these contents was not significantly improved.

On the whole, Table 28 reveals that the respondents have high overall satisfaction with board games, with average scores approaching or exceeding 4 points in multiple dimensions, especially in the two dimensions of "whether they are willing to play again" and "whether they would recommend it to friends", reaching 4.484 and 4.234 respectively, indicating that board games are widely praised in terms of fun, willingness to repeat play and visual design. In addition, respondents believed that board games also played a significant role in helping them learn TCM knowledge, with an average value of 4.281.

Table 29 provides the knowledge of the respondents before the game through the pre-test questionnaire. Although in the two basic knowledge areas of "name of Chinese herbal medicine" and "four qi and five taste", the performance is better, the correct rate is 3.125 and 5.031, but in the more specialized knowledge points, such as "normalization knowledge" and "processing method", the performance is weaker, the correct rate is low, the average value is 0.359 and 0.391.

The correlation analysis in Table 30 shows that respondents' liking degree of board games (Q1) has a strong positive correlation with perception of game fun (Q4) ($r = 0.488$, $p < 0.01$), indicating that liking degree is closely related to the perception of fun. At the same time, the positive correlation between the various dimensions of satisfaction further emphasizes the importance of game design, especially visual design, in influencing overall satisfaction and learning motivation.

The paired T-test results in Table 31 are the focus of this analysis. The data showed that the respondents had significant improvement in the two core knowledge points of "Name of Chinese herbal medicine" ($t = -4.200$, $p < 0.01$) and "four Qi and five taste" ($t = -7.456$, $p < 0.01$), indicating that board games had achieved remarkable results in helping respondents master the basic knowledge of Chinese herbal medicine. However, some specific knowledge points, such as "suiting knowledge" ($t = -2.553$, p

< 0.05) improved, but the extent was small, while the applied knowledge, such as “preparation method,” did not show a significant difference, indicating that the educational effect of games in these aspects is limited.

4.6.2.2 OBSERVATION TABLE ANALYSIS

During the course of the game, two recorders recorded the real-time feedback of the test players, and each observer recorded the two groups of test players on an observation sheet. In the first test, three observers recorded the real-time feedback data of two groups of tested players, and each filled in an observation record form. A total of three observation records were recovered. In the second test, one of the observers recorded the real-time feedback data of three groups of tested players and filled in an observation record form; two observers recorded the timely feedback data of two groups of tested players and filled in an observation record form respectively, and a total of three observation record forms were recovered. In the third test, two observers recorded the real-time feedback data of two groups of tested players, and each filled out an observation record form, and a total of two observation records were recovered. The record sheet contains five dimensions of observation content: participation, rule understanding, cooperation and communication, emotional response, and strategy use (Table 32). Observers are required to record the content and score briefly for each dimension. The score is set to 1-5 points, 1= lowest, 2= low, 3= medium, 4= high, and 5= highest.

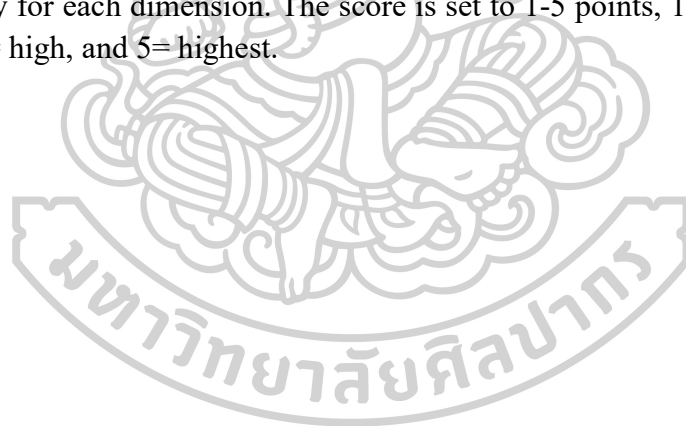


Table 32*Observation Record Summary*

Group	Engagement and mark (1-5)	Rules understanding and mark (1-5)	Cooperation & Communication & mark (1-5)	Emotional response and mark (1-5)	Strategy Use and mark (1-5)
1-2	Five students were actively involved and three were more passive.	The four players are somewhat confused when understanding the rules and need to be prompted again when synthesizing herbs.	Most players are willing to cooperate, but prefer to make independent decisions.	Most players are very excited when they roll dice.	Six students were able to develop strategies on their own initiative, and three were able to adjust their strategies according to the situation.
3-4	mark (3) Most players actively participate, with no apparent distraction.	mark (2) Three players need to be prompted when healing “organ patients”.	mark (1) Five players are willing to actively collaborate and discuss how to synthesize herbal strategies faster.	mark (5) Players were visibly emotional when they rolled the dice and drew skill cards.	mark (4) After the two students took the initiative to formulate the strategy, they actively discussed and suggested it with other players.
	mark (5)	mark (2)	mark (3)	mark (5)	mark (3)

Group	Engagemen t and mark (1-5)	Rules understanding and mark (1-5)	Cooperation & Communicatio n & mark (1-5)	Emotional response and mark (1-5)	Strategy Use and mark (1-5)
5-6	One player was slightly distracted at the beginning of the game, while the rest were highly motivated.	Most players understand the rules perfectly and don't need any extra cues.	Most players rarely communicate, preferring to make independent decisions.	Three players appear to be very upset when using the "Poison card".	Most famous players think less about strategy and more about luck.
	mark (4)	mark (4)	mark (2)	mark (4)	mark (1)
7-8	All four players were relatively flat throughout the game.	The use of special skill cards by both players is unclear.	The three players will only communicate when trading herbs.	Most players can make a quick decision to synthesize herbs.	Four players gave a very clever strategy on how to use the "gold" flexibly.
	mark (3)	mark (4)	mark (3)	mark (4)	mark (3)
9-10	The players are very focused.	Four players have doubts about synthetic herbs and need to be prompted several times.	Players largely ignore the player trading session at the end of the round.	Both players react more slowly while synthesizing herbs.	Six players prefer the "roll the dice" approach to getting elements. The policy usage is low.
	mark (5)	mark (2)	mark (2)	mark (3)	mark (2)

Group	Engagement and mark (1-5)	Rules understanding and mark (1-5)	Cooperation & Communication & mark (1-5)	Emotional response and mark (1-5)	Strategy Use and mark (1-5)
11-12	The two players are often distracted during the game.	Doctor's card portion.	Four players actively communicate with the rest of the players about trading herbal strategies.	The mood of the three players is relatively stable, and there is no significant change.	Most players will actively discuss the use of "skill cards" and prefer to develop strategies together.
	mark (3)	mark (2)	mark (3)	mark (4)	mark (4)
13-14	Most players are focused.	Players are generally familiar with the rules and occasionally need to be prompted.	Players are eager to communicate, exchange strategies, and remind each other about the use of skill cards and certification cards.	Most players have higher emotions and faster reaction times throughout the game.	Players generally formulate strategies and discuss them shortly after the game begins.
	mark (4)	mark (3)	mark (5)	mark (4)	mark (4)

Group	Engagement and mark (1-5)	Rules understanding and mark (1-5)	Cooperation & Communication & mark (1-5)	Emotional response and mark (1-5)	Strategy Use and mark (1-5)
15-16	The players are very enthusiastic.	Five players were hesitant about the synthetic herbal part, but understood the rules correctly and needed several encouragements.	The four players often talk to each other, and it is very good to drive the atmosphere within the group.	The players were relatively stable at the beginning, and their enthusiasm increased after the treatment of an organ patient.	Five players were able to strategize at the beginning of the game, and the rest were able to strategize as the game progressed.
	mark (5)	mark (3)	mark (3)	mark (4)	mark (4)
Divide equally	4	2.75	2.75	4.125	3.125

Note. Compiled and analyzed by the author.

Based on the above analysis and summary of observation records:

In terms of participation, most players are highly involved, and only individual players will be distracted, indicating that the game can arouse children's interest, the enthusiasm for the game is very high, and they actively cooperate. For the understanding of the rules some players are confused about understanding the rules of synthetic herbs and special skill cards and need to give a second reminder. The learning cost of the rules is high, and the basic game flow is basically smooth after mastering the rules, and some can explore different ways of playing. Through the test, children can understand the game's rules and mechanisms after several prompts. The verbal explanation of the rules of the game may not lead to the ambiguity of the rules for them. Consider adding the form of video explanation of the game's rules, so that children can understand the process and details of the game more vividly. In cooperation and communication, some players show a certain willingness to cooperate. Still, more players tend to make decisions and choices independently, so it

is necessary to strengthen the trading mechanism after a single round and enhance the willingness to cooperate between players and the advantages brought by cooperation to improve the communication between them. Most players show high enthusiasm at the beginning and during the game, especially when rolling dice and drawing skill cards. In using strategy, a few players will rely purely on luck; some players are more inclined to use gold to obtain elements, and some players rely too much on gold accumulation and miss the best chance to win. Consider adding mechanics that require long-term thinking or planning to encourage players to strategize more and earlier.

4.6.2.3 FOCUS GROUP INTERVIEW AND ANALYSIS

A total of 16 children participated in the focus interview group, the purpose of which was to understand the learning experience and gains of the tested players during the game, collect feedback results to thoroughly analyze whether the game difficulty is suitable for the target player group, deeply explore the interaction and cooperation between players, and the fun of game design, and collect players' suggestions for game improvements. Evaluate the game's educational value, fun and attractiveness, difficulty and challenge, and cooperative experience.

The interview topics and questions are as follows:

Theme 1: Game experience and gameplay experience

Question 1: How difficult do you find the game easy or challenging? Is it suitable for your age group?

Question 2: In the process of collecting herbs, do you find the synthesis of the four Qi and five flavor elements interesting?

Theme two: Learning and Harvest

Question 3: What did you learn about Chinese herbal medicine through the game?

Q4: Do you think that by playing the game "I am a Little Miracle Doctor", you can memorize the knowledge of Chinese herbs?

Theme three: Cooperation and interaction

Question 5: At the end of each round, you can trade herbal elements and cards with other players. Do you think that cooperating and communicating with other players in this part of the session will help you heal organ patients faster?

Question 6: Do you think this game is suitable to play with your parents or friends?

Theme 4: Game Design and Gameplay

Question 7: At the beginning of the game, each person can get 8 initial coins, and during the game, through different challenges to obtain coins, do you think the distribution and acquisition of coins is fair? Do special skill cards make the game more fun?

Question 8: If you could add any other new elements to your game, what would you like to add?

Theme V: Overall evaluation

Question 9: After the game is over, would you recommend this board game to your friends? What parts of the game do you find most appealing?

In this study, the responses of tested players collected for each topic were open-ended coded, and the keywords and valid and important information were marked for feedback analysis. The feedback results are as follows:

Theme 1: Game experience and gameplay experience

Key words: “OK”, “interesting”, “five tastes”

Players highly praised the fun of the game, and many players said that they were looking forward to playing the “I am a Little Miracle Doctor” board game developed by the research institute next time. When talking about this topic, the children’s reactions were very excited, through their tone and facial feedback can show their love for the game. Most children feel that the difficulty of the game is moderate; they said that after playing three or four rounds, they are completely clear about the rules of the game and can quickly find a variety of ways to obtain the “four gas” and “five taste” elements. The mechanics of dice play are loved and admired by children, and they say that although dice play is largely influenced by luck, gold coins, special skill cards, miracle doctor certification cards, and trading links can all obtain the necessary elements to collect herbs. Here are some examples representing the views of child players:

Player 7: “I felt OK, the game wasn’t too hard, but I didn’t know how to play at first. While collecting the four Qi and five flavor elements, I look forward to my next roll of the dice to get the elements I want.”

Player 25 “was a good fit for me, especially the part about collecting herbal elements, which felt like a pair of hands”.

Player 45: “At first, I was a little confused about what to do after successfully collecting herbs, but after being prompted by others, I figured it out, and once I understood the rules of the game, it became easy.”

Player 58: “Suitable for our age stage. Before playing the game, I knew ‘Astragalus’ had this taste of herbal medicine, but I have only seen my mother use it to soak in water; I do not know what it originally looked. Before playing the game, I knew ‘Astragalus’ this taste of herbal medicine, but I had only seen my mother use it to soak in water, do not know what it originally looked like. Now, today I found it is very good-looking, I like Astragalus.”

Player 32: “It is not particularly difficult, but it is not very simple; it is OK; I do not understand the role of ‘little miracle doctor certification card’, so I did not use it in the game, but it does not seem to affect the game.”

Theme 2: Learning and Harvest

Keywords: “Five tastes,” “organs”

In terms of knowledge gain, the children’s feedback on the knowledge gained was different; some players remembered most of the knowledge content involved in the game, and some players gained less knowledge content and only memorized the

general content. However, it was found that most players had a deep memory of the “five tastes,” which may be that children’s perception of taste is stronger; Some players were impressed by the “Guijing” and said they liked the expression design of organ patients. The knowledge gained by each player is different, but they all agree that there is something to be gained from playing the game. Here are some examples that represent the perspective of children:

Player 58: “I remember the five tastes! Because I like to eat candy, now I know that ‘Huashan ginseng’ is sweet. I also thought that Chinese medicine is bitter.”

Player 45: “I was particularly impressed with ‘sour’ because I was trying to synthesize sour jujube nuts, and I couldn’t throw them on that side.”

Player 60: “I’m very impressed with white shellfish because I really like light blue, and I know it means cool, and I know it grows in the sea, so it’s salty! I remember the art teacher also said that blue gives people a cool feeling.”

Player 30: “I know musk is spicy! I saw that cute little deer very early.”

Player 56: “I remember the ‘four gases and five tastes’ because synthetic herbs need to collect them”.

Player 3: “I remember the gallbladder; it’s green, and it stands out on the map.”

Player 7: “I have a strong memory of the heart because I once synthesized herbs and found that I had cured the heart”.

Theme 3: Cooperation and interaction

Keywords: “less help,” “I want to...”

The game sets up a trading session after each player’s individual action, during which players can communicate with other players and exchange or purchase elements. Most players say they do not communicate much at this stage, and many times they will skip this session because they still expect to collect “four gases” and “five flavors” elements by rolling dice. If another player happens to have an extra element and happens to need it, they will communicate within the round and trade directly, but players say this is rare. When asked if they would like to play with family or friends, players said yes. Here are some examples that represent the views of children:

Player 15 “I can synthesize madder without bitter elements, I want to exchange with XXX, but he does not agree”.

Player 11: “Our group seems to trade very little because I always want to live by myself through dice, and I don’t feel much help.”

Player 50: “I don’t know the people in my group, I don’t dare to talk to them, so I haven’t traded with them.”

Player 45: “I want to go back and share it with my good friend because we used to play similar games and we both like nice cards and I think she will like this board game too”.

Player 53: “I want to play with my grandparents, my grandfather is a Chinese doctor, I want to win him”.

Player 60: “I think my sister will enjoy this board game! Because her dream is to be a doctor.”

Theme 4: Game Design and Gameplay

Key words: “relatively fair,” “playing doctor.”

There are several ways to earn gold in the game; the first is at the beginning of the game, each player is allocated eight denominations of gold; The second is to roll a dice and randomly obtain a gold coin with a face value of 1; The third is acquired through special skill cards; The fourth is to borrow money from the “bank,” the premise of borrowing money is to pass the “small God doctor certification,” the player needs to answer the correct Chinese herbal medicine knowledge on the card to be able to borrow money successfully, but to pay off the “bank” before the successful treatment of ten “organ patients”; The fifth is a gold coin with a face value of 2 when the player cures “an organ patient”. Most of the tested players said that there would be insufficient gold in the game. Still, the variety of channels available to obtain gold, although affected by the luck component, the impact is not very large, is acceptable. In terms of special skill use cards, players say they are not familiar with other players in their group, and the “poison” skill cards will cause them trouble. If you can add something new to the game, most players are more interested in roleplay mechanics where one player plays the doctor and one player plays the patient. Here are some examples that represent the views of children:

Player 32: “Fair enough, I didn’t pay much attention to the acquisition of gold; I wanted to get the ‘four Qi’ and ‘five taste’ elements for herbal synthesis; when I keep getting the elements I want, I will focus on the use of gold”.

Player 11: “I bought a lot of the elements I wanted with gold, and I got a lot of gold through the ‘Miracle Doctor’ card, so I treated a lot of ‘organ patients’ very quickly, those problems were not too difficult for me, I think the ‘Miracle Doctor’ card is very fair”.

Player 8: “I’m looking forward to drawing a special skill card because it’s full of unknowns”.

Player 7: “I don’t really want to use the Poison card because I don’t know who to use it with and it’s a little awkward”.

Player 58: “I want to be a doctor, and I want to use a stethoscope to treat them and prescribe them medicine.”

Theme 5: Overall evaluation

Keywords: “will,” “roll the dice”

Most of the children were willing to share the game “I am a Little Miracle Doctor,” developed and designed by this research institute. They affirmed the fun and learning of the game. Some children expressed their love for the art design of board games, especially the design of cards. Some students like herbal image design; they expressed a strong interest in plants; individual players said they would consider it because the game does not fully understand how to play; this view is concentrated in the younger players. Secondly, this topic shows that children especially show a strong

love for the game mechanism of dice playing. They look forward to the luck brought by randomness and like the process of dice playing. However, a few players say that they are always very entangled in the choice of dice faces and do not know which element to choose. Some students also enjoyed collecting “four Qi” and “five taste” elements. Here are some examples that represent the views of children:

The player: “I would recommend, my friend loves plants”.

“I want to share it with my sister, she loves to draw and I think this game is beautiful”.

Players: “I like ‘special skill cards’, me and my friends like to collect nice cards”.

Player: “I am not sure, will consider, I do not quite understand the use of ‘Little Miracle Doctor certification card’.

Players: “I like to ‘roll the dice’ and I want lots and lots of gold”.

Players: “Rolling the dice ‘is fun for me, but every time I get a little confused about which element to choose.”

“I really like to collect the ‘four Qi’ and ‘five taste’ sections, because I was lucky today and always got the elements I wanted.”

Summary based on focus group interview results:

On the whole, “I am a little God Doctor” has achieved good results in fun and education, children can participate in and actively learn the relevant knowledge of Chinese herbal medicine through the game, due to the difference in children’s age, education, personal cognition and other differences, each player will gain knowledge will be different, it is worth affirming that the tested players have gained. In terms of the difficulty of the game, the children said that the game itself is not difficult, but also said that the understanding of the rules of the early game is a little difficult, and it needs to be prompted in the first few rounds of the game. Some players said that they did not use all the game props in the process of the game, and there was a communication problem in the explanation of the game rules. Due to the game mechanism of “rolling dice”, most children find the process of collecting herbal elements very interesting and enjoy the randomness brought by dice, and they are willing to share the game with their family and friends, learn Chinese herbal knowledge with them, and want to experience this board game with people close to them, which proves that the game has the potential to spread.

Due to the limited time of the interview and the small number of participants, although the interview has collected some feedback, it may not be able to represent the views of a wider range of subjects due to the limitations of the sample. The discussion of each question is not too in-depth, the players’ answers are generally short, and the discussion of players’ strategic thinking during the game lacks depth. Future interview research should reserve more time for discussion to dig out more thoughts and feelings of children and bring more comprehensive data support for the optimization of the game.

4.6.2.4 SUMMARY

Through the intervention research method, 64 children were “pre-test” and “post-test,” and the satisfaction rating of the board game “I am a Little Miracle Doctor,” and 16 randomly selected players were interviewed in focus groups. Including observing the real-time feedback of the tested players in the game to test the degree of the board game, “I am a Little Miracle Doctor” to children’s knowledge of Chinese herbal medicine, children’s love, acceptance, and recognition of this board game. Overall, children generally like to use board games to learn knowledge and show their love and recognition of “I am a Little Miracle Doctor”. In terms of the game’s difficulty, older players think it is relatively moderate, and younger players say it takes time to understand the rules. In terms of cognitive knowledge of Chinese herbal medicine, players significantly affect the number of cognitive herbs and the understanding of the knowledge of “four properties” and “five tastes”.

In contrast, another knowledge is not significantly improved. Judging from the test results, “I am a Little Miracle Doctor” has achieved certain results; However, the tested players are not very familiar with some knowledge of Chinese herbal medicine, but from a number of results feedbacks, children have improved in different knowledge dimensions and recognition of Chinese herbal medicine after playing the board game “I am a Little Miracle Doctor”. As this test is limited by objective conditions such as time, sample number, and test times, it has limitations. In future tests, we will learn from the experience of this test, increase the number of samples, continue to explore and record the depth and width of players’ feedback and focus interviews during the game as much as possible.



CHAPTER 5

CONCLUSIONS, DISCUSSION AND SUGGESTIONS

5.1 CONCLUSION

Traditional Chinese medicine is on the rise in China and the world stage. People trust the therapeutic effects of traditional Chinese medicine. Still, they do not understand traditional Chinese medicine's knowledge and theory and even think it is very mysterious, obscure, and difficult to understand. It can be seen that conventional Chinese medicine-related knowledge has yet to be widely popularized in people's cognition, and spreading and carrying forward the culture of traditional Chinese medicine has become an essential and urgent mission. In response to this challenge, this research is determined to develop and design a children's educational board game to convey the basic knowledge of Chinese herbal medicine, named "I am a Little Miracle Doctor". The purpose is to understand the knowledge of traditional Chinese medicine across disciplines deeply, convey the basic knowledge of traditional Chinese medicine through visual symbols, and recombine the game mechanism through board games. Enable children to learn an obscure understanding of Chinese medicine through entertainment.

Children aged 7-11 are in a critical period of cognitive development when they have logical thinking ability and an initial understanding of abstract concepts. The combination of board games and Chinese herbal medicine aims to effectively mobilize their enthusiasm for learning. The gamified learning mode can stimulate their interest in learning and achieve good educational results. At the same time, this stage is also a key stage for the formation of children's cultural identity, which helps them to establish their recognition of traditional culture, open a new learning field for children through the way of board games, guide children to understand the importance and charm of traditional Chinese medicine culture, and enhance their interest in traditional medicine and sense of mission. In order to make the content of game design more suitable for the cognitive range of children aged 7-11 years old, this study ensures that the content of game design can be accepted and understood by children through literature review, field research, observation research, questionnaire survey, interview and other research methods.

In terms of game design, this study visualizes and interactively the knowledge of traditional Chinese medicine, aiming to enable children to truly understand the "four properties", "five taste", "sutra", "processing method" and other related knowledge of herbal medicine. This study not only enables the development of a board game but also provides a new way for children to learn Chinese herbal medicine. We continue to explore the basic information and therapeutic effects of 26 herbs for the treatment of "organ patients".

In order to ensure that the design of board games is reasonable, scientific and practical, this study is based on the feedback analysis of the preliminary questionnaires and expert interviews, and the creation and development of the board games are based on the gained octagonal behavior analysis framework, semiotics and color science. The board games are actually tested by 64 children through the comparison of the data information of the pre-test and the post-questionnaire and the feedback of the discussion content of the focus group. Certain results have been achieved: Because the “four properties” and “five taste” elements of the game need to be repeatedly synthesized herbs, children have significantly improved the image cognition of Chinese herbs and the knowledge of “four properties” and “five taste”. The data results of the pre-test and post-test indicated that the children’s knowledge of the number of authentic medicinal materials and herbs, Qin medicine, the medicinal parts of 26 herbs, and another knowledge had been improved. At the same time, through the game, it was found that due to the love and recognition of the board game “I am a Little Miracle Doctor”, many children said that they were looking forward to having the opportunity to play this board game again to learn traditional Chinese medicine knowledge after the test.

In addition, this study also pays special attention to the application of board games, hoping to introduce board games into classroom or family parent-child activities, which can not only enable children to learn the basic knowledge of Chinese herbal medicine but also enhance children’s hands-on ability, cooperation ability, communication ability and strategic consideration, and increase parents and teachers’ understanding and recognition of traditional Chinese medicine culture.

After a year of research and practice, this study has accomplished the set research objectives and expanded the way of the spread of traditional Chinese medicine culture. The combination of Chinese herbal medicine and board games provides an innovative and effective learning tool for children, enhances children’s interest in and knowledge and understanding of Chinese herbal medicine, and provides a new perspective and strategy for traditional Chinese medicine cultural inheritance.

5.1.1 IN-DEPTH UNDERSTANDING OF CHINESE HERBAL MEDICINE

CULTURE AND BOARD GAME MECHANICS

Through the research of literature and the research method of expert inquiry, the interdisciplinary in-depth understanding of the “four properties”, “five taste”, “processing method”, “classics”, “medicine part”, “authentic medicinal materials”, “the role and efficacy of herbal medicine”, “traditional Chinese medicine diagnosis method” and other knowledge content. Through in-depth research on the four growth characteristics of children aged 7-11 years old, combined with observation and research methods, through visiting and investigating TCM clinics, walking into schools to observe children’s behaviors and habits, and jointly sorting out important

and basic relevant knowledge in TCM with experts: “four properties”, “five taste”, “processing method”, “classics” and “medicine part”, these knowledge contents can not only meet the children’s learning needs for Chinese herbal medicine culture but also meet their understanding level and ability. In terms of the selection of Chinese herbal medicine, through in-depth investigation and literature search of authentic herbal medicine, a total of 25 kinds of authentic herbal medicine were finally selected as the characteristics of Shaanxi official selection. Meanwhile, during the in-depth study of these 25 herbs, it was found that they lacked “salty” and “cool” herbs. In order to ensure the accurate transmission of the knowledge concept of “four properties and five tastes” in game design, and added a “white shell” medicinal material, a total of 26 kinds of herbs, so these 26 kinds of herbs “four properties”, “five taste”, “processing method”, “return to the classics” and “medicine part” as the core knowledge content of this study.

The top ten game mechanisms ranked by BGG (the world’s largest comprehensive board game platform) are extracted from the literature research in chapter 2: hand card management, dice rolling, simulation, hexagonal grid, modular layout, set collection, modular layout, area control, plate placement, card selection; At the same time, the four most popular game mechanics mentioned in the literature in recent years are: hand management, worker placement, variable player abilities; In this study, we searched the top 10 board games for children aged 7-11 and extracted 11 mechanics from these board games: point-to-point movement, pen and paper, multi-purpose cards, role playing, connecting, rolling rotation and movement, instant, open drafting, card drive, deck building, dice rolling; By searching the BGG website for educational board games, nine mechanisms were extracted from educational board games for ages 7-11: point-to-point movement, betting and betting, racing, pattern recognition, action response, variable layout, game of luck, storytelling, reasoning. After removing the same mechanism, a total of 29 game mechanisms were extracted, and four game mechanisms were selected through expert inquiry: dice rolling, set collection, luck fighting, and area control. Finally, these four game mechanisms were used in the final design.

5.1.2 TRANSFORM THE KNOWLEDGE RELATED TO CHINESE HERBAL MEDICINE INTO SYMBOLS AND FULLY INTEGRATE IT WITH BOARD GAMES TO GIVE THE GAME EDUCATIONAL SIGNIFICANCE

Through the visual transformation and drawing design of the five knowledge of Chinese herbal medicine, the design and application of symbolization and anthropomorphism combined with children’s illustration crayon style will transform the esoteric knowledge concepts into a visual language that children can accept and understand. The “four properties” correspond to the attributes of “warm,” “hot,” “cold,” “cool,” and “neutral,” which are designed through color theory: orange means

warm, red means hot, light blue means cool, dark blue means cold, and gray means flat. “Five tastes” refers to the five tastes of “sour,” “salty,” “bitter,” “sweet,” and “pungent.” The graphic design is transformed by the image association method. Lime represents sour, salt represents salty, coffee represents bitter, candy represents sweet, and pepper represents hot. “Return to the meridian” refers to the action of drugs on the internal organs of the human body. Based on the 26 kinds of Chinese herbs studied in this paper, these herbs act on 10 kinds of internal organs of the human body: heart, liver, spleen, lung, kidney, stomach, large intestine, small intestine, bladder and gallbladder, the cartoon visual image of personification is designed; 26 kinds of herbs are visually displayed in the style of children’s illustration crayons, in order to allow children to identify the characteristics of these Chinese herbs more intuitively and in detail. By using this knowledge in graphics, symbols, colors, establishing cartoon visual images, and using four board game mechanisms of dice playing, set collection, luck playing, and area control, the aim is to enhance children’s understanding of Chinese herbal medicine, learn and memorize relevant knowledge points easily and happily during the game, and effectively apply complex knowledge of Chinese herbal medicine in the game through visual elements. Improve children’s learning interest and sense of participation, to ensure that children in the process of entertainment imperceptible understanding of the cultural connotation of Chinese herbal medicine.

5.1.3 DEVELOP THEMED BOARD GAMES TO IMPROVE CHILDREN’S KNOWLEDGE AND RECOGNITION OF TRADITIONAL CHINESE MEDICINE CULTURE

After thoroughly combining the visual knowledge of Chinese herbal medicine with the board game mechanism, this study successfully developed a Chinese herbal medicine children’s educational board game named “I am a Little Miracle Doctor.” The test of this board game, the pre-test, post-test, game satisfaction survey, and focus group interview of the tested children effectively confirmed that the board game has educational significance and fun. “I am a Little Miracle Doctor” not only enables children’s players to have a particular understanding of the properties, functions, and efficacy of herbs in the process of the game but also encourages players to communicate, exchange, and cooperate in the game, carry out strategic thinking, diversified game tasks and random challenges, and cultivate players’ resilience and anti-pressure ability. Based on the above, it aims to develop children’s sense of identity in traditional Chinese medicine culture through board games and stimulate children’s interest in learning traditional culture.

At the same time, I hope that the Chinese herbal medicine children’s educational board game can open new ideas and ways for the transmission of Chinese herbal medicine, help children in the entertainment while in-depth understanding of Chinese herbal medicine knowledge and have more in-depth exploration of traditional Chinese

medicine culture interest, and desire, promote the spread of Chinese herbal medicine knowledge and the promotion of cultural honor, cultivate children's cultural confidence.

5.2 DISCUSSION

Through the comprehensive discovery and exploration of knowledge of Chinese herbal medicine and theories related to board games, this study developed a children's Chinese herbal medicine puzzle game named "I am a Little Miracle Doctor", which aims to help children aged 7-11 to learn and master related knowledge of Chinese herbal medicine in a relaxed atmosphere created by the game. By comparing the results of this study with the existing "Chinese herbal medicine" related content board game products, we found some similarities and differences:

First of all, compared with Chinese herbal medicine-related products on the market at present, this study shows a unique advantage in terms of education. The existing Chinese herbal medicine related board games have not been developed for children aged 7-11, and the game Settings have a wide range of ages, and the pertinence and applicability are not strong, resulting in a relatively simple learning effect. The core goal of most Chinese herbal medicine -related board games is not to learn Chinese medicine-related knowledge but to pay more attention to the strategy of the game, add the relevant story background of Chinese medicine, but not involve the relevant knowledge content of Chinese medicine. Through an in-depth analysis of the learning needs and aspirations of the target population and the design of knowledge of Chinese herbal medicine, this study emphasizes the subdivision of basic knowledge of Chinese herbal medicine, ensuring that the design of board games not only helps children learn related knowledge of Chinese herbal medicine but also can effectively memorize knowledge content such as "four Qi", "five taste", "sutras" and "processing methods". This is also the core competitiveness of the "I am a little Miracle Doctor" board game developed by this research in similar products.

Secondly, compared with the existing relevant studies, this study attaches great importance to the visual transformation of the knowledge content of Chinese herbal medicine, and the pictorial and visual communication methods make the complex knowledge vivid and flexible, which is easy for children to understand and remember. The knowledge in books often focuses on describing words and theories, which may cause children to feel bored and bored in learning and give up understanding Chinese herbal culture. By introducing the framework of semiotics, colorology, and octagon behavior, this study provides a visual and intuitive learning experience, communication, and cooperation mode by reconstructing the knowledge of "four Qi," "five taste," "processing method," "Sutra" and "authentic medicinal materials" through visual expression and repeated testing and adjustment. Effectively help children understand Chinese herbal medicine's characteristics and basic knowledge more intuitively, vividly, and interestingly. At the same time, in the game design, the

duration should be strictly controlled at about 20 minutes. Due to the broad target group of the existing Chinese herbal medicine board games, the game design is more complex than that of children aged 7-11. Most of the games of the relevant products are often focused on about 40 minutes, which may bring confusion and frustration to children and reduce their attention.

In addition, this study is very concerned about the cost and affordability of board games. In the current board game market, some educational products are rich in content and beautifully designed, but the cost is high. According to the preliminary questionnaire survey, parents expect to pay between 50 and 100 RMB for Chinese herbal medicine board games, although parents say that if the game is of high quality, the cost of Chinese herbal medicine board games is high. Willing to pay more for it. In this study, economical coated paper was used for printing, some game accessories were also made of fake, cheap, and safe wooden chess pieces, and the cost of the board game design product "I am a Little Miracle Doctor" in this study was strictly controlled within 100 yuan.

Although this study has made progress in the education of Chinese herbal medicine for children, there are still some limitations and challenges. The design of this study covers knowledge related to Chinese herbal medicine, but it is only designed for children aged 7-11 years old, which is not applicable to players at a higher level. The knowledge content is relatively simple. To meet the needs of players of different ages. Relevant experts suggest that in future designs, how to apply the functions of herbs in life can be integrated into the game. This can be used as an expanded version of the game to suit a wider range of people. More specialty herbs from other regions can also be added to the game to ensure that the game content can be more widely used, which can effectively reduce the decline in players' interest in the game over time. In terms of game visuals, experts suggest that personal player indicators can be visually optimized to be more consistent with the game theme.

In general, this study successfully developed a Chinese herbal medicine children's educational board game with both education and entertainment. The research results indicate that children's knowledge of Chinese herbal medicine has been significantly improved, providing a new perspective and communication plan for the promotion of traditional Chinese medicine culture. Future research may further improve the board game "I am a Little Miracle Doctor" through technological means and strategic adjustments to the game mechanism, so as to meet the educational needs of different age groups and groups in different regions for traditional Chinese medicine cultural learning.

5.3 SUGGESTIONS

(1) The research results show that the Chinese herbal medicine children's board game designed and developed in this study can effectively help children to recognize the image of Chinese herbal medicine, understand the relevant basic knowledge of

Chinese herbal medicine, such as four qi, five tastes, processing methods, classics, etc., and have a certain understanding of traditional Chinese medicine culture. However, due to the excessive number of Chinese herbs, the limitation of this study is that the design of the board game only involves 25 kinds of herbs from Shaanxi Province, which have no “salty” medicine and “cool” medicine. In order to supplement the knowledge of “four properties” and “five tastes” of Chinese herbs, a total of 26 kinds of white shell medicine are added. Future research should expand the scope of herbal medicine research, add more representative herbs from more regions so that the game can cover more types of herbs, and help children to have a more comprehensive understanding of Chinese herbal medicine and learn Chinese medicine culture.

(2) “four properties”, “five taste”, “return to the classics”, “processing method”, and “medicine part” are the basic and very important knowledge part of the discipline of Chinese medicine, this knowledge constitutes the theoretical framework of Chinese herbal medicine so that people understand the properties of Chinese herbal medicine, taste, action on the human body which organs, the treatment of Chinese herbal medicine, and herbal medicine part. Through the test of this study, it is found that children can understand the knowledge of Chinese herbal medicine well through the visual communication of knowledge, especially in the understanding of the abstract concepts of “four properties” (warm, hot, cold, cool and flat) and “five tastes” (sour, salty, bitter, sweet and pungent) and sutras, and through the design of game tokens, icons and game mechanisms, etc. These traditional and obscure knowledge can be visualized to make children understand and remember. Although this study has proved that visual knowledge transmission through board games is effective for children’s learning of Chinese herbal medicine knowledge, the culture of Chinese medicine is wide, in-depth, and deep in dimension. More knowledge modules of Chinese medicine can be added to future research, such as the role and efficacy of herbs, the compatibility of herbs, and the gamification simulation of traditional Chinese medicine diagnosis methods (look, smell, ask, and cut). Players can be diversified through visual communication, interaction, cooperation, scene simulation, and other game mechanisms to master a more comprehensive knowledge of traditional Chinese medicine.

(3) Aiming at the learning needs of children aged 7-11 years old, this study explored the dissemination of basic knowledge related to Chinese herbal medicine through gamification and achieved relevant results: Children at this stage could well accept board games as the medium for learning related knowledge of Chinese herbal medicine, and developed a strong interest in traditional Chinese medicine, which broadened the dissemination mode of traditional Chinese medicine culture. However, due to the low age of the target group, the study design is in line with the group’s knowledge level and learning ability at this stage, and the knowledge of Chinese herbal medicine in the study does not involve deeper content. This limitation is to ensure the simplification of complex knowledge, in line with the cognitive

development of children, and to ensure the fun of the game. Future research can deepen the learning content of Chinese herbal medicine knowledge according to different age groups, conduct deeper research on TCM knowledge disciplines, improve the difficulty and knowledge dimension of games, meet the needs of players of higher age groups, and promote the knowledge popularization and inheritance and development of TCM culture in different age groups.

(4) In the game test stage, this study divided the test subjects into groups by random drawing. The members of each test group came from different ages and grades. The mixed grouping method was used to obtain the overall data of the learning results of Chinese herbal medicine in the age group of 7-11 years and the overall age group. Since the children tested were not broken down by age and grade level, precise data on cognitive level, learning style inertia, and interest differences may be missing. Future research may consider subdividing the target population by age and grade to conduct group test research during the test so as to deeply understand the characteristics and needs of different age and development levels in learning Chinese herbal medicine knowledge and optimize the design after obtaining more detailed data, so as to make the game more targeted and educational. To provide more powerful theoretical data support the fine study of Chinese herbal medicine education.

(5) In terms of the material of board game accessories, 200g coated paper is used in this study, which has a smooth texture and can well present the color degree and image clarity. However, in the actual test, it was found that the “four gas”, “five taste” and “medicine pot” tokens and the game public map, personal map, small doctor certification cards, and special skill cards may have the risk of wear and tear, especially the “four properties”, “five taste” and “medicine pot” tokens are frequently used in the game process, and are easy to fold, break, and fade. The durability and durability of board games are affected. In future research, in terms of material selection, more robust and durable cardboard, and other materials can be selected for printing to improve the robustness and durability of game accessories. For large layout accessories, the service life of board games can also be extended by means of laminating and adding card sleeves, which can not only be waterproof and stain-resistant but also strong and durable. Enhancing the texture of accessories, enhancing the player’s satisfaction with the game, and enhancing the game experience.

(6) It is recommended to apply for copyright protection in time after the product has been fully tested and the safety has reached the standard. Copyright protection provides designers with strong legal support and a competitive advantage. The advantage of copyright is that designers can not only protect their rights but also protect their creativity and research results to the greatest extent and establish a distinct brand image in the market. While protecting creativity, it also avoids infringement and enhances the rights and interests of products in commercial competition.

APPENDIX

APPENDIX 1: QUESTIONNAIRE FOR CHILDREN AGED 7-11 AND THEIR PARENTS

PART 1: QUESTIONNAIRE FOR 7-11-YEAR-OLDS

1. What is your age?

○ _____

2. What is your gender?

○I am a boy

○I am a girl

3. What grade are you in?

○First grade

○Second grade

○Third grade

○Fourth grade

○Fifth grade

○Sixth grade

4. Can you name five Chinese medicines?

① _____

② _____

③ _____

④ _____

⑤ _____

○Not yet

5. Do you know what the four qi and five flavors are?

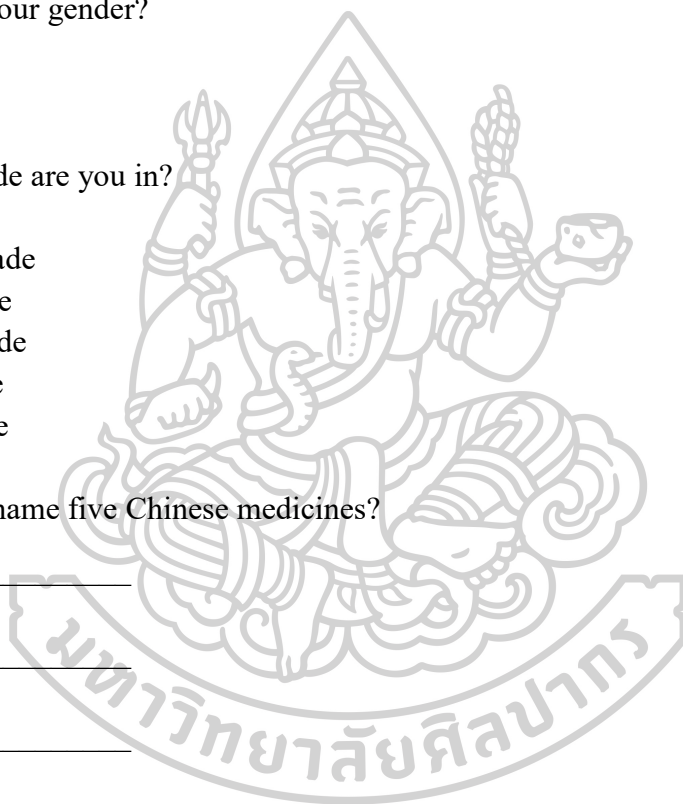
○Yes. Please explain: _____

○I am not sure yet.

6. Do you know what authentic medicinal materials are?

○Yes, please explain: _____

○I am not sure yet.



7. Can you name any herb and tell its medicinal part?

○ Yes, please explain: _____

○ I am not sure yet.

8. Can you tell me the effect of any Chinese medicine?

○ Yes, please explain: _____

○ I am not sure yet.

9. Can you tell the four properties, five flavors and meridians of any herb?

○ Yes, please explain: _____

○ I am not sure yet.

10. Which of the following is not a medical scientist?

○ Li Shizhen

○ Sun Simiao

○ Zhang Zhongjing

○ Wang Anshi

11. Do you usually play board games?

○ Yes.

○ No.

12. Do you expect to learn Chinese medicine knowledge with friends while playing board games?

○ No, I don't hope so.

○ I can consider it.

○ Yes, I want to play with friends.

13. What do you hope this Chinese medicine board game will be like?

○ It can help me learn more about Chinese medicine.

○ It can help me understand the usage and efficacy of Chinese medicine.

○ It can allow me to have more interactions with friends.

○ All of the above.

○ None of the above, please explain: _____

PART 2: QUESTIONNAIRE FOR PARENTS OF CHILDREN

1. What is your gender?

○ Male.

○ Female.

○ Not convenient to disclose.

2. How much do you know about TCM culture?

- ☐ No.
- ☐ Basically understand.
- ☐ Understand.
- ☐ Very well.

3. Do you want your children to learn TCM culture?

☐ _____

4. If there is a board game about TCM, will you support your children to play it?

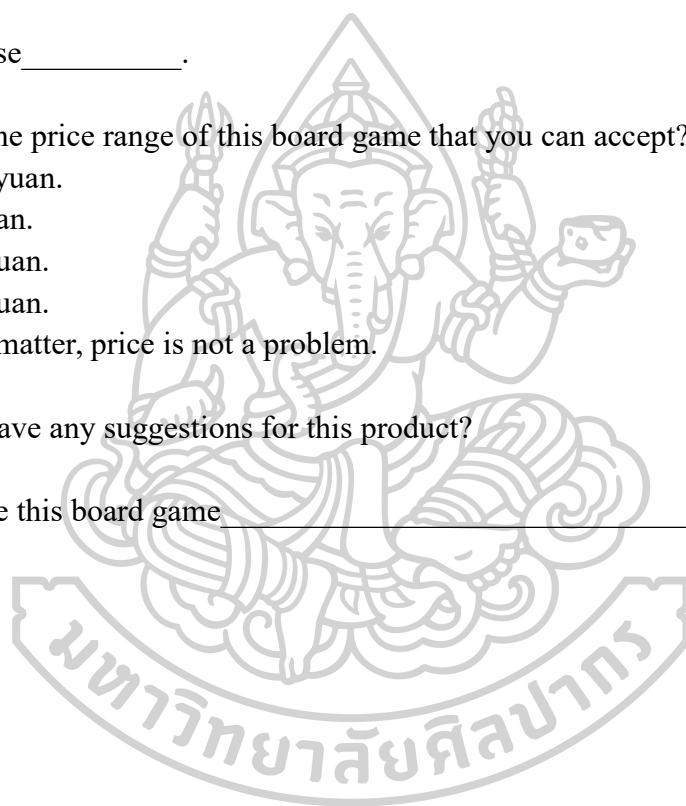
- ☐ Support.
- ☐ No, because _____.

5. What is the price range of this board game that you can accept?

- ☐ Under 50 yuan.
- ☐ 50-100 yuan.
- ☐ 100-150 yuan.
- ☐ 150-200 yuan.
- ☐ It doesn't matter, price is not a problem.

6. Do you have any suggestions for this product?

- ☐ No.
- ☐ Yes, I hope this board game _____.



APPENDIX 2: PRE-TEST QUESTIONNAIRE AND POST-TEST

QUESTIONNAIRE

1. What is your age?

☐7 ☐8 ☐9 ☐10 ☐11

2. What is your gender?

☐Boy ☐Girl

3. What grade are you in?

☐First grade ☐Second grade ☐Third grade ☐Fourth grade ☐Fifth grade ☐Sixth grade

4. Can you name five herbs?

What are authentic herbs?

What do the four properties, and five flavors refer to?

7. Please select the meridians that *Corydalis yanhusuo* belongs to.

☐Liver and spleen meridians ☐Large intestine meridian
☐Kidney meridian ☐Liver and kidney meridians

8. Please select the medicinal properties and flavors of *Forsythia suspensa*?

☐Bitter, slightly cold ☐Salty, hot ☐Bitter, slightly hot ☐Cold, sour

9. Please tell me the effects of *Physochlaina infundibularis*.

☐Expectorant ☐Activating blood circulation ☐De-swelling ☐Detoxification

10. Where can *Gastrodia elata* be used as medicine?

☐Tuber ☐Leaves ☐All ☐Fruits

11. How to prepare *Cornus officinalis*?

☐Take the meat of *Cornus officinalis*, remove impurities and residual cores, wash and dry.
☐Crush with pestle and mortar and dry
☐Soak in water and stir-fry.
☐No need to prepare, use directly.

12. What is Qin medicine?

- Traditional Chinese medicine of the Qin Dynasty
- The title of the best authentic medicinal materials in Shaanxi
- Authentic medicinal materials in Shaanxi, Gansu and Ningxia.
- Medicine that only grows in Shaanxi.

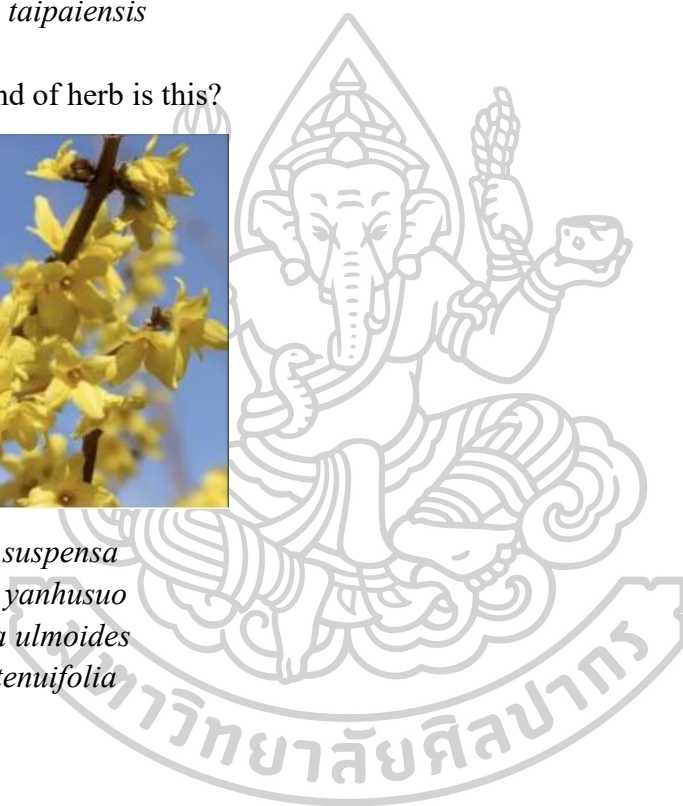
13. What medicine can be used for physical weakness?

- *Astragalus membranaceus*
- *Physochlaina infundibularis*
- *Bergenia scopulosa*
- *Fritillaria taipaiensis*

14. What kind of herb is this?



- *Forsythia suspensa*
- *Corydalis yanhusuo*
- *Eucommia ulmoides*
- *Polygala tenuifolia*



APPENDIX 3: SATISFACTION SURVEY OF THE CHILDREN TESTED ON THE BOARD GAME “I AM A LITTLE DOCTOR”

1. Do you like this Chinese medicine board game?

1	2	3	4	5
---	---	---	---	---

Very
dislike

Very
like

2. Do you think this board game is difficult/ easy?

1	2	3	4	5
---	---	---	---	---

Very
difficult

Very
easy

3. Did you gain any knowledge about Chinese medicine while playing?

1	2	3	4	5
---	---	---	---	---

No

Yes

4. Do you think this board game is interesting?

1	2	3	4	5
---	---	---	---	---

Very
boring

Very i
nteresting

5. Would you like to play this board game again in the future?

1	2	3	4	5
---	---	---	---	---

Don't
want

Want

6. Would you recommend this board game to a friend?

1	2	3	4	5
---	---	---	---	---

No

Yes

7. Are you satisfied with the design style of this board game?

1	2	3	4	5
---	---	---	---	---

Very dissatisfied Very satisfied

8. Do you think the knowledge you learned from this board game is useful to you?

1	2	3	4	5
---	---	---	---	---

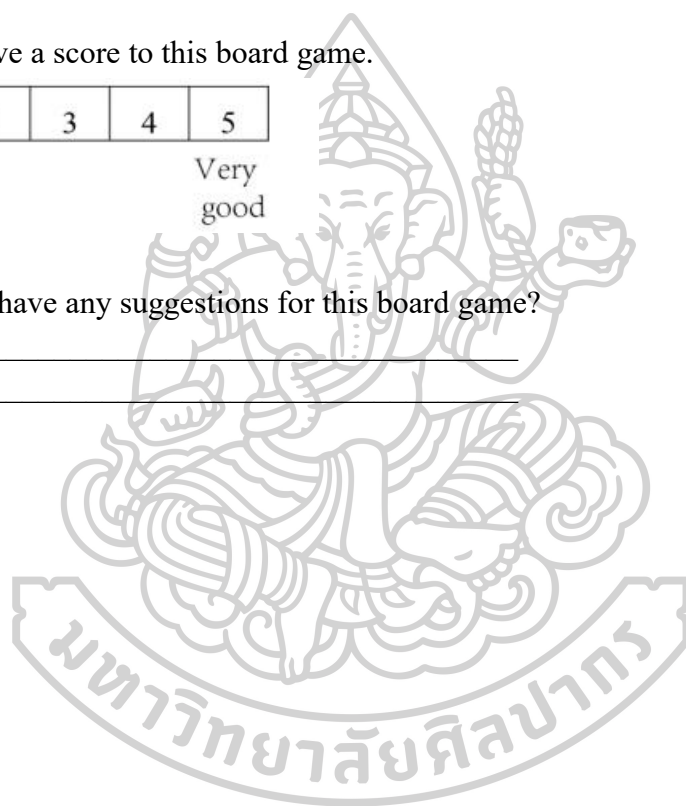
Useless Useful

9. Please give a score to this board game.

1	2	3	4	5
---	---	---	---	---

Very bad Very good

10. Do you have any suggestions for this board game?



1=lowest, 2=low, 3=medium, 4=high, 5=highest

APPENDIX 4: IOC EXPERT EVALUATION AND ANALYSIS RESULTS

Index of item objective congruence

Through the Index of item objective congruence and the applicability of research tools, the data collection is organized in the following table, and the experts' ratings in the per person section are as follows:

All variables and questionnaire questions in this research: Chinese herbal medicine edutainment board game. In order to ensure the consistency of each variable and question in questionnaire, the questionnaire was evaluated the by the thesis advisor and three experts in related fields including:

Expert1: Assistant Professor Dr. Athiphat Wichitsathitrat

Expert2: Professor Dr. Sucha Thongsima

Expert3: Assistant Professor Dr. Atitthep Chaetnalao

The author uses index of Item Objective Congruence (IOC) to examine consistency between questions and objective or objective and content (Turner & Carlson, 2009), it's can be calculated from formula:

$$IOC = \frac{\sum R}{N}$$

Where:

IOC= Consistency between questions and objective or objective and content.

$\sum R$ = Total assessment points that given from all qualified experts.

N= Number of qualified experts.

There are 3 levels of assessment point as follow:

Suitable (+1) means the questionnaire's questions are certainly consistent with the objective.

Not Appropriateness (0) means the questionnaire's questions are unsure to be consistent with the objective.

Not Suitable (-1) means the questionnaire's questions are inconsistent with the objective.

The consistency index value must have the value of 0.5 or above to be accepted.

Index of Item Objective Congruence (IOC) from three experts result are as followed:

QUESTIONNAIRE PART 1:

No.	Expert1			Expert2			Expert3			Total Scores Σ	IOC $\frac{\Sigma R}{N}$	Data Analysis
	-1	0	1	-1	0	1	-1	0	1			
Q1			√			√	√			3	0.3	Reject
Q2			√			√			√	3	1	Acceptable
Q3			√			√			√	3	1	Acceptable
Q4			√			√	√			3	0.3	Reject
Q5			√			√			√	3	1	Acceptable
Q6			√			√	√			3	0.6	Acceptable
Q7			√			√	√	√		3	0.6	Acceptable
Q8			√			√	√	√		3	0.6	Acceptable
Q9			√			√	√	√		3	0.6	Acceptable
Q10			√			√	√	√		3	0.6	Acceptable
Q11		√				√			√	3	0.6	Acceptable
Q12			√			√			√	3	1	Acceptable
Q13			√			√		√		3	0.6	Acceptable
Q14			√			√		√		3	0.6	Acceptable

QUESTIONNAIRE PART 2:

No.	Expert1			Expert2			Expert3			Total Scores Σ	IOC $\frac{\Sigma R}{N}$	Data Analysis
	-1	0	1	-1	0	1	-1	0	1			
Q1			√			√	√			3	0.3	Reject
Q2			√			√			√	3	1	Acceptable
Q3		√				√	√			3	0	Reject
Q4			√			√			√	3	1	Acceptable
Q5			√			√		√		3	0.6	Acceptable
Q6			√			√			√	3	1	Acceptable
Q7			√			√		√		3	0.6	Acceptable
Q8			√			√			√	3	1	Acceptable

INTERVIEWS PART 1:

No.	Expert1			Expert2			Expert3			Total Scores Σ	IOC ΣR _____ N	Data Analysis
	-1	0	1	-1	0	1	-1	0	1			
Q1			√			√			√	3	1	Acceptable
Q2		√				√			√	3	0.6	Acceptable
Q3			√			√		√		3	0.6	Acceptable
Q4			√			√			√	3	1	Acceptable
Q5			√			√			√	3	1	Acceptable

INTERVIEW PART 2:

No.	Expert1			Expert2			Expert3			Total Scores Σ	IOC ΣR _____ N	Data Analysis
	-1	0	1	-1	0	1	-1	0	1			
Q1			√			√			√	3	0.6	Acceptable
Q2			√			√			√	3	0.6	Acceptable
Q3			√			√			√	3	1	Acceptable
Q4			√			√			√	3	1	Acceptable
Q5			√			√			√	3	1	Acceptable

INTERVIEW PART 3:

No.	Expert1			Expert2			Expert3			Total Scores Σ	IOC ΣR _____ N	Data Analysis
	-1	0	1	-1	0	1	-1	0	1			
Q1			√			√			√	3	1	Acceptable
Q2		√				√			√	3	0.6	Acceptable
Q3			√			√			√	3	1	Acceptable
Q4			√			√			√	3	1	Acceptable
Q5			√			√			√	3	1	Acceptable

USER TESTING (USED BEFORE AND AFTER PLAYTESTING) PART 1:

No.	Expert1			Expert2			Expert3			Total Scores Σ	IOC ΣR _____ N	Data Analysis
	-1	0	1	-1	0	1	-1	0	1			
Q1			√			√			√		1	Acceptable
Q2			√			√	√				0.3	Reject
Q3			√			√			√		1	Acceptable
Q4			√			√			√		1	Acceptable
Q5			√			√			√		1	Acceptable
Q6			√			√			√		1	Acceptable
Q7			√			√			√		1	Acceptable
Q8			√			√			√		1	Acceptable
Q9			√			√			√		1	Acceptable
Q10			√			√			√		1	Acceptable
Q11			√			√		√			0.6	Acceptable
Q12			√			√			√		1	Acceptable
Q13			√			√			√		1	Acceptable
Q14			√			√			√		1	Acceptable
Q15			√			√			√		1	Acceptable

INTERVIEWING 7-11 YEAR OLDS AFTER THE GAME PART 2:

No.	Expert1			Expert2			Expert3			Total Scores Σ	IOC ΣR _____ N	Data Analysis
	-1	0	1	-1	0	1	-1	0	1			
Q1			√			√			√	3	1	Acceptable
Q2		√				√			√	3	0.6	Acceptable
Q3			√			√			√	3	1	Acceptable
Q4			√			√			√	3	1	Acceptable
Q5			√			√			√	3	1	Acceptable
Q6			√			√			√	3	1	Acceptable
Q7			√			√		√		3	0.6	Acceptable
Q8			√			√			√	3	1	Acceptable

Q9			√			√			√	3	1	Acceptable
Q10			√			√			√	3	1	Acceptable

$$IOC = \frac{\Sigma R}{N}$$

Where:

IOC= Consistency between questions and objective or objective and content.

ΣR = Total assessment points that given from all qualified experts.

N= Number of qualified experts.

Therefore

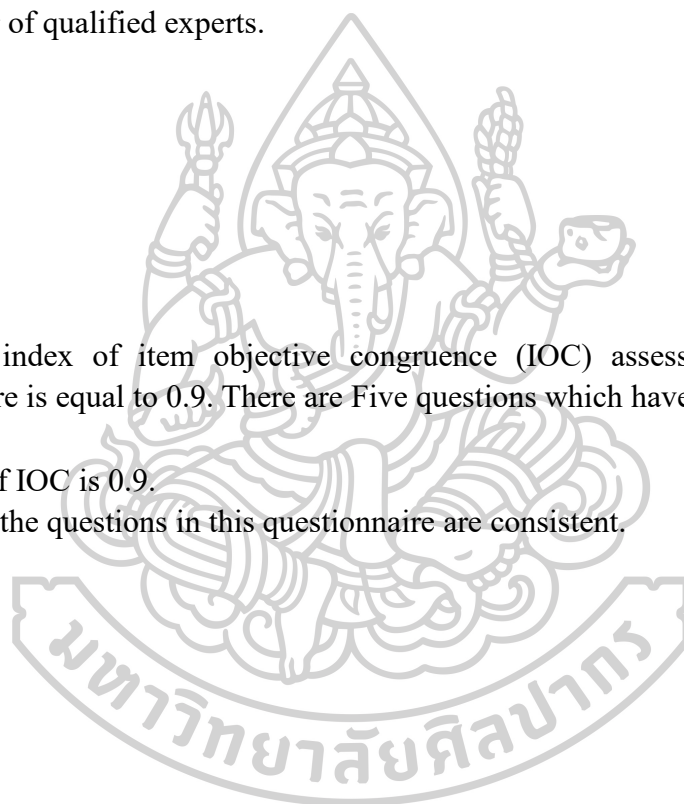
$$IOC = \frac{57}{62}$$

$$=0.9$$

The value index of item objective congruence (IOC) assessment result of this questionnaire is equal to 0.9. There are Five questions which have IOC index less than 0.5.

The value of IOC is 0.9.

It is proved the questions in this questionnaire are consistent.

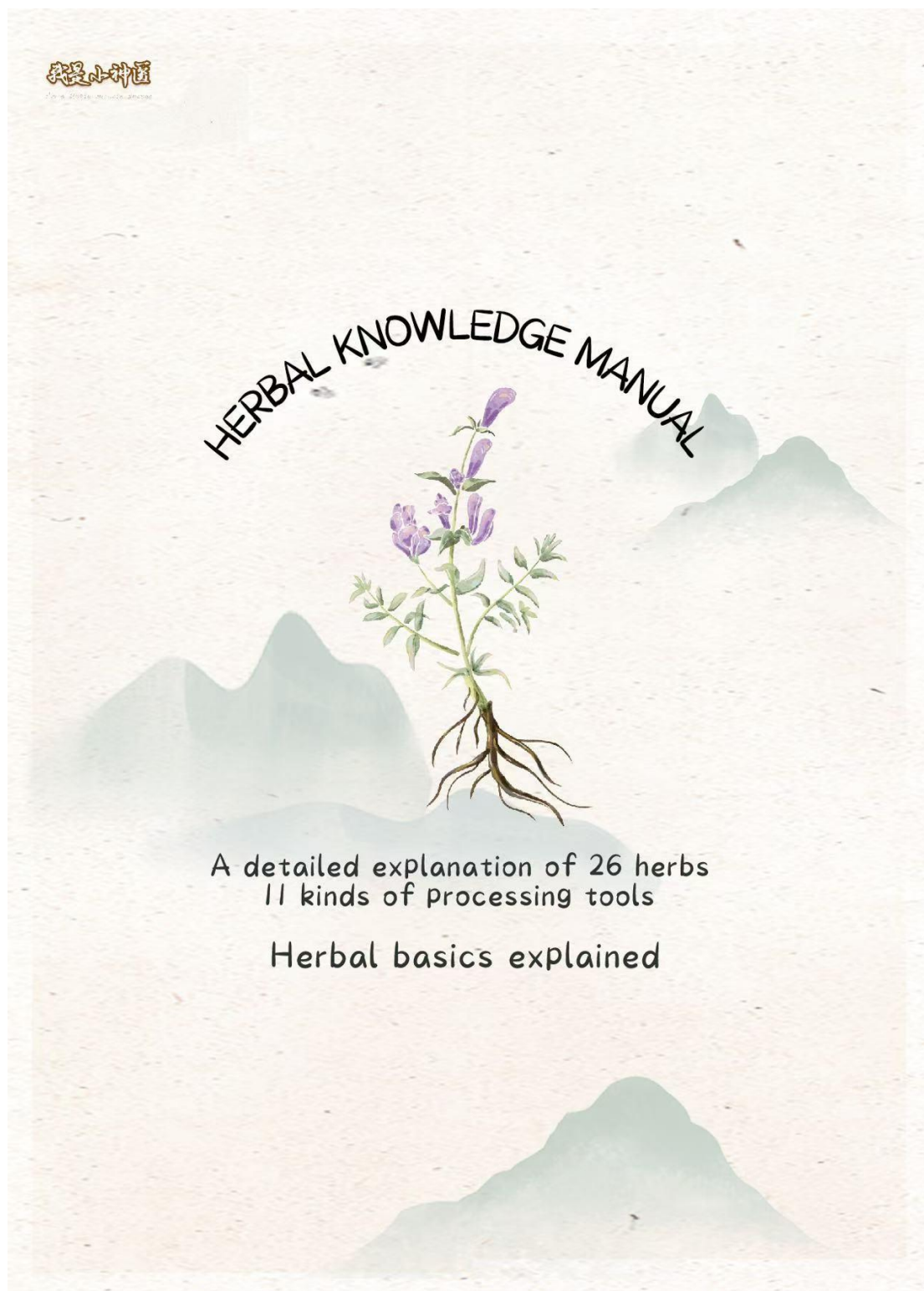


List of experts

Expert 1: Assistant Professor Dr. Athiphat Wichitsathitrat
Srinakharinwirot University
Faculty of Fine and Applied Arts

Expert 2: Professor Dr. Sucha Thongsima
Srinakharinwirot University
Faculty of Fine and Applied Arts

Expert 3: Assistant Professor Dr. Atithep Chaetnalao
Silpakorn University
Faculty of decorative arts

APPENDIX 5: APPENDIX 5: "I AM A LITTLE MIRACLE DOCTOR"**CHINESE HERBAL MEDICINE KNOWLEDGE HANDBOOK**



CHINESE HERBAL MEDICINE

Traditional Chinese medicine is mainly composed of plant medicine (root, stem, leaf, fruit) and mineral medicine. Because plant medicine accounts for the majority of Chinese medicine, so Chinese medicine is also called Chinese herbal medicine. There are about 5000 kinds of Chinese medicine used in various places, and the formulas formed by combining various medicinal materials are countless. After thousands of years of research, it has formed an independent science.





FOUR PROPERTIES

Four Properties means that herbs have four attributes of warm, hot, cold and cool, warm is inferior to heat, cool is inferior to cold, and some medicines are between warm and cold, also known as neutral medicine. Cold medicine can help the body clear heat, detoxification, fire and so on; Warm medicine can help the body to dispel wind, cold, moisture and so on. The warm and cold properties of neutral drugs are not obvious, and it is customary to collectively refer to the four gases, and its medicinal properties are moderated, and it is often used in combination with other drugs.



THE FIVE FLAVOURS

The five flavours refers to the five tastes of medicine: sour, salty, bitter, sweet, pungent. Five kinds of taste have their own characteristics: pungent taste can be dispersed, sour taste can be astringent, sweet taste can be slow, bitter taste can be purging and dry, salty taste can be soft and strong. The five tastes also have a corresponding relationship with the five



viscera, sour medicine can enter the liver, bitter medicine can enter the heart, pungent medicine can enter the lung, sweet medicine can enter the spleen, and salty medicine can enter the kidney.

CHANNEL TROPISM

Return, that is, the attribution, refers to the attribution of drug effects; Jing, that is, the body's zang-fu meridians. Tropism, that is, the location of drug action. It is to closely link the action of drugs with the viscera and meridians of the human body to explain the selectivity of drug action to a certain part of the body.



AUTHENTIC MEDICINAL MATERIALS

Traditional Chinese medicinal materials, also known as authentic traditional Chinese medicinal materials, are the representatives of high-quality traditional Chinese medicine.

It refers to high-quality traditional Chinese medicine materials with remarkable therapeutic effects. After being verified by clinical practice for thousands of Years, it has become a unique standard for identifying high-quality traditional Chinese medicine materials. Traditional Chinese medicinal materials are not only a key criterion for ensuring the quality of traditional Chinese medicine in traditional Chinese medicine, but are also widely regarded as medicinal materials produced under specific natural conditions and ecological environments, usually produced in concentrated areas in these regions, with specific/cultivation techniques and harvesting and processing methods, superior quality, and remarkable therapeutic effects.

PREPARE

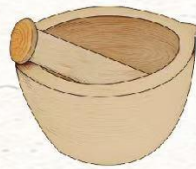
Refers to the process of making medicine from Chinese herbal materials. There are fire, water or water and fire processing methods. The main purpose is to strengthen the effectiveness of the drug, reduce toxicity or side effects, easy to store and easy to take.



WASH: Put the herbs into clean water and wash to remove the sediment impurities on the surface of the medicine.



DRENCH: A method of softening medicine by spraying or drenching it with water.



GRINDING: The medicine is mashed and ground into a powder.



SOAKING: To reduce the intensity or irritability of an original drug.



FIRE HEATING: Require heavy fire, so that the drug to achieve volume expansion and fat.



MOISTEN: Cover with wet cloth, wet sack and other wet things, often spray an appropriate amount of water, keep moist state, so that the external water of the medicinal materials slowly penetrate into the internal tissue, to achieve the same internal and external humidity, easy to cut.



DRYING: Placing medicinal materials or preparations in a dry place with air circulation and drying them naturally. The drying method can remove water and improve the quality and stability of medicinal materials, and is often used in the preliminary treatment of various Chinese medicinal materials.



CUT: The medicine after washing and softening, according to the texture of soft and hard or individual size, thickness, etc., with a machine or artificial cut to make sheet processing process.



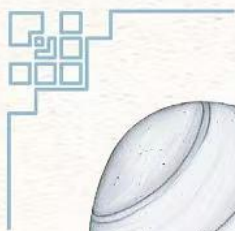
RAMMING: The Chinese medicinal materials are ground, rolled and other operations, so that it is in the form of small particles or powder, in order to facilitate the subsequent frying, soaking or into pills, powder and other preparations.



DRYING: Refers to the method of removing moisture from wet materials by gasification.



STEAMING: The method of putting the purified medicine with or without excipients (steaming) into the steaming container and heating it with steam or water isolation to a certain extent is called steaming.



MONETARIA ANNULUS

PROPERTIES Salty

FLAVORS Cool

MERIDIAN TROPISM To bladder, liver channel.

MEDICINE PART

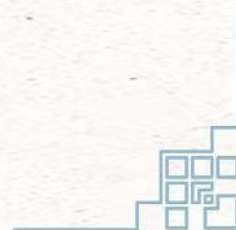
The shell of a baby clam, a ringed clam, etc.

EFFECT

Clearing heat and diuresis, clear eyes and remove opacity.

PROCESSING METHOD

Catch from June to August and dry.





CORYDALIS YANHUSUO

PROPERTIES Pungent, bitter.

FLAVORS Warm

MERIDIAN TROPISM Liver, spleen, heart
meridian.

MEDICINE PART

Dry the tubers.

EFFECT

Activating blood, promoting qi and relieving
pain.

PROCESSING METHOD

Take the original medicine, remove impurities,
wash, dry, cut thick slices or mash when used,
sift to remove debris,



PHYSOCHLAINA INFUNDIBULARIS



venomous

PROPERTIES Sweet taste, slightly bitter.

FLAVORS Warm

MERIDIAN TROPISM Return to lung meridian.

MEDICINE PART

Dry the roots.

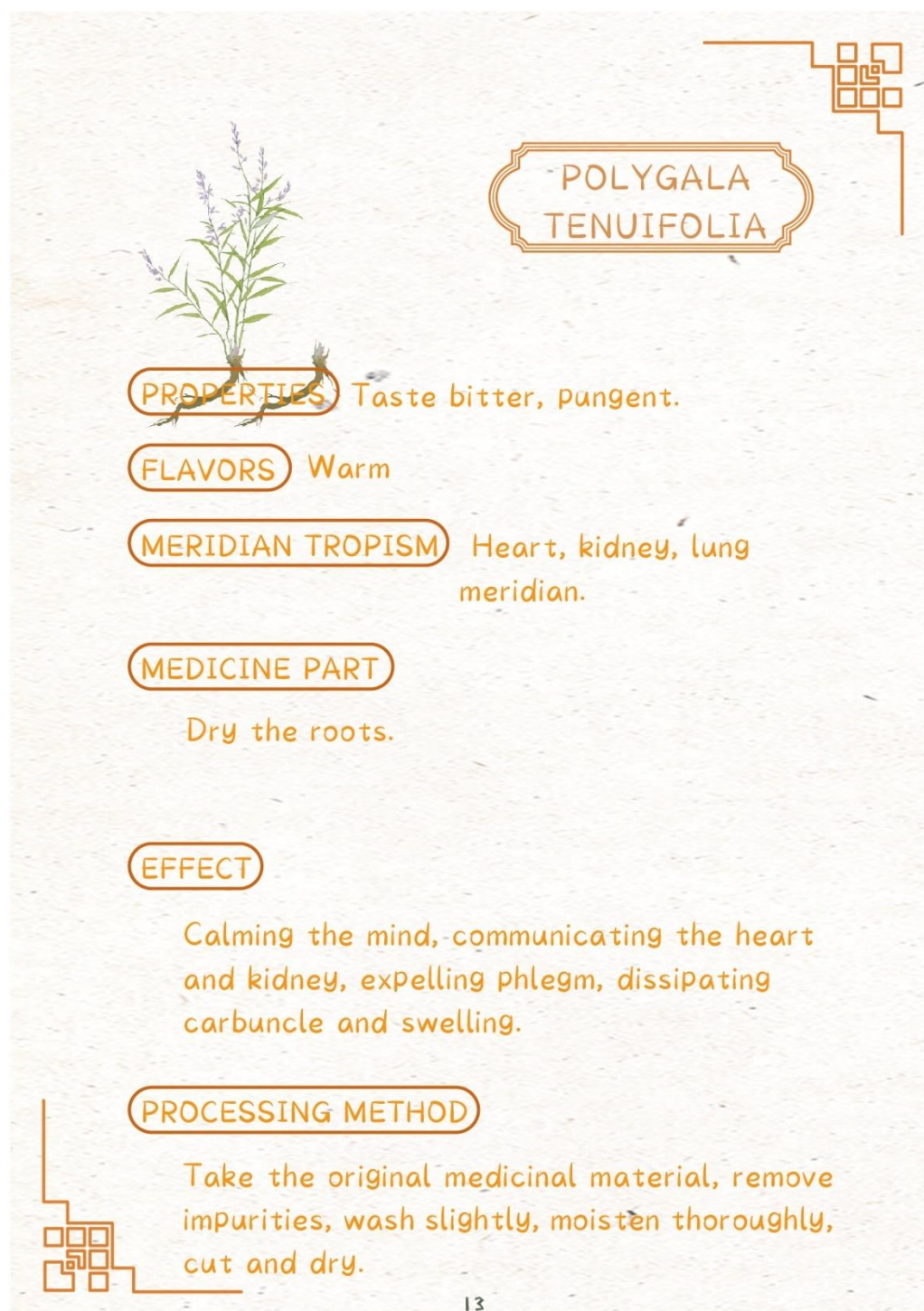
EFFECT

Warm lung expelling phlegm, relieving cough and relieving asthma.

PROCESSING METHOD

Harvest in early spring or early summer, remove the heads and roots, wash and dry.







CORNUS OFFICINALI

PROPERTIES Sour, astringent.

FLAVORS Warm

MERIDIAN TROPISM Return to liver and
kidney channels

MEDICINE PART

Dried and ripe flesh.

EFFECT

Tonifying liver and kidney, receiving astringent solid shedding.

PROCESSING METHOD

The dogwood is removed from dirt and cores, then washed and dried.





ASTRAGALUS MEMBRANACEUS

PROPERTIES Sweet taste.

FLAVORS Warm

MERIDIAN TROPISM Spleen, lung meridian.

MEDICINE PART

Dry the roots.

EFFECT

Tonifying Qi rising Yang, Yiwei solid table, water detumification, promoting fluid nourishing blood, stagnation Tongbi, supporting poison discharging pus, restraining sores and producing muscle.

PROCESSING METHOD

Take the original medicine, remove impurities, separate the size, wash, moisten thoroughly, cut thick slices, dry.



ASTRAGALUS COMPLANATUS

PROPERTIES Sweet taste.

FLAVORS Warm

MERIDIAN TROPISM Liver, kidney channel.

MEDICINE PART

Dry and ripen the seeds.

EFFECT

Tonifying kidney and Yang, strengthening essence and shrinking urine, nourishing liver and brightening eyes.

PROCESSING METHOD

Take the original medicine, remove impurities, wash, dry.





EUCOMMIA
ULMOIDES

PROPERTIES Taste sweet, pungent.

FLAVORS Warm

MERIDIAN TROPISM Return to liver and kidney channels.

MEDICINE PART

Dry bark.

EFFECT

Tonifying liver and kidney, strengthening muscles and bones, placenta.

PROCESSING METHOD

Take the raw material, scrape off the rough skin, wash, cut into shreds or chunks, dry, sift to remove debris.



MOSCHUS BEREZOVSKII

PROPERTIES Pungent.

FLAVORS Warm

MERIDIAN TROPISM Heart, spleen channel.

MEDICINE PART

The dry secretions from the sachets of mature males of the deer family musk deer.

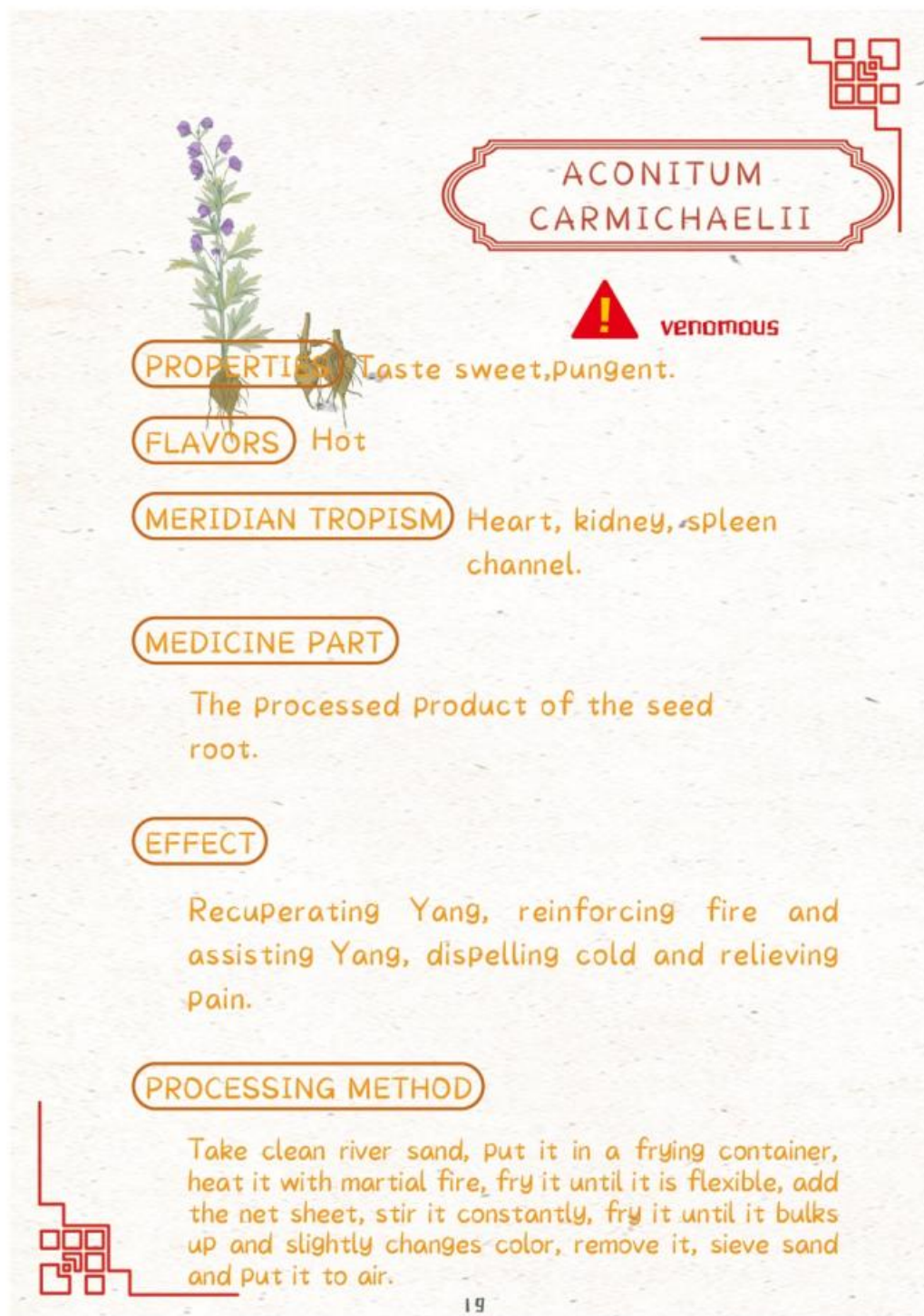
EFFECT

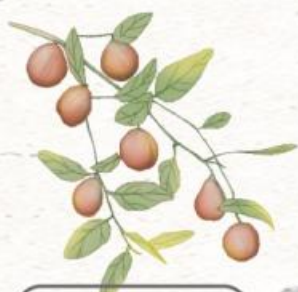
Awaken the spirit, promote blood flow through menstruation, relieve swelling and pain,

PROCESSING METHOD

Remove the fur shell musk, remove the capsule shell, remove the kernel of musk, and remove the impurities.







ZIZIPHUS JUJUBA
MILL. VAR. SPINOSA

PROPERTIES Taste sweet, sour

FLAVORS Neutral

MERIDIAN TROPISM Return to liver, gallbladder, heart meridian.

MEDICINE PART

Dry and ripen the seeds.

EFFECT

Nourishing the heart and tonifying the liver, calming the heart, collecting sweat and producing fluid.

PROCESSING METHOD

Take the original medicine and remove the impurities. Mash when used.





BERGENIA SCOPULOSA

PROPERTIES Slightly bitter.

FLAVORS Neutral

MERIDIAN TROPISM Return to stomach, spleen,
lung, kidney, large intestine
meridian.

MEDICINE PART

Rhizomes.

EFFECT

Tonifying the spleen and stomach, astringent and solid intestine, promoting water circulation.

PROCESSING METHOD

It can be mined all year round, washed, removed of impurities, sliced and dried.



ASARUM
HETEROTROPOIDES

PROPERTIES Pungent, slightly bitter.

FLAVORS Neutral

MERIDIAN TROPISM Heart, liver, stomach channel.

MEDICINE PART

Whole grass.

EFFECT

Dispelling cold, dispelling wind and relieving pain, clearing orifice, warming lung and huai-yin.

PROCESSING METHOD

Remove impurities, spray water, slightly moisten, cut, dry.



GASTRODIA ELATA

PROPERTIES Taste sweet.

FLAVORS Neutral

MERIDIAN TROPISM Return to the liver channel.

MEDICINE PART

Dry the tubers.

EFFECT

Calming wind and stopping spasm, calming liver-yang, expelling wind and clearing collaterals.

PROCESSING METHOD

Wash, moisten or steam until soft, slice thinly and dry.



POLYPORUS UMBELLATUS

PROPERTIES Sweet taste, light,

FLAVORS Neutral

MERIDIAN TROPISM Return to kidney, bladder meridian.

MEDICINE PART

Dried sclerotium of poraceae fungus
Porus.

EFFECT

Relieve water and permeate dampness.

PROCESSING METHOD

Remove impurities, soak, wash, moisten, cut thick slices, dry.





POLYGONATUM KINGIANUM

PROPERTIES Sweet taste.

FLAVORS Neutral

MERIDIAN TROPISM Spleen, lung, kidney channel.

MEDICINE PART

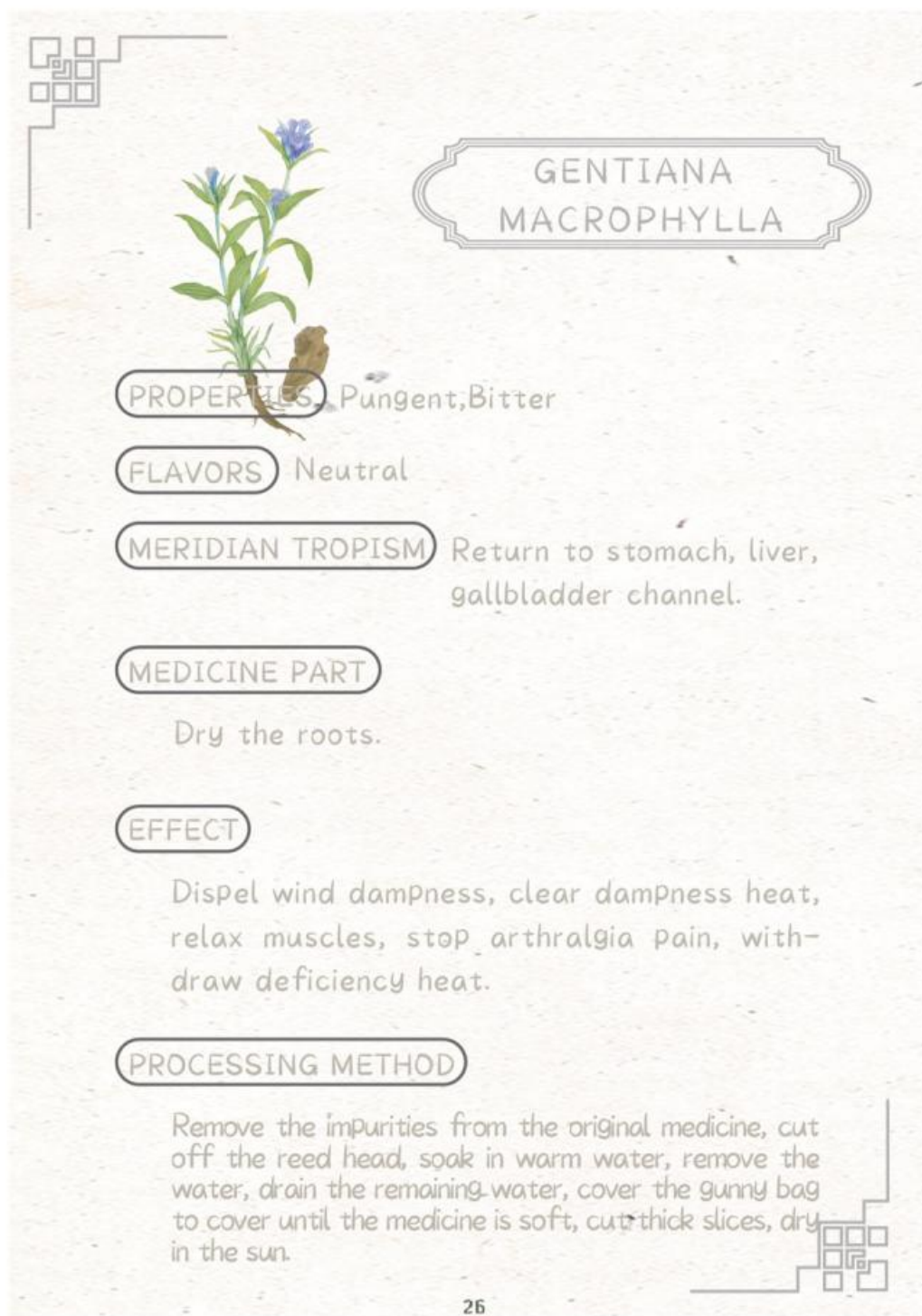
Dry the roots.

EFFECT

Tonifying qi and nourishing Yin, strengthening spleen, moistening lung and tonifying kidney.

PROCESSING METHOD

Take the original medicinal material, remove impurities, wash, slightly moisten, cut thick slices, dry.





GYNOSTEMMA PENTAPHYLLUM

PROPERTIES Taste sweet, bitter.

FLAVORS Cold

MERIDIAN TROPISM Spleen, lung meridian.

MEDICINE PART

Dry the ground part.

EFFECT

Supplementing Qi and strengthening spleen, eliminating phlegm and relieving cough, clearing heat and detoxifying.

PROCESSING METHOD

Take the original medicine, remove impurities, wash.



FRITILLARIA TAIPAENSIS

PROPERTIES Taste sweet, bitter.

FLAVORS Slightly cold

MERIDIAN TROPISM To bladder, liver channel.

MEDICINE PART

Bulblet

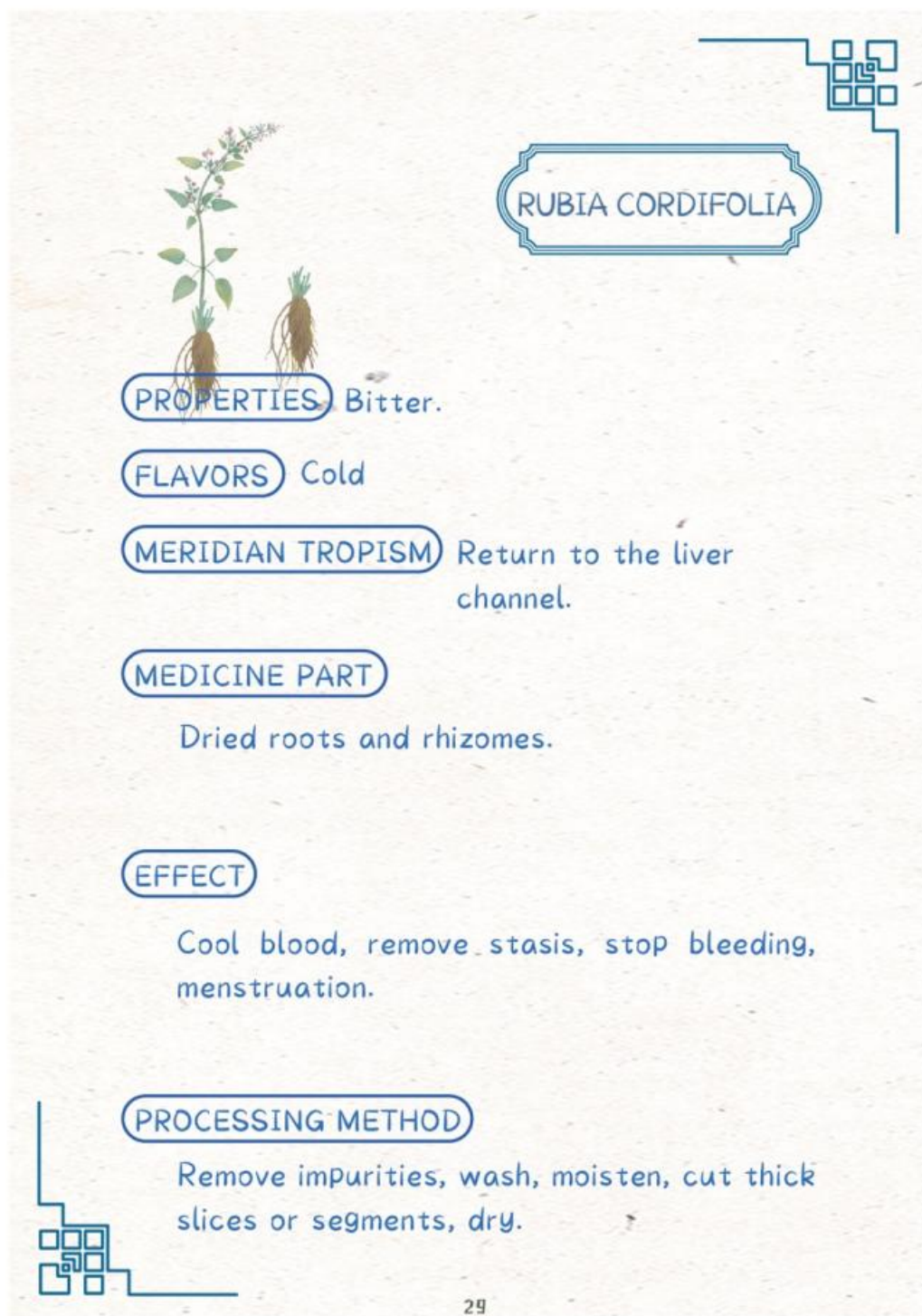
EFFECT

Moistening lung, eliminating phlegm, relieving cough.

PROCESSING METHOD

Scale propagation 2-3 years of harvest, seed propagation 3-4 years of harvest. When the stems and leaves wilt after June, dig out the bulbs and dry or dry them.







SALVIA MILTIORRHIZA

PROPERTIES Taste bitter.

FLAVORS Slightly cold

MERIDIAN TROPISM Return to the heart,
liver meridian.

MEDICINE PART

Dried roots and rhizomes.

EFFECT

Promoting blood circulation to remove blood stasis, relieving pain through menstruation, clearing the heart and eliminating irritability, cooling blood to eliminate carbuncle

PROCESSING METHOD

Take the original medicine, remove impurities and residual stems, wash, moisten, cut thick slices, dry. Sift to remove debris.





BUPLEURUM CHINENSE

PROPERTIES Taste pungent, bitter.

FLAVORS Slightly cold.

MERIDIAN TROPISM Liver, gallbladder, lung
meridian.

MEDICINE PART

Dried root

EFFECT

Evacuating heat, soothing liver, lifting Yang
Qi.

PROCESSING METHOD

Take the original medicinal material, remove
impurities and residual stems, wash, moisten
and cut thick pieces, dry.



FRAXINUS RHYNCHOPHYLLA

PROPERTIES Bitter, astringent

FLAVORS Cold.

MERIDIAN TROPISM Liver, gallbladder, large intestine meridian.

MEDICINE PART

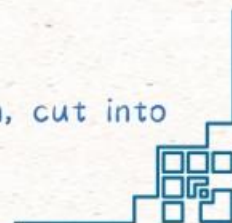
Dried bark or bark.

EFFECT

Heat and dry dampness, astringent stop dysentery, antidote snake venom, dark hair.

PROCESSING METHOD

Remove impurities, wash, moisten, cut into pieces or segments, dry.





FORSYTHIA SUSPensa

PROPERTIES Bitter.

FLAVORS slightly cold.

MERIDIAN TROPISM It belongs to lung, heart and small intestine.

MEDICINE PART

Dry the fruit.

EFFECT

Clearing heat and detoxifying, reducing swelling and dispersing knot, evacuating wind and heat.

PROCESSING METHOD

Harvest the autumn fruits when they are green at the beginning of ripening, steam them and dry them in the sun.



RHEUM PALMATUM

PROPERTIES Bitter.

FLAVORS Cold.

MERIDIAN TROPISM Spleen, stomach, large intestine, liver, pericardium meridian.

MEDICINE PART

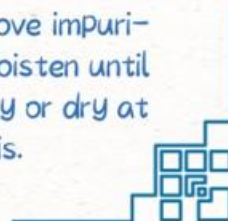
Dried roots or rhizomes.

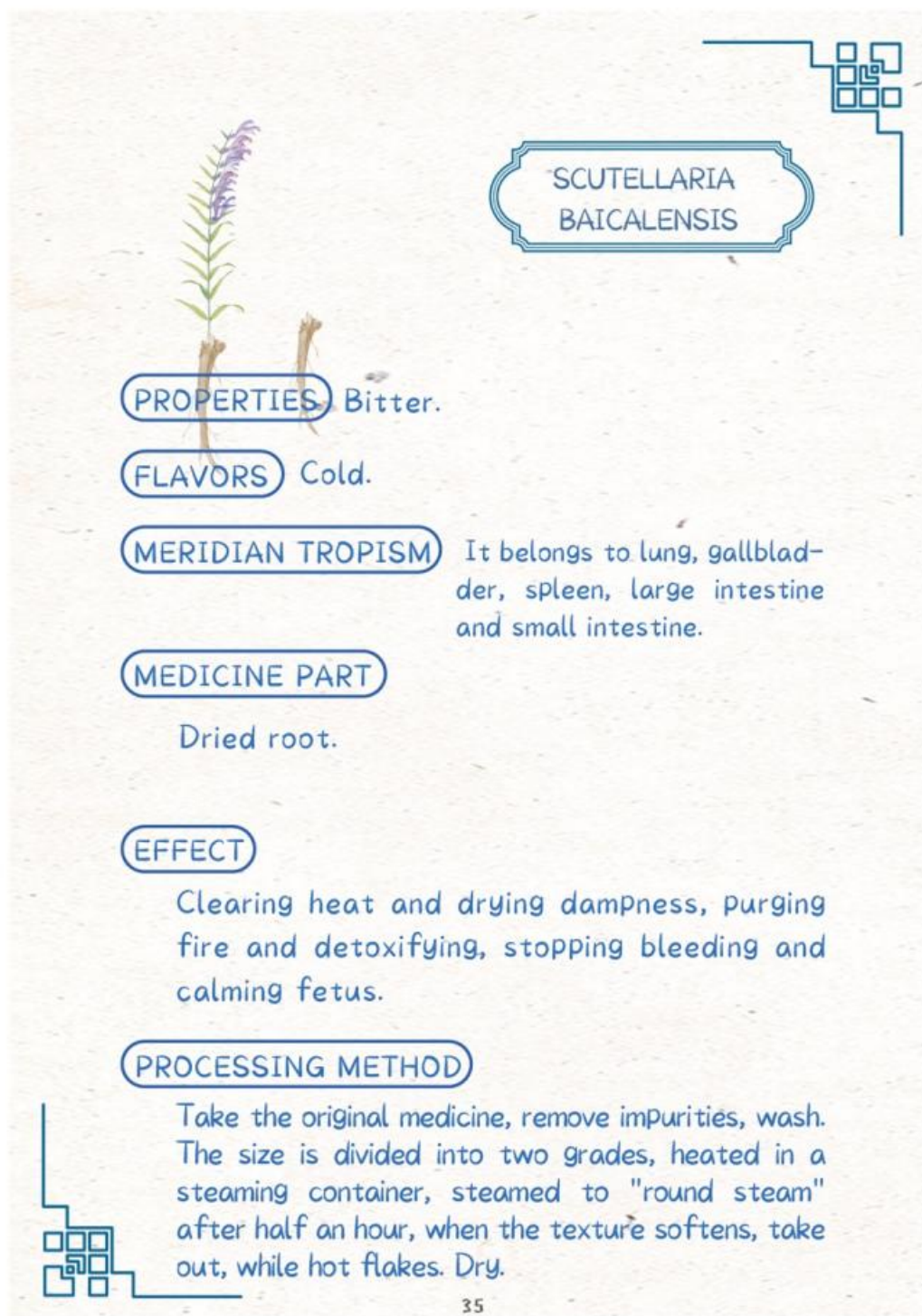
EFFECT

Purging and attacking accumulation, clearing heat and purging fire, cooling blood and detoxification, stopping bleeding, eliminating stasis and channeling meridian, diuresis and yellow withdrawal.

PROCESSING METHOD

Take the original medicinal material, remove impurities, separate the size, wash, fish out, moisten until soft, cut thick slices or small squares, dry or dry at low temperature, screen to remove debris.







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