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Application of Job Safety Analysis in the Safety Management of Off-Campus Internship in Environmental Geological Engineering

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Abstract: Off-campus internship is an important part of the training in environmental geological engineering. The main difference of internship for environmental geological engineering major compared to internship programs is that these internships are usually in the field and there are safety risks due to natural, social, biological, and other factors. The purpose of this study is to summarize the safety risks through work safety analysis and propose corresponding preventive measures, so as to make the internship program safer.

Keywords: Job Safety Analysis; Off-campus internship; Safety management

Online publication: August 24, 2023

1. Introduction

According to the talent cultivation mode of “cultivating people in the landscape,” we aim to cultivate students’ core ability of geological mapping in the field by refining their professional skills in the natural environment of the landscape and shaping their comprehensive ability of understanding, analyzing, and solving problems in real projects in the field. This is a necessary means and measure for environmental geological engineering majors, but the internship process is risky in terms of safety and prone to potential risks.

The internship base is located in the southwestern part of Liaoning Province on the coast of Bohai Sea, which has rich geological characteristics. This makes it an excellent location for learning geological mapping, tectonics and mineral deposits. The main contents of the internship program are as follows: (i) visual identification and description of minerals and rocks; (ii) observation and description of outcrops in the survey area; (iii) description of geological routes and geological observation points; (iv) preparation of letter hand sections and actual stratigraphic sections; (v) regional geological mapping, etc.

2. Characteristics of off-campus internship

2.1. Long field internship time, difficult to manage

The length of an off-campus internship site is four weeks. During this period, students will be subjected under

an unfamiliar environment instead of their campus. The internship base is a famous scenic area near the sea, so it is difficult to place any restrictions on the students during their free time, and students inevitably come into contact with society^[1]. However, students have little social experience, and they do not know the local customs and lifestyle. Students are often impulsive, so they might cause conflicts and other potential risks.

2.2. Dangerous wildlife

The off-campus internship base is located at the seaside hills on the eastern edge of the Black Mountain hills in western Liaoning. The elevation is generally 20–500 m, with a relative height difference of 200–350 m. The highest point is located in Jiulong Mountain in the northwest of the prefecture-level city, with an elevation of 558.7 m. During the field practice, students have to go deep into the mountains and hills, where there are poisonous snakes and insects, making it dangerous for the students.

2.3. Psychological issues

The change of environment may bring many psychological changes. In addition, compared to on-campus teaching, the field internship is very difficult because of the hot weather, harsh environment, and long working hours. Nowadays, many students lack physical fitness and a hard-working attitude, so they might experience psychological issues during the internship program^[2,3].

2.4. More sudden safety risks in off-campus internships

In addition to the safety hazards above, there are also other hazards like landslides, mudslides, or injuries. In addition, because field internships are conducted in big batches, there are often issues like physical exhaustion and people falling out of line.

3. Job safety analysis implementation process

According to the procedure of the job safety analysis method, there are three stages to the safety control of field internships: pre-event safety assessment, in-event safety protection, and post-event safety feedback.

3.1. Pre-event safety assessment

3.1.1. Semi-open-ended interview

The author drew up a semi-open interview outline, including the following questions: what do you think are the potential risks of off-campus internships, and what preventive measures that are taken in each segment?

3.1.2. Formation of job security analysis team

We selected 5–8 people from our teaching managers, professional teachers, practical training administrators, counselors, internship base managers, students, and other people to form an internship safety risk analysis group. The staff members in the group all had rich experience in guiding internship training, among which the professional teachers were double-qualified teachers who have worked in enterprises for more than ten years and have guided this kind of internship program for many years; the students are the students who are going to participate in this internship in the last term in this internship base.

3.1.3. Introduction to job safety analysis content

The meaning, main objectives, considerations, and procedure of Job Safety Analysis was explained to the job safety analysis team members. After that, a blank Job Safety Analysis form was distributed to the group

members, and they were provided with an explanation of its contents and the logical relationship between them. They were also given guidance on how to fill out the form.

The Job Security Analysis covers the following aspects: first, the assessment of those responsible for security. This includes assessing whether the instructors, internship managers, or counselors are qualified for the task. Additionally, it examines whether the internship guidance team possesses adequate capacity to ensure continuous supervision of all students throughout the internship period. Secondly, the safety of the internship site was assessed. Whether field visits have been made to the internship site, including aspects such as the terrain, topography, wildlife species, and bodies of water such as marine beaches and marshes. Third, the assessment the participating students' abilities were evaluated. This includes whether the physical fitness, history of physical or mental illnesses, and many more. Fourth, the assessment of the safety of the internship process. This includes whether the content of the internship is appropriate, whether the internship involves very dangerous locations, whether the daily internship tasks are too heavy, etc. The fifth aspect evaluated is the ability to handle accidents. This involves assessing whether there is an ample supply of emergency medicine available, whether timely external assistance can be sought, whether accident insurance has been procured, and whether there are medical facilities and resources near the internship site. Sixth, the transportation, the accommodation, and the food safety were assessed ^[4-6].

3.1.4. Pre-event assessment

Through pre-event assessment, the safety risks of off-campus internships were identified as follows:

Firstly, there were safety risks due to natural causes. In this case, the location of the field internship is in the northeast region. The specific place of operation is in the field, and the environment is difficult and there are many uncontrollable natural factors. Therefore, natural causes can become an important potential risk. There are mainly two types of common risks, one is a geological disaster, including rock falls, landslides, mudslides, etc.; the other is catastrophic weather, including high temperature, heavy rain, strong wind, lightning, etc. These risks can be avoided through understanding the pattern of occurrences of these phenomena.

Secondly, social reasons are also a potential risk in this internship program. Social reasons include traffic accidents, food, and health safety incidents, personnel conflicts, and property safety issues that may occur during field internships. The risk increases as the field internship involves frequent travel by car or on foot, and the internship site has mountainous roads and poor road conditions. In addition, most of the students participating in the internship are not local people, so they do not know much about the local customs. Furthermore, the students are young and enthusiastic, so they might cause conflicts with the locals ^[7].

The third potential risk is wildlife. Various poisonous plants can be found in the internship site such as acacia, wild apricot, and poisonous celery. However, the students' curiosity and lack of necessary discriminatory skills may lead to poisoning incidents. Furthermore, since this internship takes place in June each year, the hot weather and increased activity of poisonous insects pose risks. Additionally, encounters with wild bees, poisonous snakes, or domestic animals in the field are also possibilities, leading to potential risks such as mosquito bites, poisonous snake bites, wild bee stings, and injuries from domestic animals during the internship.

The fourth potential risk of field internships is caused by personal reasons. Personal reasons include injuries, sickness, non-compliance with the internship management regulations, or negative emotions. Falls and sprains happen from time to time during the field internship, and serious falls like falling off a cliff lead to unimaginable consequences. Some students often have diarrhea, fever, sore throat, heatstroke, etc. because of poor health or unconvincing soil. There have been students who do not comply with the rules of the internship

management, left the team, got lost in the field, swim in the sea without permission, drowned, etc ^[8]. Bad moods, such as depression, fatigue, homesickness, and maladjustment to the environment are also potential safety hazards.

3.2. In-event safety prevention

3.2.1. Safety management process

To prevent potential risks during the field internship and ensure the successful completion of the tasks, it is essential to implement thorough safety management throughout the entire internship process. We drew a flow chart of the safety management of field internship based on the Job Safety Analysis and our school's condition (Figure 1).



Figure 1. Workflow of safety management of field internship

3.2.2. The main points of prevention in each stage

Compared to pre-event safety assessments, in-event safety precautions need to be implemented in every detail.

(i) Material preparation

Personal protective gear includes such as clothing and footwear, sunscreen, insect repellent, heat stroke, and other items. Team protective gear includes pathfinding tools, positioning tools, marking tools, etc. Emergency items, such as necessary drugs, whistles, life jackets, are also needed.

(ii) Preparation of the mind

Targeted safety training should be provided to students. Discipline should be emphasized during practical training to ensure that the students do not get lost; local customs and traditions should be taught to prevent conflicts between the students and local residents. Moreover, education on natural geography and the local environment, and emergency response measures should also be provided.

(iii) Safety protection

For traffic safety, first of all, instructors must conduct a field survey beforehand to ensure the safety of the route. Secondly, the vehicles used needs to be in good condition, and it is important to do a headcount before taking off. It is also important to perform headcounts while trekking, and the group should act as a unit, have smooth communication, and have enough food and water. Unexpected situations should not be handled hastily. The amount of work in a day should be arranged reasonably and everyone should return to their accommodation before dark.

3.3. Post-event safety evaluation

Taking this off-campus internship as an example, we divided the potential risk causes of off-campus internship into natural social, biological, and personal reasons, evaluated the probability of their occurrence according to different risk factors and manifestations, and proposed corresponding prevention guidelines.

(i) Natural causes

Floods, lightning, strong winds, hail, and hot weather are all weather-related factors. According to our analysis, these phenomena are all prone to occur, with hot weather being the most likely. Therefore, the precautions taken are as follows: pay attention to weather forecasts in advance, return to base immediately in thunderstorms, stay away from dangerous areas (such as under large trees, utility poles, riverside, seaside, etc.), stay away from dangerous objects, try to avoid going out during hot weathers, use sunscreen, wear a hat, carry anti-heat medication such as patchouli.

(ii) Social causes

Based on our assessment, traffic accidents are prone to occur. Therefore, the precautions taken are as follows: the vehicles used must adhere to certain specifications. It is also important to strictly abide by the traffic rules, wear seat belts when riding in the car, march in a single line during the hike, always watch out for motor vehicles, and prohibit chasing around on the road. Secondly, conflicts lead to arguments and possibly fights. To prevent that, the participants should be educated on local customs to prevent conflict. Besides, fighting and brawling should be prohibited and other disciplinary rules should be set up. The teachers should be immediately notified when conflict arises. Loss of property or thefts are also prone to occur. Therefore, it is important for the participants to take care of their belongings at all times. Food poisoning is also prone to occur. Therefore, it is important to pay attention to food hygiene, washing hands before meals, not eat outside the base, and not pick and eat fruits of wild plants.

(iii) Biological causes

Injuries caused by wildlife such as bites from mosquitoes, poisonous snakes, wild bees, are prone to occur. Therefore, participants should wear long-sleeved clothes, long pants, and high boots suitable for fieldwork. Besides, participants should pay attention to the presence of wild animals when working and avoid them. Training on first aid should also be given, necessary first aid tools should be prepared and medical attention should be given when injuries occur. Accident insurance should also be purchased. Secondly, injuries from domestic animals, such as bites from domestic cats and dogs are also very likely to occur. Precautionary measures: Do not tease domestic animals, stay away from cats, dogs, and other domestic animals, seek medical attention immediately if injuries occur, and purchase accident insurance.

(iv) Personal reasons

Personal reasons include physical illnesses, such as colds, diarrhea, and other diseases. Probability assessment: highly likely to occur. Therefore, students should pay attention to their physical condition and inform the teachers in time if they are feeling unwell. Students should also carry around some common medicines. Secondly, accidents like sprains, falls, and getting lost are prone to occur. Therefore, it is important to buy accident insurance, wear shoes suitable for fieldwork, pay attention to foot safety, carry emergency medicine, and seek help or medical attention in time. Thirdly, bad mood, such as depression, fatigue, and homesickness are prone to occur. Hence, teachers should pay attention to their students' emotions, organize some recreational activities after daily tasks are completed, and talk to them if needed.

4. Conclusion

Off-campus internship is an important part of the teaching of environmental geological engineering. Through

field observation and field survey, the theory of geology is combined with practice, and through practice, disciplinary thinking is cultivated and professional skills are mastered. Job Safety Analysis is used to make a comprehensive assessment of the internship process and corresponding preventive measures are formulated, which greatly improves the safety of the internship.

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Author contributions

T.B. conceived the idea of the study. Y.L. wrote the paper.

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Research on the Implication of the Concept of a Community with a Shared Future for Mankind from the Perspective of Marxism

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Abstract: The concept of a community with a shared future for mankind is the inheritance and development of Marxist philosophy, a major theoretical achievement of the Sinicization of Marxism in the new era, and the core concept of contemporary Chinese diplomacy. Based on Marxist philosophy and scientific socialism, this article systematically expounds the basic composition of the concept and value system of a community with a shared future for mankind and discusses its rich connotations and significance to society, so as to promote a comprehensive grasp and deep understanding of it.

Keywords: Marxist theory; Community of shared future for mankind; Common values of all mankind

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1. Introduction

The concept of a community with a shared future for mankind is guided by Marxism, based on traditional Chinese culture, and its core value is the value shared by all mankind. It constitutes a set of ideological and conceptual systems related to the establishment of a community with a shared future for mankind. Drawing upon the contents of the four aspects of the socialist core value system – guiding ideology, cultural foundation, core values, and goals – and guided by Marxist theory, China has developed a philosophical framework known as the “five in one.” This framework is grounded in the nation’s traditional history and cultural background, while also being guided by the “five worlds” and centered around the “five ones.” It encompasses universal significance and exemplifies a profound sense of social responsibility. This article organically integrates value rationality and instrumental rationality based on the Marxist world outlook and methods, and systematic research was conducted on the value concept and value system of a community with a shared future for mankind from multiple perspectives.

2. The basic composition of the concept and value system of a community with a shared future for mankind

(i) The basic composition of the concept and value system of a community with a shared future for mankind

The concept and value system of a community with a shared future for mankind carries the vision of people all over the world for the future and development of mankind, and it is a scientific method about how mankind can get rid of the current international management problems. As the globalization continues to accelerate, human beings as a closely connected group are facing many global problems. To overcome challenges and difficulties more effectively, the concept of a community with a shared future for mankind emerges, grounded in the common value orientation of all humanity. This concept encompasses a range of global values, including security, culminating in an interconnected set of values known as the “value system of the community with a shared future for mankind” ^[1].

(ii) The core elements of the concept and value system of a community with a shared future for mankind

The value system of a community with a shared future for mankind is the value concept of the entire world, and a new type of common value for all mankind. Therefore, it has greatly improved human cultural values and global governance. In essence, the community of shared future for mankind is a new era of international relations built on the basis of adhering to common values such as peace and development. The purpose and ideal of development ^[2], therefore, has a very profound practical meaning and obvious practical orientation. It is based on Marxism and Chinese traditional culture. It is characterized by rich value connotations and embodies the core elements of Marxist theory and the common values of all mankind.

Marxism not only forms the foundation of the value system for a community with a shared future for mankind but is also inherently oriented towards the well-being of all mankind, as it originated for the world’s mass proletarians. Marxism has always emphasized on putting people first, taking the development and pursuit of interests of all mankind as its ideological orientation, and considering the development prospects of all mankind, which is the sustainable driving force of Marxist theory ^[3]. The community of shared future for mankind integrates the pursuit of the general public by Marx and Engels into the process of world development and the formation of world civilization, and provides a brand-new, sustainable, and valuable value direction for human development.

After hundreds of years of development, the concept of peaceful development has gradually become the common goal of people all over the world, continuously promoting international relations towards a more stable and harmonious direction, and finally evolving into the common values of all mankind.

3. Main features of the concept and value system of a community with a shared future for mankind

The concept of a community with a shared future for mankind is a brand-new value concept, an important achievement of the modernization of Marxist theory, and a scientific judgment and value choice for the development trend of the world today and the direction of human society’s progress.

(i) Value rationality

Value rationality is the rationality of value objects and value judgments, and is an evaluation of the internal logic and external effects of value. The concept of a community with a shared future for mankind has a high value rationality, that is, it conforms to the trend of the development of human society and the historical trend, reflects the yearning and desire of the people of all countries for peace and development, and shows the development trend and direction of the progress of human society. The concept of a community with a shared future for mankind is not just an empty abstract concept, but a concept with practical basis and theoretical guidance. Based on a profound cultural and historical background, the concept of a community with a shared future for mankind has garnered broad international recognition and provides a clear guide to action. This groundbreaking scientific guiding concept possesses high value, strong rationality, remarkable vitality, and

substantial influence ^[4].

Specifically, the concept of a community with a shared future for mankind is consistent with the historical laws and trends of the development of human society, that is, from division and confrontation to win-win cooperation, from closed conservatism to openness and tolerance, from a single center to multipolar balance, etc. These are a common understanding of human society throughout history, and it is also an inevitable development. The concept of a community with a shared future for mankind is based on such historical rules and the trend of the times, thus producing a new type of value concept that is in line with the requirements of the times, with historical development, with the aspirations of the people, and with the wishes of mankind ^[5]. At the same time, the concept of a community with a shared future for mankind reflects the common aspirations and fundamental interests of people of all countries for peace and development, that is, to achieve the common goals of economic development, peace, and stability. These are the basic needs and legitimate rights determined by the natural and social attributes of people all over the world as “real people.” The concept of a community with a shared future for mankind is based on these common aspirations and fundamental interests, presenting a fresh value concept that aligns with the interests, rights, well-being, and happiness of all countries.

Finally, the concept of a community with a shared future for mankind indicates the future development trend and purpose, which entails the collaborative effort of people from all nations to collectively build an open, inclusive, clean, and beautiful world. This world will be characterized by enduring peace, shared prosperity, and a favorable environment, conducive to the free and comprehensive development of all humanity. This is people’s longing and pursuit of development in the process of continuous reform. The concept of a community with a shared future for mankind is based on this direction and purpose, resulting in a new type of value concept that conforms to historical development, adapts to the changes of the times, conforms to the aspirations of the people, and reflects the wishes of mankind.

(ii) Instrumental rationality

Instrumental rationality refers to the consideration of the effectiveness of the strategy adopted to achieve the value goal, and it is the in-depth research and grasp of the various elements and conditions involved in the value realization process. The concept of a community with a shared future for mankind exhibits significant instrumental rationality. It serves as a means to address the diverse problems and challenges confronting the world today, fostering the reform and development of the international community. Through enhanced collaboration and communication among nations, this concept aims to facilitate the development and prosperity of all countries worldwide ^[5].

At the same time, the concept of a community with a shared future for mankind provides an effective tool and method to promote the reform and improvement of the international community to build a more open, inclusive, democratic and fair international community development model. There are many problems in the international community, such not being compatible with the development of the times, imbalance of international power, differing interests of various countries, and other global issues. These problems need to be improved urgently ^[6]. Therefore, there is a need to propose a new development method that adapts to the international situation, the development of the times, the aspirations of the people, and is consistent with the wishes of mankind. By upholding multilateralism and upholding the international order centered around the United Nations system, it is essential to foster equality and justice among nations, while amplifying the voice of developing countries. Striving for balance and harmony within the international community requires a commitment to openness, inclusiveness, and diversity, enabling effective collaboration among diverse countries and institutions ^[7].

Lastly, the concept of a community with a shared future for mankind provides an effective tool and method

to realize the common development and prosperity of people of all countries and build a people-centered development mechanism. In modern society, in the pursuit of a better social environment, people are more proactive in defending their rights. Therefore, this concept can act as the basis for a brand-new model that is in line with the interests of all countries. This model is based on the principle of respecting the will and choices of people in all countries, safeguarding the rights and dignity of their citizens, and promoting the collective interests of all countries. By doing so, the well-being and happiness of people of all countries can be ensured. Besides, there will be more opportunities for the development of all countries. Understanding and respecting national cultures will lead to greater cultural diversity, encouraging people from around the world to actively engage and contribute. By doing so, individuals can unleash their creativity and enthusiasm, fostering social development and progress ^[8].

4. The value and significance of the concept and value system of a community with a shared future for mankind

(i) The concept of a community with a shared future for mankind has deepened the meaning of “community”

As a major theoretical inheritance of Marxist philosophy, the concept of “community” is a scientific conception of the purpose and ideal form of human development. In Marx’s view, the ultimate goal of human society is to build a “true community” based on human freedom and full development. Here, people can get rid of the shackles of traditional production and social division of labor, and can independently carry out various activities and choose various survival modes, so as to achieve the diversification of personality and the perfection of the individual ^[9].

Building upon the foundations of Marxism’s concept of “community,” the idea of a community with a shared future for mankind has evolved and expanded its intellectual scope and meaning. This idea has expanded from the nation to the world, from economy to politics, culture, ecology and other aspects, from one dimension to multiple dimensions, from an abstract idea to a practical action. The concept of a community of shared future for mankind not only highlights the close connection and indivisibility between different nations, but also advocates that people of all countries seek common ground while reserving differences to create a colorful world.

(ii) The concept of a community with a shared future for mankind clarifies the dominant position of “realistic people”

“Realistic people” is a scientific generalization of human nature by Marx, which means a person with his/her own social attributes and values ^[10]. Marxism believes that “realistic people” are the main force, the source and purpose, and the foundation for the development and progress of society. Building upon the concept of “realistic people” of Marxism, highlighting the people-centered concept, the people of all countries should be the main body and participants of the world’s development, rather than bystanders. The concept of a community with a shared future for mankind emphasizes the idea of “people-oriented,” which means safeguarding the sovereignty of the people of all countries, protecting the rights and dignity of the people of all countries, making the people happy ^[11]. At the same time, the concept of a community with a shared future for mankind also puts forward the idea of “responsibility-oriented,” advocating that all countries play a part in maintaining world peace and promoting common development, so as to establish a community of shared future for win-win cooperation and shared achievements.

(iii) The concept of a community with a shared future for mankind points out the path to the realization of “human liberation”

“Human liberation” is Marx’s lofty ideal and value orientation about people getting freedom and full

development from various exploitation and oppression, and finally becoming the master of society and history. According to the viewpoint of Marxism, “human liberation” is a kind of socialism realized in various methods and ways in various periods. On the basis of summarizing and carrying forward the idea of “human liberation,” the concept of a community with a shared future for mankind provides a way to the future, that is, through the joint efforts of people of all countries, a new world of peace, prosperity, and development can be built ^[12]. The concept of a community with a shared future for mankind not only emphasizes the enhancement and advancement of human material well-being but also seeks to enrich spirituality, individual rights, and responsibilities. It encompasses the pursuit of happiness and a promising future for both present and future generations. The idea of a community with a shared future for mankind contains an overall understanding and in-depth grasp of the issue of “human liberation,” and it is the entry point and practical path and means of the noble ideal of “human liberation.”

5. Conclusion

Based on Marxist philosophy and scientific socialism, this paper systematically expounds the basic composition, main characteristics and value significance of the concept and value system of a community with a shared future for mankind. The concept and value system of a community with a shared future for mankind has strong value rationality and instrumental rationality, conforms to the historical laws and trends of the times of the development of human society, reflects the common aspiration and fundamental interests of people of all countries in pursuit of peace and development, and also provides an effective tool and methods to solve various challenges and problems in the world today. Besides, this concept also promote cooperation and exchanges among countries, which leads to the common development and prosperity of people of all countries. The concept and value system of a community with a shared future for mankind has also deepened the connotation of the idea of “community,” clarified the dominant position of “real people,” and pointed out the path to realize “human liberation,” which makes it a valuable, rational, innovative, and advanced development concept with strong vitality and influence.

Disclosure statement

The author declares no conflict of interest.

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Professional Bottlenecks and Targeted Suggestions for Young Teachers in Vocational Colleges

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Abstract: This paper discusses the weaknesses young teachers in vocational colleges, including insufficient teaching and research skills, and limited professional development and career progression. Targeted recommendations involve fostering young teachers' teaching skills and research capabilities through mentorship, training, research participation and skills competitions. Addressing these bottlenecks effectively develops young teachers' competencies, contributing innovative ideas and practices to improve vocational education quality, cementing their role as the next generation of vocational educators.

Keywords: Young teachers; Vocational colleges; Professional bottlenecks; Vocational education

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1. Introduction

Vocational education plays an essential role in preparing students for the workforce and supporting economic growth. It equips them with practical skills and knowledge necessary for various industries. Therefore, the quality of vocational education is critical for the development of the economy and society. The quality of vocational education is highly dependent on the teachers. Teachers are the foundation of high-quality vocational education ^[1,2]. They are responsible for designing and delivering effective lessons, managing classrooms, and providing guidance and mentorship to their students. Hence, the high-quality development of vocational colleges relies heavily on the quality of their teachers ^[3,4]. Previous studies have explored the composition of teaching staff in vocational education and their impact on students' academic achievement. Agasisti ^[5] found that the teaching staff quality significantly influences academic performance, and the need to prioritize it in educational policy was emphasized. Additionally, Deng ^[6] and Cui ^[7] highlighted the importance of school-enterprise cooperation for teachers' career development. Cui ^[7] specifically suggested the joint training of "double-qualified" teachers as a means to bridge the gap between schools and enterprises. Guo ^[8] analyzed the career development of young teachers and identified a lack of practical teaching skills as a common issue. He recommended that universities offer opportunities for young teachers to study in enterprises. Peng ^[9] argued that a high-level teacher team is essential for the development of higher education institutions.

Young teachers play a critical role in the development of vocational colleges as they bring fresh perspectives and innovative ideas to the field. However, they face several bottlenecks in their career development, such as lack of teaching experience, access to mentorship, and professional development opportunities. This paper aims to analyze these bottlenecks and provide targeted suggestions to address these challenges. The content of this article will include an analysis of the challenges faced by young teachers in vocational colleges and relevant countermeasures for administrators and young teachers to improve the career development of young teachers and the quality of vocational education. By addressing these bottlenecks and promoting the development of young teachers, vocational education can continue to play a critical role in supporting economic growth and social development.

2. Bottlenecks in the career development of young teachers

Young teachers in vocational colleges face several bottlenecks in their career development, which can hinder their ability to succeed in their careers and contribute to the development of vocational education. In this chapter, we will examine these bottlenecks in detail, including teaching skills and pedagogy, research and innovation, professional development, student guidance and mentorship, administrative responsibilities, and career advancement.

2.1. Teaching skills and pedagogy

Effective teaching skills and pedagogy are essential for young teachers in vocational colleges to succeed in their careers. However, young teachers may face several bottlenecks in this aspect, including lack of teaching experience, access to mentorship, time, and resources, and insufficient feedback on their teaching performance. Lack of teaching experience can make it difficult for young teachers to design and deliver effective lessons, manage classrooms effectively, and engage students in learning. Access to mentorship is crucial for young teachers to develop their teaching skills and receive feedback on their performance. However, young teachers may lack access to experienced mentors who can guide them in their teaching activities. Time and resource constraints may also make it difficult for young teachers to devote adequate time and attention to teaching activities.

2.2. Research and innovation

Research and innovation are crucial for the development of vocational education, and young teachers in vocational colleges are expected to engage in research activities and contribute to the development of new teaching methods and approaches. However, young teachers may face several bottlenecks in this aspect, including lack of research experience, limited access to research resources, heavy workload, and lack of mentorship. Lack of research experience can make it difficult for young teachers to develop research ideas, design effective research studies, and analyze data. Limited access to research resources such as funding, equipment, and research networks can also hinder their ability to engage in research activities. Heavy workload and lack of mentorship can make it difficult for young teachers to engage in research and innovation activities and contribute to the development of the field.

2.3. Professional development

Professional development is essential for young teachers in vocational colleges to stay up-to-date with the latest trends and best practices in their field. However, young teachers may face several bottlenecks in this aspect, including limited professional development opportunities, time constraints, financial constraints, and lack of

mentorship. Limited professional development opportunities, such as workshops, conferences, and training programs, can make it difficult for young teachers to stay up-to-date with the latest trends and best practices in their field. Time and financial constraints may also make it difficult for young teachers to devote adequate time and resources to professional development activities. Lack of mentorship can make it difficult for young teachers to identify and pursue professional development opportunities that are relevant to their career goals.

2.4. Student guidance and mentorship

Young teachers in vocational colleges are expected to guide and mentor their students to help them develop their skills and achieve their career goals. However, this may be challenging for young teachers due to their lack of experience, heavy workload, and limited resources. Lack of experience can make it difficult for young teachers to develop effective mentoring relationships and help their students achieve their career goals. Besides, heavy workload can make it difficult for young teachers to devote adequate time and attention to student guidance and mentorship activities. Limited resources, such as career counseling services or mentorship networks, can hinder their ability to provide effective guidance and mentorship to their students.

2.5. Administrative responsibilities

Young teachers in vocational colleges have administrative responsibilities such as managing course schedules, grading assignments, and other administrative tasks in addition to teaching. However, these responsibilities can also hamper their career development. Administrative responsibilities can be time-consuming and may take away from time that could be used for professional development or research activities. Young teachers may lack training in administrative tasks, which can make it difficult for them to manage their administrative responsibilities effectively. Limited resources, such as administrative support staff or technology, can hinder their ability to manage their administrative responsibilities effectively.

2.6. Career advancement

Young teachers in vocational colleges need clear guidance and support for career advancement. However, young teachers may face several bottlenecks in this aspect, including lack of transparency in the promotion process, limited opportunities, and becoming stagnant in their careers. Lack of transparency in the promotion process can make it difficult for young teachers to understand what is required to achieve promotion and how to advance in their careers. Limited opportunities for promotion can make it difficult for young teachers to advance in their careers and may lead to stagnation. Young teachers may also become stagnant in their careers due to lack of career guidance and mentorship.

In conclusion, young teachers in vocational colleges face several bottlenecks in their career development, including teaching skills and pedagogy, research and innovation, professional development, student guidance and mentorship, administrative responsibilities, and career advancement. Addressing these bottlenecks requires a comprehensive approach that includes mentorship, access to resources and training, tailored professional development opportunities, administrative support, and clear guidance and support for career advancement. By addressing these challenges, young teachers in vocational colleges can develop the skills and knowledge they need to succeed in their careers and contribute to the development of vocational education.

3. Targeted suggestion

3.1. Seek guidance from experienced teachers

Mentorship and guidance from experienced teachers are invaluable for young teachers in vocational colleges to

develop teaching skills and receive feedback on their performance. Encouraging young teachers to seek advice from more experienced colleagues in their field is crucial. Experienced teachers can offer guidance on effective teaching strategies, classroom management, and student engagement, among other areas. They can also provide constructive feedback on teaching performance and offer opportunities for young teachers to observe their classes. Administrators can facilitate mentoring relationships by pairing experienced teachers with young teachers and providing time and resources for mentorship activities.

3.2. Attend professional development sessions

Professional development is essential for young teachers in vocational colleges to stay current with the latest trends and best practices in their field. Encouraging young teachers to attend more training sessions, such as workshops, conferences, and training programs, is crucial. These sessions provide opportunities for young teachers to learn new teaching strategies, develop research skills, and network with colleagues in their field. Administrators can facilitate attendance at training sessions by providing financial support, time off from teaching responsibilities, and guidance on relevant training opportunities.

3.3. Actively participate in scientific research and academic activities

Engaging in scientific research and academic activities is essential for young teachers in vocational colleges to contribute to the development of vocational education and advance their careers. Encouraging young teachers to actively participate in various scientific research and academic activities, such as publishing research papers, presenting at conferences, and serving on academic committees, is crucial. These activities can help young teachers develop research skills, build professional networks, and gain recognition in their field. Administrators can facilitate participation in scientific research and academic activities by providing funding, time off from teaching responsibilities, and guidance on relevant opportunities.

3.4. Guiding students to participate in skills competitions

Encouraging students to participate in skills competitions is an effective way for young teachers in vocational colleges to develop their teaching skills, engage students in learning, and promote vocational education. Skills competitions provide opportunities for students to showcase their skills and compete with their peers, which can motivate them to excel in their studies. Teachers can use skills competitions to develop effective teaching strategies, identify areas for improvement, and promote vocational education. Administrators can encourage student participation in skills competitions by providing financial support, time off from teaching responsibilities, and guidance on relevant opportunities.

Addressing the challenges in the career development of young teachers in vocational colleges requires a comprehensive approach that includes seeking guidance from experienced teachers, attending professional development sessions, actively participating in scientific research and academic activities, and encouraging student participation in skills competitions. By implementing these targeted suggestions, young teachers can develop the skills and knowledge they need to succeed in their careers and contribute to the development of vocational education. Administrators play a crucial role in facilitating these activities by providing mentorship, financial support, time off from teaching responsibilities, and guidance on relevant opportunities.

4. Conclusions

In conclusion, the career development of young teachers in vocational colleges is crucial for the quality of vocational education. This paper has highlighted several bottlenecks that young teachers face, including a lack

of teaching experience, limited mentorship, and insufficient professional development opportunities. Addressing these challenges requires a comprehensive approach that involves administrators and young teachers working together to implement targeted suggestions. Consulting experienced teachers, attending training sessions, participating in scientific research and academic activities, and encouraging student participation in skills competitions are effective ways to overcome these bottlenecks. By offering mentorship, financial support, time off from teaching responsibilities, and guidance on opportunities, administrators can facilitate the professional development of young teachers and enhance the quality of vocational education. It is essential to recognize the critical role that young teachers play in the development of vocational education. Young teachers bring fresh perspectives, innovative ideas, and enthusiasm to the field, which is vital for the future of vocational education. Therefore, administrators must prioritize the development of young teachers and provide them with the resources and support they need to succeed in their careers.

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Author contributions

S.W. and J.M. clarified the content of the manuscript and completed the first draft. S.Z. made several specific suggestions and revised the format of the article.

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New Advances in Social Cognitive Neuroscience

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Abstract: Social cognitive neuroscience, as an important branch of the field of neuroscience, studies the cognitive, emotional and interactive processes of individuals in social environments. In recent years, with the continuous development of neuroscience, social cognitive research has been progressing steadily. This paper discusses the latest research progress in the field of social cognitive neuroscience from the perspective of neuroscience, covering the mechanism of emotional disorders and cognitive decision making, and brain imaging of social cognitive neuroscience. These advances not only deepen our understanding of social cognition, but also provide new ideas for the intervention and treatment of social cognitive disorders.

Keywords: Social cognition; Emotional disorders; Cognitive decision making; Brain imaging research

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1. Introduction

Social cognition is an integral part of human daily life and plays an important role in shaping human interaction and cooperation. In recent years, with the continuous progress of neuroscience, researchers further explored the neural basis of social cognition, revealing to us how the brain processes information, regulates emotions, and performs cognitive tasks in social situations. This paper aims to review the latest progress in the field of social cognitive neuroscience, discuss the aspects of social cognition, mechanism of emotional disorders, cognitive decision-making, brain imaging of social cognitive neuroscience, and mechanism of memory. These new developments not only help to expand our understanding of social cognition, but also provide more possibilities for the application of neuroscience in the treatment of social cognitive disorders.

2. Theoretical framework of social cognition

Social cognition, as an important field of study of how individuals perceive, understand, and interact in social environments, presents a rich theoretical framework through the lens of neuroscience. Research in neuroscience reveals patterns of activity in the brain in social situations.

2.1. Mirror neuron system

The mirror neuron system theory emphasizes how the brain understands the behavior and emotions of others

through imitation, simulation, and empathy. This theoretical framework states that when an individual observes the actions or emotions of others, mirror neurons in the brain fire as if they are experiencing the same action or emotion. This ability to empathize may play a key role in understanding other people's intentions, predicting behavior, and making social connections ^[1].

2.2. Social cognitive theory

The social cognitive theory emphasizes how individuals infer the mental states of others, including beliefs, wishes, and intentions. These mental state inferences require not only the observation of another person's behavior, but also an understanding of their intrinsic motivations and emotions ^[2]. Studies have shown that the brain's prefrontal cortex plays a key role in understanding other people's mental states. These regions may be involved in reasoning, emotional processing, and social judgment.

2.3. Reward and emotion

The theory of reward and emotion focuses on the role of emotion in social cognition, emphasizing how reward mechanisms regulate individual decision making and behavior in social situations. Neuroscience research has shown that brain regions such as the amygdala and striatum play an important role in social-emotional processing and reward evaluation. An individual's desire for social rewards, such as social approval, may be encoded by activity in these regions.

2.4. Network theory and social cognition

Network theory focuses on the role of connectivity and communication between different brain regions in social cognition. Studies have found that social cognition involves the synergistic activity of multiple brain networks, such as the emotional processing network, the network for understanding other people's intentions, and the self-evaluation network. The transfer of information between these networks may play a key role in the performance of social cognitive tasks.

2.5. Child development and social cognition

The development of social cognition in children has also received attention in neuroscience research. From childhood to adulthood, the brain structure and function undergo important changes in social cognitive tasks. Neuroscience helps us understand how children gradually develop the ability to understand the emotions, the intentions, and the beliefs of others ^[4].

3. Mechanisms of mood disorders

Mood disorders are a class of psychological disorders that seriously affect the individual's emotional experience and regulation, and in-depth research provides important clues for our understanding of the pathogenesis and treatment of these disorders. Mood disorders, including depression, anxiety, and bipolar disorder, will be explored from a neuroscience perspective below.

3.1. Depression

Depression is a mood disorder characterized by persistent low mood, loss of interest, decreased energy, and abnormalities in cognitive and physiological function ^[5]. Neuroscience research has found that depression is associated with abnormal activity in multiple brain regions and neural pathways. Neuroimaging studies have revealed changes in the activity of subtracted neural networks involved in emotional regulation, attention, and

self-evaluation in depressed patients. Abnormal functioning of structures such as the hippocampus, prefrontal cortex, and amygdala, which play an important role in the onset of depression, can lead to impaired emotional processing and memory. Imbalances in neurotransmitters such as serotonin are also thought to be associated with depressive symptoms. Future research is needed to explore the neural circuit connectivity, synaptic plasticity, and molecular mechanisms of depression to facilitate the development of more effective treatments.

3.2. Anxiety

Anxiety disorders are characterized by excessive fear and anxiety, often accompanied by symptoms of physical discomfort. Neuroscience research has found that anxiety is involved in neural circuits involved in emotion regulation, threat perception, and stress response. The amygdala plays a key role in anxiety and is involved in the evaluation and processing of emotional stimuli. Abnormal activity in the subtracting cortical-amygdaloid-hypothalamic pathway may lead to overarousal of emotions and enhancement of fear memories ^[6]. Disturbances in the GABAergic neurotransmitter system have also been associated with anxiety symptoms. More research can be done on the neurobiological mechanism of anxiety symptoms and provide new ideas for neuromodulation therapy and drug intervention.

3.3. Bipolar disorder

Bipolar disorder is a condition with dramatic mood swings, where patients experience heightened emotions and increased activity during manic periods and negative emotions and loss of interest during depressive periods. Neuroscience research has revealed that bipolar disorder is associated with abnormalities in mood regulation, cognitive control, and the reward system. The dopamine pathway in the brain plays an important role in the pathogenesis of bipolar disorder, and abnormal activity in the amygdala and prefrontal cortex can lead to extreme mood swings. Further research of the neural basis of bipolar disorder is still needed in order to better understand the mechanisms of bipolar disorder and provide a basis for targeted treatment.

4. Cognitive decision-making mechanisms

Cognitive decision-making as an integral and important part of our everyday life and it has gained widespread interest in the field of neuroscience. Research has shown that cognitive processes involve multiple brain regions working together, and everything from perception and information processing to behavior execution has been exhaustively explored at the neural level.

4.1. Cognitive decision-making

Cognitive decision-making is the process by which an individual makes the best choice when faced with multiple options by evaluating potential outcomes and risks. Neuroscience research has revealed the neural basis of cognitive decision making, primarily involving the interaction of brain regions such as the prefrontal cortex, amygdala, striatum, and subtractive neural networks. The prefrontal cortex plays a key role in integrating different information, weighing pros and cons, and executing plans in decision-making. The amygdala is involved in the processing of emotional value, which influences the emotional color of decision making. The striatum is associated with reward, and the assessment of incentive value plays an important role in the decision-making process. In addition, the activity of subtracting neural networks regulates cognitive control and attention allocation in decision making, affecting the accuracy and stability of decision making. Future research could further delve into the mechanisms of interaction between these brain regions, as well as the neural basis of individual differences in cognitive decision-making.

4.2. Time cognition

Time cognition is an aspect of cognitive decision making, which refers to an individual's ability to perceive and process time, covering such aspects as time interval estimation, time memory, and time decision-making. Neuroscience research has revealed the neural mechanisms of temporal cognition, mainly involving the involvement of brain regions such as the dorsolateral prefrontal cortex, basal ganglia, hippocampus, and cerebellum. Damage to the dorsolateral prefrontal cortex, which plays an important role in time interval estimation and time decision making, may lead to disruption of time perception. The basal ganglia are involved in the regulation of time memory and perception, and the perception of time passing is encoded and integrated in this region. The hippocampus is involved in the encoding and integration of the chronological order of events and plays an important role in the storage and retrieval of temporal information. The cerebellum may play a role in time control and prediction. Further research could explore the detailed associations between these brain regions and time perception, as well as the neuroregulatory mechanisms of time perception.

4.3. Mechanisms of memory

Memory is an important part of human cognitive function, which involves the process of acquiring, storing, and retrieving information. Neuroscience research has revealed the complex neural mechanisms of memory formation and expression that, from the molecular level to the network level, profoundly influence our understanding of past experiences and knowledge.

4.4. Short-term memory and working memory

Short-term memory and working memory are the processes of temporary storage and processing of information, involving the collaborative activity of the cerebral cortex. Studies have shown that the prefrontal cortex plays a key role in working memory, and it has an important impact on the maintenance and manipulation of information. Structures such as the hippocampus and amygdala have been linked to the role of emotion and attention in memory. Synchronous oscillatory activity in neurons plays an important role in the transfer and integration of information in both short-term and working memory.

4.5. Long-term memory

Long-term memory is the process by which information is stored persistently in the brain and can be divided into explicit and implicit memory. Explicit memory involves the hippocampus and related brain areas, such as hippocampal circuits, which play an important role in spatial, temporal, and factual memory^[8]. Implicit memory involves processes such as motor learning and conditioning, and involves structures such as the basal ganglia and cerebellum. Synaptic plasticity plays a key role in the formation and consolidation of long-term memories, including long-term potential, the interaction of neurons before and after synapses, etc.

4.6. Classification and neural mechanism of memory

Memory can be classified in various ways, such as short-term memory and long-term memory according to time persistence, factual memory, and process memory according to memory content, explicit memory and implicit memory according to state of consciousness, etc. Each type of memory involves complex interactions between multiple brain regions^[9]. For example, anterior and posterior connections in the cerebral cortex play a key role in encoding and retrieval of factual memories, while the basal ganglia play an important role in recessive memory of motor skills.

4.7. Memory impairments and neurological disorders

Memory disorders have received a lot of attention in neuroscience research, such as memory loss due to neurodegenerative diseases like Alzheimer's disease. Studies have shown that these diseases involve multiple factors such as neuronal damage, defects in synaptic plasticity, and disorders of neurotransmitters.

Studying the neural mechanism of memory disorders can offer insights into early diagnosis and treatment approaches for related diseases.

5. Brain imaging studies in social cognitive neuroscience

Neuroscience research in the field of social cognition covers the understanding of human social behavior, emotion, and cognitive processes, and brain imaging techniques play an important role in this. This chapter will cover the basic principles and applications of brain imaging techniques to social cognitive research, including functional magnetic resonance imaging (fMRI), electroencephalography (EEG), and magnetic electroencephalography (MEG).

5.1. Introduction to brain imaging techniques

Brain imaging techniques are a range of methods for observing and recording active brain regions, and they provide scientists with an insight into the neural activity of the brain during a variety of cognitive tasks and behaviors. These techniques are widely used in neuroscience research, including those related to social cognition. With the help of brain imaging techniques, we can explore the interconnections and activity patterns between different regions within the brain, revealing the neural mechanisms of social cognitive processes. The development of brain imaging technology provides a powerful tool for us to deeply explore the neural mechanism of social cognition. These non-invasive techniques allow researchers to observe patterns of activity in the brain as it performs social cognitive tasks, revealing the neural basis of aspects such as social interaction, emotional resonance and social decision-making. Through brain imaging techniques, the role of temporal cognition in social situations can be better understood, providing new insights into the cognitive basis of human social behavior.

5.2. Functional magnetic resonance Imaging (fMRI)

Functional magnetic resonance imaging (fMRI) is a technique used to detect neural activity that provides information about brain activity by monitoring changes in blood oxygen levels. In the field of social cognition, fMRI is widely used to study time perception and its neural mechanisms in social situations, and fMRI can also be used to probe brain regions involved in social decision-making processes, such as the basal ganglia and cerebellum, and the functional connections between these brain regions, thereby revealing the neural basis of social cognition^[10]. The application of this technology helps us to better understand time perception in social cognition and the brain mechanisms associated with it.

5.3. Electroencephalogram (EEG) and event-related potential (ERP)

Electroencephalography (EEG) has been used in social cognition research to record electrical activity in the cerebral cortex, while event-related potentials (ERP) have been used to study electrical brain responses triggered by specific social stimuli or tasks. In social cognitive neuroscience, EEG and ERP techniques help researchers to delve deeper into brain activity related to social cognitive processes.

5.4. Magnetoencephalogram (MEG)

Magnetoencephalography (MEG) is a technique for recording the magnetic fields generated by the brain, which reveals temporal and spatial properties of neuronal activity. MEG has helped to reveal neural oscillations related

to social cognitive processes. Through MEG, we can gain a more comprehensive understanding of the temporal dimension of social cognitive processes, providing deep insights into human social interaction, emotional resonance, and social decision-making.

6. Conclusion

The field of social cognitive neuroscience has advanced rapidly in the past few years, deepening our understanding of human social interaction and cognitive processes. These new advances not only help advance our understanding of social cognitive disorders (e.g., autism spectrum disorders, social anxiety disorders, etc.), but also offer new possibilities for future neurological interventions and treatments. By better understanding how the brain functions and changes in social situations, we can more effectively develop individualized intervention programs for social cognitive disorders. In addition, new findings in neuroscience have also promoted the integration of interdisciplinary research, and social cognitive neuroscience is increasingly cooperating with psychology, philosophy, anthropology and other fields, providing a broader vision for a comprehensive understanding of human social cognition.

Disclosure statement

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Labor education in Vocational Colleges in the New Era from the Perspective of “Three-Wide Education”

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Abstract: Labor education is an important way to realize the historical mission of cultivating socialist builders and successors with all-round development of morality, intelligence, physique, and beauty, and it is also an important carrier of ideological and political education in colleges and universities. Labor education is an important part of vocational college education. Therefore, implementing the concept of “three-wide education” is more conducive to achieving the goal of labor education and teaching, thus forming an integrated labor education and teaching system. This paper focuses on the significance of labor education in vocational colleges from the perspective of “three-wide education” and puts forward three practical paths of labor education, namely, building a system of full-time labor education, perfecting the process labor education, and creating an all-round labor education atmosphere.

Key words: Three-wide education; Vocational colleges and universities; Labor education

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1. Introduction

The curriculum of labor education is an important part of college education and teaching, and at the same time, it is also the key to improving the quality of college education reform. From the perspective of Marx’s materialism theory, labor is the basic condition of all historical creation. Therefore, labor ability, as an important factor in cultivating comprehensive qualities, which includes morality, intelligence, physique, and beauty. It can be said that everything in the world is created by the basic skill of “labor”^[1]. Labor not only creates people’s material and cultural life, but also their spiritual world. Besides, it is also one of the signs that people gain external recognition through their own abilities. Labor plays an important role in scientifically constructing an education system of all-round cultivation and comprehensive development of morality, intelligence, physique, and beauty, and strengthening the development of comprehensive qualities. College students can only become real builders and successors of the new era if they have these comprehensive qualities. Labor education in colleges and universities is an important link in higher education, and it also deeply embodies the current higher education policy in China. In the new era, continuously enhancing the integrated development of “three-wide education” and “five-round education,” which includes aspects like morality, intelligence, beauty, and physique is a heightened and modern

requirement for comprehensive development among the people in China ^[2]. Therefore, the principle of “three-wide education” is incorporated into schools, families, society, and other aspects, even in talent training. This further promotes the improvement of the quality of labor education for colleges and lays a solid foundation for the all-round development of quality education, thus comprehensively improving the effectiveness and pertinence of labor education in colleges and universities.

2. Definition of related concepts

2.1. The concept of “three-wide education”

“Three-wide education” emphasizes educating individuals comprehensively, inclusively, and in all directions. In the present stage, Chinese colleges and universities have established clear educational objectives rooted in ethical cultivation. This is achieved through the integration of ideological and political education across various disciplines and majors. The curriculum across majors is designed to incorporate ideological and moral education, cultural enrichment, and practical social engagement. This approach aims to establish a systematic and scientifically informed framework for curriculum-based ideological and political education. College educators play a crucial role in this effort by integrating theoretical knowledge with practical application, thereby effectively advancing the comprehensive “three-wide education” reform, enhancing the relevance, scientific nature, and effectiveness of higher education ^[3].

2.2. The concept of “three-wide education” in labor education in colleges and universities

“Labor” has driven historical progress, shaping all of society’s accomplishments through human effort. It stands as the origin and motivation for achieving social value. In the context of “three-wide education,” labor education in universities means that students should use their skills to contribute to society and improve their lives. This involves a comprehensive approach to labor education that covers all individuals, processes, and aspects. By integrating theoretical knowledge and practical skills, universities aim to enhance students’ participation in labor, practical activities, and community service. There are three aspects to the concept of “three-wide education”: full-time labor education, whole-process labor education, and all-round labor education.

2.2.1. Full-time labor education

Full-time labor education in colleges and universities means to divide the responsibilities of labor education among all faculty members, so that labor education can be an education in which everyone can participate. Therefore, the concept of full-time labor education is not to distinguish between levels, groups, and identities, and everybody plays a role in labor education. From this point of view, it is clear that labor education in colleges and universities does not depend on teachers alone, but also all faculty members. In addition, labor education should be reflected in all aspects of college education, not just in classrooms. That is to say, in addition to classroom teaching, other professional teachers, counselors, administrative personnel and logistics support personnel in colleges and universities are also responsible for strengthening the awareness towards labor education and comprehensively enhancing the subjectivity, consciousness, and autonomy of labor education ^[4]. The value and significance of labor should be taught to college students by setting good examples, creating a good atmosphere of labor education within universities driven by the dedication and noble professional ethics displayed in various roles. This, in turn, contributes to the establishment of a comprehensive labor education system where labor education instructors serve as the cornerstone, supported by teachers, counselors, administrative personnel, and logistics staff.

2.2.2. The whole-process of labor education

The whole-process of labor education in colleges and universities mainly means to embody labor education in all stages of college education, including internships. The essence of labor education in colleges and universities is the practicality of labor posts. Therefore, college students will receive labor education in the process of college study and practice through classroom education, social practices, cultural and sports activities, college student volunteer activities, and other activities, so that students can develop good labor habits and ideas. In addition, family and society also play an important role in college education. Therefore, social practices and family background, and life experiences are also an important part of the labor education in colleges and universities, which is crucial to realizing the objectives to labor education ^[5].

2.2.3. All-round labor education

All-round labor education means to incorporate labor education in all places, fields, and majors of higher education. Colleges and universities should make full use of their classrooms, laboratories, libraries, gymnasiums, and other facilities. Labor education activities can be organized in different ways, and a higher education labor teaching system integrating in-class and out-of-class lessons can be constructed. In addition, in view of the development of new media, colleges and universities should make good use of online and offline education and carry out labor education in the most suitable way.

2.3. The significance of labor education in vocational colleges from the perspective of “three-wide education”

Labor education is one of the crucial elements in China’s higher education system, and it is also an important way for contemporary college students to grow, progress and develop in an all-round way. “Three-wide education” is also an indispensable part of cultivating practical talents for college students in the new era ^[6]. At the same time, it is also an important way for college students to improve their labor skills and literacy in order to be successful. Therefore, in the perspective of “three-wide education,” the significance of labor education in terms of all-round development should be highlighted in vocational colleges, and the connotation and value implication of labor education for college students in the new era should be deepened continuously.

2.4. for the new era of college students to establish a correct labor values

Throughout the history of modernization in China, the Marxist concept of labor has been the basis for theoretical innovation and practical application in building a socialist society with Chinese characteristics. Therefore, students in private colleges and universities appreciate labor as the basis of the great development. In addition, the understanding of the value embodiment of labor in the new era should also be carefully understood from the complexity and diversity of the concept of modern labor. There are millions of kinds of labor in society. In colleges and universities, the labor that college students are exposed to is only a small fraction. Therefore, college students should actively think, be brave in participating and be willing to contribute in the limited labor in colleges and universities, so as to fully realize that labor is the fundamental driving force for social development. Only through these actions can we foster mutual assistance and trust within genuine labor-driven social practice, genuinely find joy in labor, and celebrate its beauty. This path leads to the realization of self-worth.

2.5. Actively cultivating positive labor consciousness of college students

From the perspective of “three-wide education,” labor education in vocational colleges should focus on the cultivation of workers’ subjective consciousness of college students ^[7]. Every field of modern China is

developing rapidly, especially the field of science and technology, making science and technology the new form of labor. In the new era, vocational college students should not only master traditional labor skills, but also pay attention to the development of science and technology. In this way, their ability and quality of labor innovation will be enhanced.

2.6. Developing and improving the labor skills of college students

From the perspective of “three-wide education,” labor education in vocational colleges will accelerate the improvement of the labor skills of college students in the new era. Today’s students, armed with contemporary knowledge, need to prioritize improving their practical abilities and mastering skills applicable to the working world. This is crucial for them to excel in their jobs. Additionally, real-world practice remains the ultimate yardstick for assessing one’s abilities. Adopting the “three-wide education” approach, labor education in vocational colleges becomes necessary for students to enhance their practical skills. Labor education not only help build e a strong work ethic but also deepens their understanding of skill development, making them more proactive in improving their practical abilities ^[8].

3. The path of developing labor education in vocational colleges from the perspective of “three-wide education”

3.1. Building a system of full-time labor education to stimulate the consciousness and initiative of full-time participation

From the perspective of “three-wide education,” vocational colleges should ensure full participation in labor education, maximize the role of each professional teaching post, and scientifically build a collaborative educational system, so that every member of vocational colleges can play a role in labor education. Vocational colleges should also study and analyze the forms of labor education on campus regularly, formulate scientific labor education teaching plans reasonably, and do a good job in the top-level design of labor education. The organization, management, and evaluation of labor education should be carried out systematically ^[9]. In addition, vocational colleges should also actively study and analyze the responsibilities and authorities of teaching subjects in organizing education, so as to achieve rules-based and law-based teaching behavior with the concept of institutionalization and rule of law, thus stimulating the consciousness and initiative of collective participation of labor education teaching staff in colleges and universities, and achieving the effect and purpose of teaching all labor education staff.

3.2. Gradually improving the whole process of labor education, including its overall planning and design

When organizing labor education, vocational colleges should pay attention to the overall design of labor education, ensure the continuity and long-term nature of the education, and think about problems in the whole process of labor education practice to prevent the discontinuous development of the labor education process. In addition, vocational colleges should also focus on the first classroom, the second classroom and the social practice of graduation, ensure a seamless link of the whole process of education. By diligently implementing an education approach that merges in-school and off-campus labor practice, prioritizing work-study and volunteer initiatives, vocational colleges can strengthen students’ entrepreneurial mindset and self-improvement attitude. This approach aligns with the comprehensive blend of curriculum-based education, experiential learning, and practical education within vocational colleges.

3.3. Efforts to create an all-round labor education atmosphere, highlighting the innovative value of labor education

Vocational colleges should further enrich the forms of labor education, increase the content of labor education, and expand the field and scope of labor education, so as to realize the all-round and all-field development of labor education in colleges and universities. Colleges and universities are the main places for college students to learn cultural theoretical knowledge^[10]. Therefore, colleges and universities should strive to create an all-round labor and cultural environment, and vigorously publicize and promote the quality of “hard-working.” Colleges and universities should also regularly carry out educational activities such as labor competitions, thematic education, and skill competitions, so as to cultivate labor value consciousness and stimulate the enthusiasm of students. This approach is crucial for cultivating a labor-oriented culture and atmosphere, encouraging students to consistently enhance their knowledge and practical skills through labor practice. It also stimulates their innovation and work ethic, leading to the improvement of their character and labor skills.

4. Conclusion

Labor education in vocational colleges should be guided by the concept of “three-wide education.” This involves consolidating labor education’s influence and building consensus among staff, exploring abundant labor education resources, and consistently expanding both online and offline teaching platforms for practical labor education. This approach aims to establish a comprehensive labor education system that achieves full-time, whole-process, and all-round labor education. In the context of “three-wide education,” proactive research and innovative strategies in vocational colleges’ labor education, along with reinforcing students’ experiential value, contribute to nurturing well-rounded socialist builders and successors among college students.

Disclosure statement

The author declares no conflicts of interest.

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Current Situation and Improvement of the Construction of Ideological and Political Teachers in Jiangxi Private Colleges and Universities

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Abstract: Through the investigation of the current situation of the construction of ideological and political teachers in 10 private colleges and universities in Jiangxi Province, it is found that the number of teachers in private colleges and universities does not reach the standard, and the original quality of the teachers is low and the postgraduate quality is sluggish. The imbalance of the team structure still exists. The article believes that strengthening policy support at the government level, emphasizing the quality supervision of team building, establishing a long-term mechanism for supervision and inspection, strengthening the cooperation of multiple parties, and exploring new models for improving the teaching team are the feasible ways for improving the construction of teaching staff of ideological and political courses in private colleges and universities.

Keywords: Private colleges and universities; Teachers of ideological and political courses; Team building; Current situation

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1. Introduction

The development of education depends on the teachers. A high-quality team of teachers is an important guarantee for building a strong education country, running a satisfactory education for the people, and accelerating the modernization of education. Since the 18th National Congress of the Communist Party of China, the construction of teachers of ideological and political courses has been focused on. A series of important speeches, instructions, and guidelines have been made on the important role and the construction of teachers of ideological courses at many meetings and occasions. Private colleges and universities occupy a very important position in the country's higher education system. Building a team of high-quality ideological and political teachers in private colleges and universities is a need to promote the implementation of reform and innovation plans for the ideological and political theory courses in the new era. The achievement of the training goals of colleges and universities is also related to the high-quality development of private higher education.

Private colleges and universities are social organizations or individuals other than state agencies, using non-state financial funds to open colleges and universities, and other educational institutions for the society according to law. According to the list of private colleges and universities released by the Ministry of Education in 2022, there are a total of 773 private colleges and universities across the country, and 33 in Jiangxi (including undergraduate and junior colleges).

In order to ensure the richness, accuracy, and objectivity of the data, the research team adopted in-depth interviews and questionnaires. According to the current situation of the development of private colleges and universities in Jiangxi, 10 representative private colleges and universities were selected, including 6 private undergraduate schools and 4 private higher vocational (technical) schools. The person in charge of the School of Marxism (or the Department of Ideological and Political Teaching and Research) conducted an interview. According to the interview situation and the problems that emerged, the “Questionnaire on the Current Situation of Ideological and Political Teacher Team Construction in Private Colleges and Universities in Jiangxi Province” was designed, and a random sampling method was used to issue electronic questionnaire links through the “Questionnaire Star” platform. A total of 108 valid questionnaires were collected. The content of the survey involves the number and scale, team structure, training status, professional quality, management system, and evaluation system of teachers in ideological and political courses in private colleges and universities.

2. Current situation of the construction of ideological and political teachers in private colleges and universities in Jiangxi

The current situation of the construction of ideological and political teachers in Jiangxi private colleges and universities is described from the two dimensions of the internal goals and external mechanisms of the teaching team. The number, scale, quality, ability, and structure of the teaching team are the internal goals of the construction of the teaching team. The management and evaluation systems, and so on are its external mechanisms.

2.1. Shortage of teachers of ideological and political courses

Through the analysis of survey information, in recent years, the total number of teachers of ideological and political courses in Jiangxi private colleges and universities has increased significantly, basically reaching the Ministry of Education’s “Regulations on the Construction of Teachers of Ideological and Political Theory Courses in Colleges and Universities in the New Era” (Decree No. 46 of the Ministry of Education) (hereinafter referred to as the “Regulations”). It is stipulated in Article 7: With a team of full-time teachers for Jianqiang Ideological and Political Courses, colleges and universities should approve full-time teacher positions in Ideological and Political Courses based on the total number of full-time students and strictly in accordance with the teacher-student ratio of not less than 1:350^[1]. However, judging from the teaching workload undertaken by teachers, as shown in **Figure 1**, teachers of ideological and political courses in private colleges and universities often have to take on the teaching task of two or even three ideological and political theory courses. With 20 or more sessions, teachers’ teaching tasks are heavy, which reflects that the number of teachers of ideological and political courses in private colleges and universities is still relatively low, and there is a special situation of teacher shortage. This shortage situation means that the ratio of teachers to students in the “Regulations” is 1:350, but the actual number of ideological and political teachers is still insufficient. In most of the surveyed private colleges and universities, they have been committed to expanding the number of teachers of ideological and political courses in recent years. However, due to the limited funds and the difficulty of recruiting talents, they can only alleviate the standard ratio between the number of students and the number of full-time teachers of ideological and political courses through internal personnel deployment. In order to solve the problem,

other professional teachers, administrative staff or counselors are transferred to be teachers of ideological and political courses. These newly transferred teachers of ideological and political courses often need to complete the relevant affairs of their original positions, which leads to low investment in the teaching of ideological and political courses. Their time and energy are limited, and thus can only undertake a small amount of teaching tasks. As a result, there is a shortage of the number of teachers of ideological and political courses in private colleges and universities.

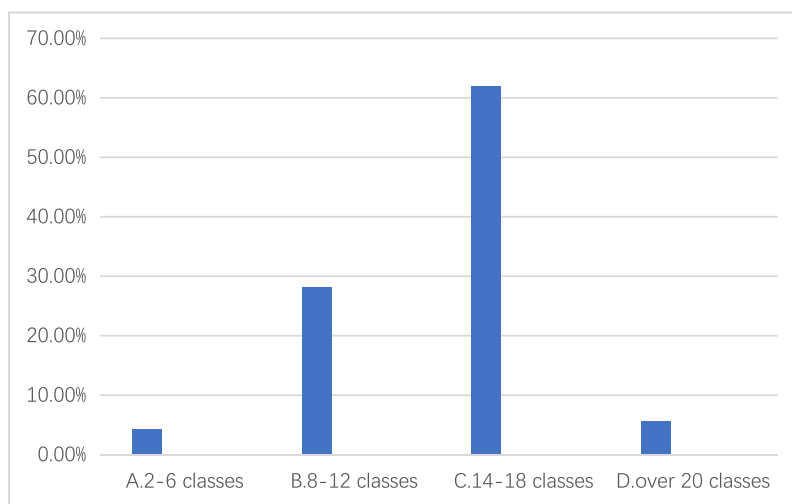


Figure 1. Weekly class hours of teachers of ideological and political courses in private colleges and universities

2.2. Low original quality and sluggish postgraduate quality

The original quality of teachers of ideological and political courses refers to the development status of teachers' education, qualifications, and graduate schools before they enter the job.

Compared with public colleges, private colleges and universities have certain disadvantages in terms of the original quality of ideological and political teachers. Most of the ideological and political teachers in Jiangxi's private colleges and universities have postgraduate degrees, and the number of doctors is very small. Most teachers are generally from ordinary colleges and universities in the province. Due to the difficulty of publishing core papers for teachers of ideological and political courses in private colleges and universities, coupled with heavy teaching tasks, the professional titles of teachers of ideological and political courses in private colleges and universities have stagnated, and the highest proportion of professional titles in the team is still lecturers. In addition, according to the interview results, as the party and the state pay attention to the cultivation and training of teachers of ideological and political courses, private colleges and universities are also paying more and more attention to the training of teachers of ideological and political courses. Teachers are encouraged to participate in and complete relevant training programs and tasks of the Ministry of Education and the Department of Education, such as regular pre-job training for teachers of ideological and political courses, backbone teaching training, demonstration training, and special training, etc. However, the training in terms of academic qualifications improvement, field trips, etc. is relatively weak, and there are few private colleges that combine their own characteristics in training, and there is no appropriate training feedback mechanism. Teacher training has a direct impact on the quality of postgraduates. Through post-service training and learning, teachers can better improve the quality of postgraduates, thereby improving the quality of teachers ^[2].

2.3. Imbalance of team structure

The structural problems of the ideological and political teachers in private colleges and universities are mainly

manifested in the “five major imbalances” of age, gender, education, professional title, and full-time and part-time jobs. Firstly, from the perspective of age structure, in the surveyed private colleges and universities, the teacher structure of ideological and political courses lacks levels and echelons. The loss rate of young teachers is relatively high, resulting in less young teachers under the age of 30, and there is a phenomenon of lack of successors. From the perspective of gender ratio, there are more women than men, leading to the embarrassing situation of “daughter country.” Thirdly, from the perspective of education structure, the education status of the surveyed teachers is shown in **Figure 2**. Private colleges and universities have many graduate students. Postgraduate educational background accounts for the largest proportion, followed by undergraduate education, and there is a small proportion of teachers with college education. In addition, private colleges and universities with different levels of schooling also have differences in the level of education of their ideological and political teachers. Among the surveyed private colleges, the proportion of ideological and political teachers with doctoral degrees is zero. It can be seen that teachers with postgraduate degrees are the main force of teachers of ideological and political courses in private colleges and universities. Next, in terms of professional titles, based on the platform dilemma of private colleges and universities, even if the professional title assessment is biased towards teachers of ideological and political courses, it is difficult for teachers to meet the requirements of professional title assessment. The survey results show that among the teachers of ideological and political courses in private colleges and universities, the proportion of teachers with intermediate professional titles is the highest, accounting for 73.24%. Junior and associate senior titles accounted for 12.92% and 10.03%, respectively, and teachers with full senior titles ranked last, only accounting for 3.81%. In terms of full-time and part-time jobs, a team of ideological and political teachers who are mainly full-time, and combining full-time and part-time jobs has not yet been formed. There is a situation in which full-time and part-time jobs (i.e. double reduction and external or special employment) each account for half of the country. These “five major imbalances” directly hinder the overall level of the construction of ideological and political teachers in Jiangxi private colleges and universities.

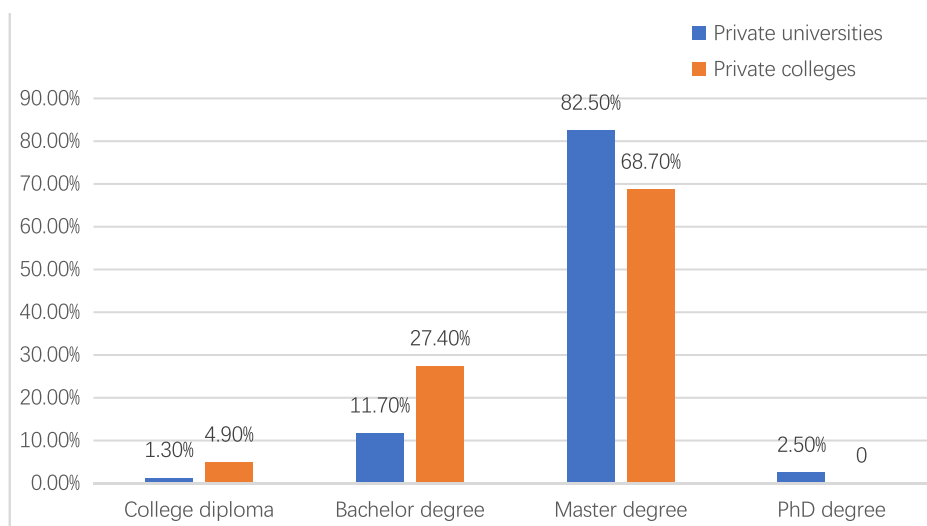


Figure 2. Academic qualifications of teachers of ideological and political courses in private colleges and universities in Jiangxi

2.4. Lack of management mechanism

During the investigation, the management mechanism and system construction of the ideological and political teachers in Jiangxi private colleges and universities were also investigated. In terms of teacher selection, among the 10 private colleges and universities surveyed, 7 of them have formulated the qualification admission

and exit system for teachers of ideological and political courses. However, most of them do not work when implemented, and violation of the system is ignored. In terms of assessment and evaluation, at present, most private colleges and universities still follow the uniform standards of the school. There is no assessment and evaluation system for teachers of ideological and political courses, and the assessment standards are singular, including the teaching quality, teaching attitude, and practical operation. In terms of training, due to the limited source of funds for private colleges and universities, and the lack of government financial support, most private colleges have not been able to expand the training channels for teachers of ideological and political courses. It is difficult for the teachers to learn about the achievements of China's reform and development, to organize field trips and comparative analysis of the economic and social development at home and abroad, to go to local party and government agencies, enterprises and institutions, grassroots, etc., to carry out practical exercises. In terms of incentive mechanism, the self-made incentive plan of private colleges and universities is unreasonable. In terms of funding, the interviews found that most private colleges and universities did not strictly follow the standard of no less than 40 yuan per student per year for undergraduate colleges and no less than 30 yuan per student per year for junior college colleges. The standard arrangement of special funds is used to guarantee the academic exchanges and practical training of teachers of ideological and political courses, and there is no post-allowance for them, which decreases the enthusiasm of teachers and hinders them from moving in a benign development direction ^[3].

3. Strengthening the construction of teachers of ideological and political courses in private colleges and universities

3.1. Strengthening policy support at the government level

The construction of teachers of ideological and political courses in private colleges and universities is inseparable from the support of government departments. In recent years, governments at all levels have focused on the construction of teachers of ideological and political courses, and have introduced a number of policies and measures to promote the construction of teachers of ideological and political courses ^[4]. In view of the particularity of the school-running system of private colleges and universities, at present, the same standard is applied to the construction of ideological and political teachers in public and private colleges and universities. Specialized instructions for team building are required to overcome the key obstacles that affect the construction of ideological and political teachers in private colleges and universities. The government should formulate relevant policies to provide detailed regulations on the rights and interests of teachers of ideological and political courses in private colleges and universities to enjoy the same treatment as teachers in public colleges and universities in terms of professional training, application for high-level topics, and publication of papers in core journals. In terms of evaluation, commendation, and rewards, policy arrangements have been made for classified evaluation with public colleges and universities, and a special fund support policy for the development of ideological and political teachers in private colleges and universities has been established. In terms of implementing national policies, local administrative agencies must implement policies in different categories. According to the characteristics and development of the ideological and political teachers in private colleges and universities, inter-school differences need to be considered, targeted measures and efforts are necessary to promote ideological and political education in private colleges and universities. The construction of political class teachers has developed properly ^[5].

3.2. Establishing a long-term mechanism for the supervision and inspection of team building

Relevant government departments should pay close attention to the inspection and supervision of the

construction of ideological and political teachers in private colleges and universities, establish a long-term supervision and inspection mechanism with comprehensive coverage, simultaneous correction and construction, and strong accountability. Inspection, regular supervision and inspection, and special supervision and inspection, supervision by specialized forces, and supervision by various forces, traditional supervision and inspection methods, and the use of modern scientific and technological means are combined to further improve the pertinence and effectiveness of supervision and inspection work.

Firstly, the internal supervision of the party committees of private colleges and universities is strengthened, fully utilizing their supervisory and restrictive functions. The party organization in private schools is the party's battle bastion in private schools and it plays a political core role ^[6]. The party committees of private colleges and universities must take the initiative and be proactive, unswervingly implement the fundamental task of cultivating people by morality, fully support the construction of teachers for ideological and political courses, and run ideological and political courses, which is a key course for cultivating people by morality. Secondly, special supervision and inspection are carried out. The Ministry of Education's "Regulations on the Construction of Ideological and Political Theory Teachers in Colleges and Universities in the New Era" should be strictly implemented, special inspections are carried out on the construction of ideological and political teachers in private colleges and universities. There should be an in-depth understanding of the construction of ideological and political teachers in private colleges and universities, problems should be identified, and the solutions should be put forward. Thirdly, a long-term mechanism for daily supervision should be established. The construction of the team of ideological and political teachers should be regarded as the key aspect of the annual inspection, assessment, and management supervision of private colleges and universities. The private colleges and universities should be promoted to improve the level of construction of ideological and political courses teacher team. Next, the government-led accountability mechanism needs to be strictly implemented, to ensure the healthy development of the ideological and political teaching staff in private colleges and universities through an effective accountability mechanism. The supervisory department should promptly report the inspection situation to private colleges and universities by compiling and distributing briefings or documents, and commend private colleges and universities with outstanding achievements in the construction of ideological and political teachers. Colleges and universities that fail to rectify, perfunctorily deal with, make false rectifications, or even refuse to rectify should be strictly held accountable, and their enrollment plans should be deducted according to laws and regulations.

3.3. Strengthening multi-subject cooperation and exploring new models for improving the teaching staff

It is a systematic project for private colleges and universities to cultivate a team of high-level ideological and political teachers, which requires the coordination of multiple forces to form a joint force. Cooperation with relevant government departments and social institutions should be strengthened to obtain financial, material, and technical support. A support and cooperation mechanism needs to be established for the construction of ideological and political teachers in public and private colleges and universities, public-run and private-run can be implemented, and a paired assistance can be formed. At the same time, internal communication between private colleges and universities is also very important. The education authorities can set up a communication platform to help teachers of ideological and political courses in private colleges and universities to share resources with each other, enhance emotional contact, and strengthen the exchange and sharing of teaching and research experience, jointly brainstorm and discuss the construction and development of ideological and political teachers in private colleges and universities.

4. Conclusion

The construction of a team of teachers for ideological and political courses in private colleges and universities is an arduous and complex task with a long way to go. Based on the status quo, to clearly restrict the current bottleneck in the construction of ideological and political teachers in private colleges and universities, the government, private colleges and universities, and relevant entities should focus on actively adopting corresponding strategies to jointly build a team with sufficient quantity, reasonable structure, and high quality. An excellent team of teachers for ideological and political courses is necessary to achieve the high-quality development of education in private colleges and universities.

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Disclosure statement

The authors declare no conflicts of interest.

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Research on the Application of Storytelling in Display Spaces

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Abstract: The 21st century is a very perceptual era, the interpretation of happiness and games are highlighted, so interactive space displays are of great significance. In the interactive display space, significant changes are necessitated, driving rapid transformations in display methods. Modern exhibition spaces have shifted from mere listing, explaining, and introducing items to adopting narrative display themes that communicate content and materials in an emotional and vivid manner. This has led to the emergence of a new display method, “displaying the content through stories,” which imbues the experience with fun and interest. The use of narrative techniques in display spaces allows for the simultaneous fulfillment of visitors’ desires to acquire information about the displayed content while offering a more expressive and enjoyable experience. It successfully meets the dual needs of visitors, providing both fun and information at the same time. In addition, it also has the advantage of technology convergence. Through the use of digital media technology, the content of the story can be expanded, allowing visitors to participate in the interactive display, so as to achieve an immersive visiting experience.

Keywords: Storytelling; Display space; Resonance

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1. Background and purpose of the study

This article attempts to review the changes in display design in recent years from the perspective of using narrative techniques in display spaces. In this, article we focus on case studies and analyzes the future trend of digital storytelling in display designs. Through the analysis, we attempt to predict the evolution and transformation of display design while uncovering the fundamental principles of the storytelling display method based on the characteristics of narrative stories. Exhibition spaces today introduce the theme of the display including its content and materials in a way that is vivid and stimulates emotions. Recently, storylines have become an indispensable means of presentation in various fields such as marketing, IT industry, art, architecture, and content industry. At the same time, this narrative technique can satisfy the visitors’ need to obtain information and provide visitors with a fun experience at the same time. In addition, it also has the advantage of technology convergence. Through the use of digital media technology, the content of the story can be expanded, allowing visitors to participate in the interactive display, so as to achieve an immersive visiting experience. Therefore, in order to understand the

correlation between storytelling and display space, this paper systematizes the characteristics and methods of storytelling display methods based on a field trip to a storytelling display space and case studies of storytelling in display spaces, and provides a basis for storytelling design.

2. Research method and scope

Firstly, the concept and properties of storytelling was studied through research of existing literature. Secondly, the changes brought about by the application of storytelling techniques in display designs were analyzed.

Thirdly, through the analysis of display cases utilizing narrative stories, the fundamental characteristics of this method and its effects were understood.

3. Concept of storytelling

Telling a story is a portmanteau of “story” and “telling,” meaning “to tell a story or to narrate a story” ^[1]. It refers to the act of creating a certain story or expressing it to others, which can be understood as a kind of “communication.” After all, storytelling is a way of presenting, and information or knowledges can all be considered as stories. The concept of story and multimedia communication or “talking” and interactive “presentation” is a technique that reflects the attributes of stories in the 21st century. Storytelling is a complete structure, including the story itself, the storytelling method, the speakers and listeners, and means of expression other than voice ^[2].

4. Concept of display

The word “exhibition” means display in English, and the word “exposition” in French has the meaning of explanation. Both sentences originated from an exhibition about painting. In addition, “display,” which is derived from the Latin word “displicare” also have meanings such as unfolding, showing, and revealing. However, exhibitions of commodities, works, and products with commercial purposes are different from the non-profit and social service exhibitions carried out by science museums or common museums. There are differences in the concept of presentation for social service purposes. In addition, the word “place” used in the East is usually enumerated without special meaning, while “display” contains a strong and active intention to explain to the outside world ^[3].

There are four aspects to display design: the object that is introduced, the space where the object is displayed, the subject that the object is conveyed to – the visitor, the time corresponding to the cycle and period of the display ^[4]. A summary of the features shown is as follows:

- (i) The content that is conveyed by the object is the most important factor in determining the direction of the display design, taking into account the shape, color, and material characteristics of the display object. It includes not only real objects such as product, consumer goods, cultural properties, and valuables, and tangible objects such as models, but also invisible objects such as images and information. Especially for the display objects in virtual spaces, which are in are in a network environment, all objects are digitized and turned into immaterial objects for display.
- (ii) Space refers to the place or environment where the object is displayed, which includes the floor, the walls, and the ceiling. The space serves as a communicative environment connecting the object and its audience. In situations where physical space cannot accommodate the object or its meaning, a virtual space might be created for display. Furthermore, advancements in information and communication

technology have led to the expansion of virtual exhibition spaces and increased visitor engagement.

- (iii) The visitors, who are the targeted information receiver, can be subdivided according to age group, gender, and living standards. Display planning, including content, methodology, and spatial layout, is significantly influenced by the target audience. This applies to both physical and virtual spaces. In virtual environments, users act as visitors, engaging with exhibits as they navigate for relevant information ^[2].
- (iii) Time in display refers to the object's temporal context, including the period of display, the durability of the object, production process, seasonal relevance, contemporary relevance, color scheme, and motion arrangement. Time sensitivity determines whether a display is permanent or temporary, and these categories can also be blended to suit the display's characteristics ^[3].

5. Relationship between space and storytelling

5.1. Ways to display items

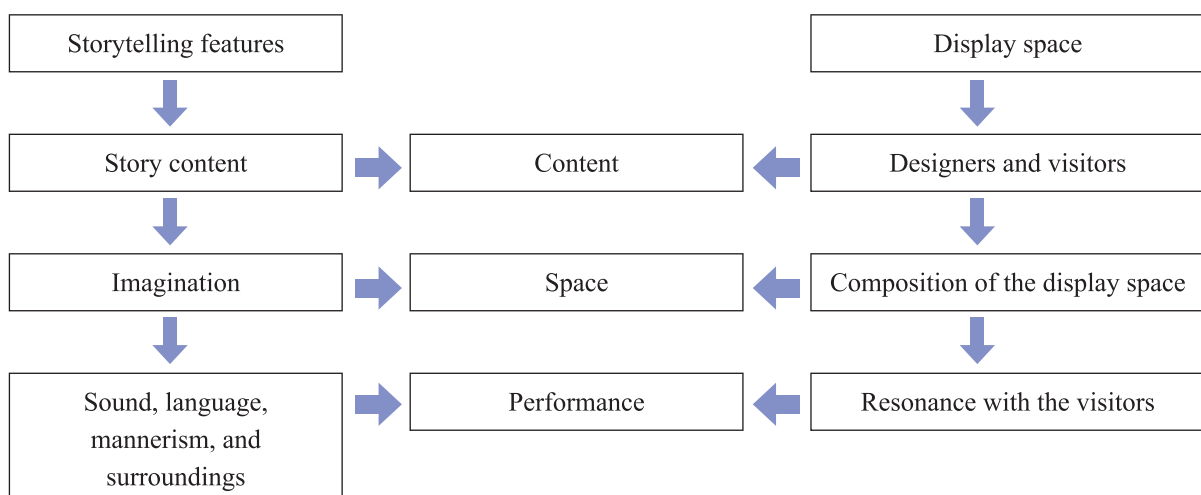
In traditional exhibition spaces, artworks are typically displayed in a straightforward manner. It is essential to analyze both the methods of creating exhibition spaces and presenting artworks. Performance is used in space displays to communicate content, inviting visitors to engage with artworks. Recent exhibitions have evolved to focus on interactive experiences for mutual communication ^[5]. To enable adaptable responses and facilitate interaction, display spaces should adopt decentralized approaches that foster two-way engagement ^[6].

5.2. Display space and storytelling

The contemporary display approach extends beyond mere observation, emphasizing a storytelling method that deeply connects with the artwork's content. This immersive approach can offer viewers a novel understanding or interpretation of the narrative concept. Storytelling in display spaces involves designers emotionally engaging with the content, conveying it to visitors through narrative. This requires interaction, imagination, and listening, creating a narrative framework to convey the theme and information. The structure comprises a core story with surrounding events, facilitating feelings, learning, perception, joy, memory, and comprehension among visitors ^[7].

5.3. Relevance of display and storytelling

The correlation between display and storytelling is analyzed through the aspects of content, space and performance, as shown in **Figure 1** ^[8].



- (i) Storytelling at the content level
Apply story features to organize display content; thus classify different display content according to certain story content ^[2].
- (ii) Storytelling at the spatial level
In the spatial arrangement of space-time design, integrating the storyline into exhibit design aids in effectively segmenting display content. This facilitates visitor interaction with the scenes, evoking resonance ^[9].
- (iii) Storytelling at the performance level
The story of the displayed content can be told using different methods, so that the public can have a fuller experience ^[8].

6. Telling the story by digital technology

6.1. Concept and development process of digital story

Stories are one of the most primitive forms of self-expression. For the longest time, human beings have been telling stories through different media like novels, dramas, movies, news, etc. Stories exist beyond time, place, and society. Nowadays, storytelling has become more digital.

Digital storytelling is storytelling through digital technology as a media environment or means of expression. In other words, a person's story can be shared through various media, namely digital images, texts, voices, sound, music, videos, and animations. Thus, digital storytelling has the ability to transform a story into a multimedia work that captures the audience's attention and provides an emotional experience. Methods of digital storytelling include computer games, animation, film, etc. Narrative content is distinguished from traditional storytelling such as novels by interactive, networked, and complex digital media characteristics. The purpose of digital storytelling is to imbue stories with value and make them more relevantly exploitable through multimedia technologies ^[1].

The digital museum exhibition design method employs digital media, characterized by the following: (i) Interactivity – diverse media-user and media-media interactions. (ii) Network – influenced by the global wired and wireless network ^[10]. (iii) Composition – combining text, sound, video, and other elements for narratives. Digital stories unfold in real-time or nearly so.

6.2. Digital story and display design

6.2.1. The trend of exhibition design

Displays serve to establish a new communication system between the audience and the displayed objects. Exhibition is a communication method that conveys information, thinking, and emotions associated with material evidence in human history and the surrounding environment to the public mainly through three-dimensional visual media ^[11]. Display design primarily aims to create a suitable environment for preserving exhibits. However, its ultimate purpose is to provide a visual connection between exhibits and visitors. This means ensuring that visitors can comfortably and authentically engage with exhibits, enhancing their experience of the aesthetic value. The process of achieving this ideal arrangement is what we refer to as display design ^[12].

Display design involves a combination of communication methods within a single act of display. The key is to maintain the essence of the materials while effectively conveying the exhibition's message through display elements. This requires understanding the interaction between visitors and exhibits and exploring spatial techniques that guide visitors. Each display method has its own characteristics, and the expected display effect can only be achieved when there are complementary systems. The appearance of a display varies based on the

exhibition hall's nature and the exhibits themselves. This variation results from employing specific display techniques tailored to the exhibit type and characteristics, utilizing their respective performance methods. Through individualized planning and interpretation of suitable display techniques for different exhibits, the optimal display effect can be achieved ^[1].

Displays have evolved into a "sensory experience" instead of just being a tool for visual communication through including experiments and operations. This creates an active display that engages all five senses of the visitors, making their experience more captivating and facilitating information conveyance. In particular, visitors of different ages can enjoy and experience an exhibition using high-tech, high-touch, high-media cutting-edge technology and media facilities such as images. In addition, robots controlled by computers, stereoscopic images, Omnimax with large screens, multi-image systems, and Fanta-View (Magic-Vision) that mix and match image performance and modeling performance have become important elements of today's exhibition facilities, but its applied deduction, compounding, and other techniques are being presented at different levels ^[13].

6.2.2. Interactive display design method for digital story and display design

Technology has continuously evolved over time, marked by distinct phases. In the 16th century, it was about "seeing" (eyes-on), followed by the "touch" (feels-on) emphasis in the 19th century. The 1960s introduced "interaction" (hands-on), and the 1980s brought about "cognition" (minds-on). In the present, the focus is on engaging emotions and feelings ("hearts-on"). The society will be moving towards an era of cross-time-space networking and scattered microprocessor functions permeating into the human activity space. In the field of display, museum environments that incorporate digital technology are also being designed ^[14]. With the development of digital technology and the expansion of the digital environment, the functions and status of exhibition halls, including museums, will also undergo tremendous changes.

Changes in exhibit design happen due to the impact of ubiquitous technology. Based on the digital story, the interchanging relationship of the exhibition components is as follows:

(i) Digital story made from the object

The digital story of the object not only refers to the part of the object itself that contains this story, but also refers to the interaction between the object and the visitor to create another story [15].

(ii) Route of digital stories

Digital stories are integrated into the exhibition layout, connecting objects and spaces to establish a narrative flow. They play a key role in shaping the arrangement of exhibits and spatial layout, ultimately guiding the visitor's path. When objects hold captivating narratives, visitors naturally follow the designated route, ensuring a sequential experience. The utilization of digital stories for route planning alleviates the necessity of creating physical pathways, easing the workload for exhibition space designers. In an exhibition space, the routes can be categorized as free-viewing, designated-viewing, or a blend of both, determined by the exhibition's content and purpose [1].

(iii) Direction of digital story

The attributes of digital storytelling find application in display techniques. The narrative approach of digital storytelling aligns with the exhibition's content. Interaction, non-linearity, and composite nature manifest as interactivity, connectivity, and multimedia components in form, space, and media choices. These digital storytelling traits are not just superficially added, but instead, emerge organically when integrating narratives into presentation methods ^[2].

7. Case study

7.1. Case overview

The correlation between display space and storytelling is divided into three aspects: content, space, and display method. The application and characteristics of storytelling in display spaces are analyzed through case studies.

7.2. Case analysis

7.2.1. Teddy Bear Museum (Gyeongju, South Korea)

Teddy bears have been loved by people of all ages since their birth in 1902. Jeju Teddy Bear Museum is the first and largest teddy bear museum in Korea, which displays diverse content. The museum is divided into multiple exhibition areas according to different stories, including History Hall, Art Gallery, Curated Exhibition Area, Field Garden, Outdoor Stage Area, Elvis Presley Arena, Museum Cultural and Creative Store, Orange T-Shirt Areas, etc. Different display spaces areas are set up according to different storylines, so as to attract visitors and resonate with visitors.

(i) History Hall

In the History Hall, visitors will get to can watch the history of teddy bears and human beings across 100 years. Visitors will get to take a “time machine,” look back on 100 years of human history with the teddy bear (Marty) from the future, and admire teddy bears collected from all over the world since 1902.

(ii) Art Gallery

In the Art Gallery, visitors will get to enjoy the world’s most expensive teddy bear Louis Vuitton bear and a 125K bear made of 125 carat gemstones. There is also an original teddy bear who played an active role as Ending Bear in the popular drama “Palace.”

(iii) Curated Exhibition Area

Visitors can find special teddy bear works in the Curated Exhibition Area. These works constitute a variety of exhibitions and experiential exhibitions presented with ideas unique to the Teddy Bear Museum. Depending on the visit schedule, the contents of the exhibition may vary.

(iv) Field Garden

In the Field Garden, visitors can watch the blue sea of Jeju Island with a teddy bear. The Field Garden overlooking the seaside of Jungmun Byeda is composed of a lawn square and a walking path, where you can enjoy the sea breeze and the natural atmosphere.

(iv) Slow Bear (Outdoor Stage Area)

Marty, who visited the past 100 years of human history, bought the world’s largest teddy bear as a gift.

(v) Elvis Presley Arena

Visitors will get to see teddy bear born as “King of Rock.” At the Elvis Presley Arena, visitors can enjoy a teddy bear reenactment of Elvis Presley’s famous hit show every 15 minutes.

(vi) Museum Cultural and Creative Store

In the museum store located in the lobby on the first floor, there are not only a variety of authentic teddy bears, but also T-shirts, bags, stationery that resemble the teddy bears in the museum.

(vii) T-shirt by Orange Tea

Taiwan’s (China) top fruit tea brand “Orange Tea” started in 2003 in Taiwan, China.

7.2.2. Seoul Museum of History

The Seoul Museum of History is divided into five exhibition areas according to the historical timeline of Korea, so that visitors can better understand the history of Korea.

(i) The first exhibition hall

The first exhibition hall exhibits the 500-year-old capital of Seoul in the Joseon Dynasty from 1392 to 1863. Hanyang is the starting point and terminal of the inflow and outflow of civilization and culture, and a place of life and culture. Seoul, formerly known as Hangyang and Hangcheng, is the capital of South Korea.

(ii) The second exhibition hall

Seoul during the Korean Empire was based on tradition and had a dream of the imperial capital from 1863 to 1910. In 1897, North Korea changed its name to the Korean Empire and carried out large-scale urban transformation.

(iii) The third exhibition hall

The shadow of the modernization of Seoul during the Japanese occupation period from 1910 to 1945. Seoul during the Japanese occupation period quickly became a modern city. The colonial city tempted Koreans, but did not integrate them into it.

(iv) The fourth exhibition hall

Seoul was a huge city and it developed rapidly from 1945 to 2002. After liberation in 1945, Seoul became the capital of a sovereign country. The beneficiaries rapidly developed into a huge modern city. At the same time, it also left behind the “big city syndrome” such as allergies, environmental damage, historical heritage damage, and social polarization, which became an issue during the “compressed growth period” in Seoul.

(v) Hall 5 Seoul, Today and Tomorrow and City Model Video Hall

The City Model Video Hall miniaturizes the entire city of Seoul at a scale of 1/1500. The city model video hall is a learning place for students and citizens to vividly understand Seoul’s natural and urban environment. It introduces Seoul’s development history and future prospects to foreigners who come to Seoul, and improves the city image of Seoul. This is also a multi-functional exhibition space for educational seminars such as city lectures based on new thinking. By telling stories, visitors can better understand history, and it is easier for children to have an intuitive understanding when visiting.

7.3. Summary

As a result of the comprehensive analysis of the characteristics of storytelling in different cases, it can be concluded that the objects of interest can be displayed in the form of a storyline, and a hybrid viewing route can be created for the visitors. Besides, performances can create resonance between the displays and the visitors.

8. Conclusion

This article discusses the application of storytelling in display spaces, which can be divided into three aspects: content, space and performance. the objects of interest can be displayed in the form of a storyline, and a hybrid viewing route can be created for the visitors. Besides, performances can create resonance between the displays and the visitors. On this basis, to clearly convey the content and the theme of the display to the visitor, it is necessary to first determine the theme of the display and the storyline of the show, with a complete plot and script. In addition, it is also necessary to anthropomorphize the displayed materials to stimulate the perceptual thinking of the visitors through touching and operating. Therefore, the story-based museum achieves this through the combination of various displays, performances and stories, and realizes two-way communication and interaction between visitors and the exhibition space. Visitors can better understand the content of the exhibition space through the story-based display method. At the same time, the interactive nature of exhibition

design built upon digital storytelling guides visitors to engage with exhibit information and the digital story's temporal and spatial context. This intensifies the immersive interaction experience, facilitating a seamless blend between exhibits and the exhibition space, enabling visitors to grasp and experience the theme conveyed by the exhibition.

Disclosure statement

The authors declare no conflict of interest.

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Analysis of Characteristics of Inpatient Death Records in a Tertiary Hospital in Hubei Province

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Abstract: *Objective:* To study the distribution characteristics of in-hospital death cases, explore the composition characteristics of death disease spectrum, and provide reference for hospital management. *Methods:* The first page information of inpatient death medical records from 2018 to 2022 in a tertiary hospital in Hubei Province was collected, and the main diagnoses were classified according to the International Classification of Diseases, Tenth Revision (ICD-10) standard for the cause of death. The *t* test and χ^2 test were used to statistically analyze the distribution characteristics of the death cases in terms of gender, age group, season, cause of death, and other factors. *Results:* From 2018 to 2022, the total mortality rate in our hospital was 0.38%, the overall male-to-female death ratio was 2.04:1, and the overall average age at death was 65.89 years old; 65.87 years old for males and 65.91 years old for females. Most of the dead patients were over 60 years old, with the mortality rate in is the highest during the winters being the highest. The disease with the highest mortality rate of was circulatory system diseases. *Conclusion:* The professional, technical, and nursing skills of medical institutions, should be improved to reduce the in-hospital mortality rate.

Keywords: Hospitalized patients; In-hospital mortality; Sex distribution; Age distribution; ICD-10

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1. Introduction

In-hospital mortality is an important indicator of a hospital's quality, especially tertiary hospitals, and an important content of the 18 core qualities for the safety systems of hospitals^[1-3]. In this study, we analyzed the characteristics of inpatient death cases in a tertiary hospital in Hubei Province from 2018 to 2022 by exploring the development of causes of death among inpatients, the distribution characteristics of several factors, the trend of disease spectrum and in-hospital mortality. We discovered the main factors that threaten the lives of patients, discovered the weak points in the management of dead patients, formulated disease prevention and control strategies hospitals, optimized the allocation of medical resources, and provided a scientific basis for

determining the focus of medical work, so as to further improve the hospital's medical service quality and social service capabilities ^[4].

2. Materials and methods

2.1. Sources of information

The basic data of this study come from the homepage of the medical records of discharged patients in the HIS system of our hospital from 2018 to 2022. All medical records have been cataloged before data extraction, and the International Classification of Diseases ICD-10 is used as the disease classification standard. Cases suffering from multiple diseases at the same time are analyzed based on their main diagnosis. The date of discharge and reason of death of the patients were obtained from the front page of the medical record. Besides, relevant information such as the patient's ID number, gender, age, and diagnosis on discharge were extracted.

2.2. Research methods

The annual in-hospital mortality rate was calculated based on the number of discharged patients [in-hospital fatality rate = (number of deaths in a certain period/number of discharges in the same period) × 100%]; According to the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Volume II (Guidebook)*, the patients were divided into 10 groups based on their age with a class size of 10 years ^[5]; According to the "Climate Seasonal Division and Characteristic Analysis in Southwest China," spring is from March to May every year, and summer is from June to August, autumn is from September to November, and winter is from December to February of the next year ^[6].

2.3. Statistical methods

Excel and SPSS 29.0 we used to organize and analyze the data. Quantitative data were described by mean ± standard deviation, and *t*-test was used for data comparison among groups; qualitative data were described by number of cases (*n*) and constituent ratio (%), and χ^2 test was used for data comparison among groups. The test level $\alpha = 0.05$, and the α value of multiple comparisons was corrected by Bonferroni method.

3. Results

3.1. Mortality and gender distribution of hospitalized patients

From 2018 to 2022, a total of 190102 patients were discharged from our hospital (96,231 males, 93,871 females), and 724 died in hospital (486 males, 238 females), with a total case fatality rate of 0.38%. The case fatality rate of females (0.25%) was lower than males (0.51%). It was found that the rate of hospitalizations in 2020 was the lowest. However, the number of deaths did not change significantly, which makes the mortality rate the highest, with the mortality rate of males being 0.70% and females being 0.35%. The year 2021 had the lowest mortality rate, with 0.41% for males and 0.16% for females. In 2022, the male death rate was 0.52% and the female death rate was 0.28% (**Table 1**).

3.2. Statistics on age difference of dead patients

From 2018 to 2022, the average age of death in our hospital is 65.89 years old, with males being 65.87 years old, and females being 65.91 years old; the overall median age of death is 69 years old, with males being 67 years old, and females being 71 years old. The details of each year are shown in **Table 2**.

Table 1. Mortality and gender distribution of hospitalized patients from 2018 to 2022

Classification	Total number of people			Male			Female			Ratio of male to female deaths
Year	Number of inpatients	Number of death	Death rate%	Number of inpatients	Number of death	Death rate%	Number of inpatients	Number of death	Death rate%	
2018	42971	165	0.38	21542	109	0.51	21429	56	0.26	1.95
2019	47659	166	0.35	24028	109	0.45	23631	57	0.24	1.91
2020	27875	147	0.53	14161	99	0.70	13714	48	0.35	2.06
2021	35439	101	0.28	17924	73	0.41	17515	28	0.16	2.61
2022	36158	145	0.40	18576	96	0.52	17582	49	0.28	1.96
Total	190102	724	0.38	96231	486	0.51	93871	238	0.25	2.04

Table 2. Statistics on age differences of dead patients from 2018 to 2022

Classification	Overall				Male				Female			
Year	Median age of death (years)	Mean age of death (years)	Standard deviation	Constituent ratio of death	Median age of death (years)	Mean age of death (years)	Standard deviation	Constituent ratio of death	Median age of death (years)	Mean age of death (years)	Standard deviation	
2018	68	65.65	18.29	66.06	66	64.24	18.40	33.94	74	68.41	17.90	
2019	69	63.80	20.55	65.66	66	64.83	17.43	34.34	72	61.84	25.54	
2020	67	64.67	17.35	67.35	66	64.57	17.54	32.65	69	64.90	17.14	
2021	69	65.88	18.64	72.28	69	67.40	17.96	27.72	71	61.93	20.09	
2022	70	69.74	14.29	66.21	69	69.07	13.43	33.79	73	71.06	15.91	
Total	69	65.89	18.06	67.13	67	65.87	17.09	32.87	71	65.91	19.26	

3.3. Distribution of deaths by age and gender of dead patients

From 2018 to 2022, the inpatients who died in our hospital were mainly elderly patients over 60 years old, with a total of 498 patients, accounting for 68.78% of the total number of deaths. Among them, the age group with the most deaths was 61–70 years old for men, with 120 persons, accounting for 24.69%; and 71–80 years old for women, with 172 persons, accounting for 23.76%. The number of deaths among patients 0–40 years old was the least, with both genders accounting less than 2.1%, respectively; among these patients, the proportion of deaths between 31–40 years old was the highest, reaching 2.80%, and the difference in death among patients of different ages was statistically significant ($t = 2.983$, $P < 0.001$), as shown in **Table 3**.

Table 3. Distribution of the number of deaths by gender in different age groups

Age group/ year	Male		Female		Overall	
	Number of deaths	Constituent ratio%	Number of deaths	Constituent ratio%	Number of deaths	Constituent ratio%
0–10	5	1.03%	7	2.94%	12	1.66%
11–20	8	1.65%	4	1.68%	12	1.66%
21–30	8	1.65%	7	2.94%	15	2.07%
31–40	10	2.06%	5	2.10%	15	2.07%
41–50	42	8.64%	15	6.30%	57	7.87%
51–60	84	17.28%	31	13.03%	115	15.88%

Table 3. (Continued)

Age group/ year	Male		Female		Overall	
	Number of deaths	Constituent ratio%	Number of deaths	Constituent ratio%	Number of deaths	Constituent ratio%
61–70	120	24.69%	45	18.91%	165	22.79%
71–80	105	21.60%	67	28.15%	172	23.76%
81–90	94	19.34%	53	22.27%	147	20.30%
91–100	10	2.06%	4	1.68%	14	1.93%
Total	486	100.00%	238	100.00%	724	100.00%

3.4. Distribution of patients' death composition in different seasons

From 2018 to 2022, the overall number and composition of deaths in our hospital in winter is the highest, among which male deaths accounted for 28.60%, female deaths accounted for 28.45%; followed by spring, in which male deaths accounted for 25.51%, female deaths accounted for 25.97%; the proportion of deaths in summer was the smallest, with male deaths accounting for 21.40% and female deaths accounting for 22.65% (Table 4).

Table 4. Distribution of number of patient deaths in different seasons

Season	Month	Male		Female		Overall	
		Number of cases	Constituent ratio%	Number of cases	Constituent ratio%	Number of cases	Constituent ratio%
Spring	March to May	124	25.51	64	26.89	188	25.97
Summer	June to August	104	21.40	60	25.21	164	22.65
Autumn	September to November	119	24.49	47	19.75	166	22.93
Winter	December to February	139	28.60	67	28.15	206	28.45
	Total	486	100.00	238	100.00	724	100.00

3.5. Annual distribution of different causes of death according to ICD-10 statistics

According to the data, circulatory system diseases rank first in the cause of death, injuries, poisoning and external causes rank second, respiratory diseases rank third, tumors rank fourth, and digestive system diseases rank fifth. The proportion of injury, poisoning and external causes is increasing year by year; circulatory system diseases rank first every year (Table 5).

Table 5. Annual distribution of different causes of death

Serial number	Coding	International Classification of Diseases Code	2018 (%)	2019 (%)	2020 (%)	2022 (%)	Total (%)
1	A	Infectious and parasitic diseases	2.42	2.41	2.72	0.69	2.07
2	B	Viral infections of skin or mucous membrane lesions	0.61	0.00	2.04	0.00	0.55
3	C	Tumors	13.94	12.05	17.69	11.03	12.98
4	D	Blood or hematopoietic organ diseases or diseases involving the immune mechanism	3.03	0.00	0.00	0.00	0.83

Table 5. (Continued)

Serial number	Coding	International Classification of Diseases Code	2018 (%)	2019 (%)	2020 (%)	2022 (%)	Total (%)
5	E.	Endocrine, nutritional, or metabolic diseases	0.00	1.81	0.00	0.69	0.55
6	G	Nervous system diseases	1.82	2.41	0.00	3.45	1.93
7	I	Circulatory system diseases	32.73	33.73	32.65	25.52	30.11
8	J	Respiratory diseases	14.55	15.66	12.93	27.59	17.68
9	K	Gastrointestinal diseases	7.27	3.01	8.84	7.59	7.04
10	L	Skin or subcutaneous tissue diseases	0.61	0.00	0.00	0.00	0.14
11	m	Musculoskeletal system and connective tissue disorders	1.21	1.81	0.00	0.00	0.69
12	N	Genitourinary system diseases	1.21	2.41	1.36	2.07	2.21
13	o	Pregnancy, childbirth, or puerperium	0.61	0.00	0.00	0.00	0.14
14	Q	Congenital malformations, deformations, or chromosomal abnormalities	0.00	0.60	0.68	0.00	0.28
15	R	Symptoms, signs, or abnormal clinical and laboratory findings that cannot be classified elsewhere	3.03	4.22	0.68	0.00	1.93
16	ST	Injury, poisoning, and extrinsic causes	16.97	18.67	20.41	21.38	20.58
17	Z	Factors affecting health status and exposure to healthcare facilities	0.00	1.20	0.00	0.00	0.28
Total			1	1	1	1	1

3.6. Distribution of cause of death in different age groups in relation to gender

From 2018 to 2022, the causes of death under the age of 18 were mainly injury, poisoning, and circulatory system diseases, and the male to female ratio was 1.18:1. The main causes of death for patients between 36 and 59 years old are injury, poisoning, and external causes, followed by circulatory system diseases and tumors; the ratio male to female ratio was 2.8:1. For patients over 60 years old, the main cause of death was circulatory system diseases, followed by injury, poisoning, and external causes, and respiratory diseases; the male to female ratio was 1.94:1.

4. Discussion

This study showed that the total number of inpatients in our hospital was the least in 2020 from 2018 to 2022, and the mortality rate in 2021 was the lowest. The difference between the number of deaths among male and female patients was significant, and the overall ratio is 2.04:1. The reason for the decrease has something to do with the adjustment of the scope of hospital admissions.

From the perspective of gender distribution, there is little difference in the total number of hospitalizations, but the mortality rate of men was significantly higher than that of women. There might be several reasons for that: (1) Men are more prone to certain risk factors like smoking, drinking, obesity, lack of exercise, and refusing to seek medical treatment; (2) middle-aged men in this county and city are more engaged in field jobs, so there are more injuries and deaths from external causes.

In terms of the average age of death and the median, there was little difference between the average age

and the median age of death of males, and it had an upward trend. The downward fluctuation of the average age of female death curve is caused by the death of newborn girls in the early years, which lowers the mean and median values; the average age of death of both males and females were both lower than what is recorded in the seventh national census data ^[7]. The reasons include the following: (1) The hospital is located in the Wuling minority area, where the living conditions are harsh and the weather conditions are severe, and the people are poor; therefore, the facilities and benefits need to be improved. (2) The healthcare services are limited with poor hygiene, and the patient's condition are usually already serious when admitted to the hospital, with many underlying diseases. Therefore, the medical services of hospitals should be improved.

In terms of age of death, most deaths occurred at 60 years old and above for both men and women, which is basically consistent with the results of other studies ^[4]. This is because they are more prone to functional decline and diseases. Therefore, hospitals also need to develop geriatric disease medical treatment and nursing services, increase comprehensive treatment capabilities, promote multidisciplinary cooperative diagnosis and treatment, and utilize medical resources to ensure better treatment for the elderly.

In terms of the proportion of deaths in each season, the proportion is slightly higher in winter, followed by spring. The leading cause of death in winters is systemic diseases, because winter is the season with high incidence of cardiovascular and cerebrovascular diseases among the elderly. Besides, and it is also related lifestyle (smoking) and diet (eating pickles, high-salt, and high fat diet) of the population in this area. In addition to active treatment, it is also necessary to vigorously promote healthy habits such as limiting salt intake, reducing weight, exercising more, stop smoking, and limiting alcohol consumption ^[8].

The top three causes of death in this study are circulatory system disease, injury, poisoning, external cause disease and respiratory system disease. Society, economy, ecological environment, population structure, lifestyle, behavior habits, biological factors, are all factors that influence mortality rate ^[9,10].

5. Conclusion

In short, the mortality rate of inpatients is an important indicator of the quality of medical services of a hospital. The results of the statistical analysis of our hospital's data show that the overall trend is basically consistent with those reported in other regions in Southwest China. It also shows that the overall quality and technical capabilities of our hospital makes our data slightly different from other regions. Through this study, it is proposed that multi-faceted publicity and improvement should be carried out on the dietary structure, daily habits, and medical awareness of residents in the region. Besides, and the business capabilities, technical levels, and nursing capabilities of medical institutions should be improved and developed in multiple aspects, so as to reduce hospital mortality.

Disclosure statement

The authors declare no conflict of interest.

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Research on the Mechanism of Music Perception in the Perspective of Neuroscience

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Abstract: Music perception and creation is a complex cognitive process, starting from listening to music to understanding the meaning of the piece, and so on. With the development of neuroscience, we can now better understand the mechanism of music perception on a neural basis. The purpose of this study is to review the current research methods on the mechanism of music perception in terms of neurology, including fMRI, EEG, ERP and other techniques. Besides, this article also discusses the application and research progress of these technologies in music perception, aesthetics, and emotion processing. The conclusion of this paper shows that the neuroscience can provide us with new perspective to deeply understand the neural mechanism of music perception, which is of great significance to strengthening music education and music therapy.

Keywords: Music aesthetics; Perception mechanism; Brain science; fMRI; EEG; ERP

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1. Introduction

The perception mechanism of music aesthetics refers to the process in which the human brain perceives and restores musical stimuli. Music triggers a series of neural responses, from the auditory cortex to a complex network of internal prefrontal cortex, amygdala, ventral prefrontal cortex, zonal gyrus, and hippocampus. These neural activities reflect musical features like sound intensity, pitch, melody, rhythm, harmony, timbre, etc. It also involves networks and systems that trigger emotional responses, enhance memory, and enhance cognitive abilities. However, music appreciation, performance, or creation, are all cognitive processes. These processes involve in many aspects, from the cognition of musical elements to the recognition and comprehension of emotion and connotation. The neural mechanism of these cognitive processes has been highlighted in the neuroscience field. In recent years, the development of neuroscience, especially the brain imaging technology, provides us with a more convenient way to understand the neural basis of music. This technique can reveal the temporal and spatial features of neural activities involved in music processing, which will not only enhance our understanding of music cognition and emotion, it also provides new directions and methods for research in the fields of music education and therapy.

2. Neuroscience methods and techniques

2.1. The origins of neuroscience

Neuroscience is an interdisciplinary frontier science, which aims to study the structure, function and mechanism of the human brain in order to better understand the nature of human cognition, emotion, behavior and so on. The origins of neuroscience can be traced back to the 19th century, when ultrasonic processing was used in neuropsychology to complement the analysis of visual electroencephalography, which became increasingly complex in the 20th century. By the end of 20th century, experts in electroencephalography and audio technology had come together to develop the brain-computer music interface (BCMIS), a remarkable achievement spanning multiple disciplines. This interface significantly expanded the creative possibilities for patients and artists alike.

In 1929, the German psychiatrist Hans Berger (1873–1941) published the first report on human electroencephalography (EEG), which described a method for recording EEG activity using noninvasive scalp electrodes. In 1934, a renowned neurophysiology and Nobel Prize laureate, Edgar Adrian (1889–1977) first described the conversion of EEG data into sound (1934). Although these early experiments focused on recording brain waves in healthy conditions, electroencephalograms soon proved to be of particular value in clinical diagnosis. In fact, in the next few decades, EEG readings will greatly improve neurological diagnosis.

By the late 1960s, there was a new paradigm shift in brain-wave ultrasonic processing, when popular cybernetics and scientific breakthroughs led to the field of biofeedback, in which biological processes are measured and fed back to the same person to gain control of these processes. In 1958, the American psychologist Joe Kamiya first demonstrated that subjects could effectively learn to control their alpha activity when provided with real-time auditory feedback, but the technique did not catch on until he published an easy-to-understand paper in 1968. Since the alpha rhythm has long been associated with a peaceful mental state, EEG biofeedback (later known as neurofeedback) was soon used to treat a variety of neuropsychiatric disorders, attention-deficit hyperactivity disorder (ADHD), depression, and epilepsy.

At that time, people began to use signal detectors to record neuronal activity and compared it with data related to behavior, perception and so on. This method was called “physiological psychology” in the broad sense. With the development of science and technology, especially brain imaging technology, people can better understand the movement of neurons and the interaction of neural circuits. Functional magnetic resonance imaging (fMRI), electroencephalogram (EEG) and event-related potential (ERP) were used to study the aesthetic mechanism of music.

2.2. Applications of brain imaging in music research

In the field of music research, brain imaging techniques can reveal the functional divisions of the human brain, which can be used to infer the main cognitive processes, emotional perception, and perceptual components of music processing. Besides, music research also involves the study of musical elements such as rhythm, melody, harmonic patterns, chords, dynamics, emotions, etc.

2.2.1. Functional magnetic resonance imaging

fMRI is widely used to explore the neural mechanisms of music processing. It can track variations in blood flow across distinct brain regions, creating a functional map of brain activity based on these changes. By analyzing the results of studies using fMRI, we can understand the brain regions associated with music processing. For example, the temporal, parietal, occipital, brainstem, cerebellum, amygdala, prefrontal motor areas, and so on. The “musical nerves” (i.e., widely activated brain structures), which are diffusely distributed in the central cortex and temporal lobe, are thought to play a crucial role in music processing.

For example, in 2009, Fritz *et al.* conducted a study titled “Universal Recognition of Three Basic Emotions in Music” ^[1]. They examined individuals from 15 diverse cultures to explore how three fundamental emotions (happiness, sadness, and fear) are perceived in music across various cultural contexts. The participants’ responses to these emotions were captured using fMRI. The results Fritz’s study showed that people have a universal understanding of these three emotions in music even with different cultural background. Listening to music composed of these emotions activated several brain regions, including the bilateral frontal lobe, the right temporal lobe, the right amygdala, and the left basal ganglia. The activation of the right temporal lobe indicates that emotional information in music might be processed and segregated within this region. Similarly, the activation of the left basal ganglia implies its potential role in emotional processing and memory functions.

In the “Cortical Dynamics of Human Music Perception: An fMRI Study on Effects of Musical Training” ^[2], Itoh *et al.* used fMRI to record the activity of various brain regions in a group of subjects, they compared the brain activity of musically trained people with that of non-musically trained people. The participants were identify musical elements of a soundtrack such as instrumental sounds, loudness and trill, as well as the emotional components of music. By comparing brain activity data between musically trained and untrained subjects, it was found that when the musically trained subjects were exposed to more complex and challenging music, there was increased activity in the prefrontal cortex, parietal lobe, temporal lobe and cingulate gyrus. These areas are involved in cognitive functions such as attention control and working memory. This region is involved in cognitive functions such as attention control and working memory. In addition, music training can improve one’s sensitivity to music, making it easier for one to hear the complexity and emotional components of music. This research has important implications for areas such as music education and music therapy. Additionally, it confirms the substantial value of neuroimaging technology in investigating music processing and perception.

In 2013, a study by Salimpoor *et al.* titled “Interactions between the Nucleus Accumbens and Auditory Cortices Predict Music Reward Value” revealed that various genres of music elicit specific brain activity patterns, triggering intense pleasure responses in regions associated with reward and emotions. The researchers found that regions such as the auditory cortex, amygdala, and hippocampus are associated with emotional features of music, and these regions are thought to be involved in emotional processing and memory encoding. In addition, regions such as the prefrontal cortex and striatum, which play important roles in reward processing and behavioral decision-making, are also associated with the rewarding features of music. The rewarding aspects of music encompass melody, harmony, rhythm, emotional expression, and cultural symbols. These elements can evoke pleasure and emotional responses from the audience, influencing their perception and preference for music.

During the experiment, the researchers used 10 pieces that the subjects had never heard before, ranging from jazz to rock and classical music. The experiment used a cross-over design, where each participant listened to different short tracks. Subsequently, fMRI was utilized to gather brain imaging data, allowing the researchers to observe changes in participants’ brain activity as they listen to different types of music. After listening to each piece, the participants were asked to rate each piece that they listened to, and the results were recorded. The researchers analyzed the subjects’ brain imaging data and self-report data to find patterns of brain activity for different types of music, and compared them with corresponding pleasure responses. The relationship between music and the brain was further explored.

Koelsch delved into the impacts of music on the brain and the neural mechanisms underlying emotional responses in his article “Brain Correlates of Music-Evoked Emotions” ^[4]. He first described how music causes the release of dopamine, which leads to feelings of pleasure or pleasure. Then, he further explored the neural mechanisms by which music triggers emotional experiences in the brain. These include motor neuron

activity, interaction between cortical and subcortical structures, activation of right temporal lobe and insula, etc. Using the techniques of fMRI and magnetoencephalography (MEG), he combined evidence to reveal how music affects brain function in cognitive, emotional, memory, and reward domains. He found that emotional expression of music can enhance language comprehension and memory, and the male hormone testosterone can enhance this effect. The book also suggests that musical training can promote the development of brain structures involved in music and language processing.

2.2.2. Electroencephalography (EEG)

EEG is a commonly used physiological signal recording technique that measures the electrical activity of brain neurons that has a higher resolution compared to fMRI, positron emission tomography (PET) or other signal analysis techniques. This technique can analyze temporal features of music such as melody, rhythm, motion, etc.

For example, in 2018, Sanyal's research team described the process of testing using EEG technology in their paper "Music of Brain and Music on Brain: A Novel EEG Sonification Approach" ^[5]. In their study, they initially gathered psychological data based on human responses by assessing the mood of selected acoustic segments. Then, they carried out EEG responses using the same musical segments as stimuli. Five frontal (F3, F4, FP1, FP2, and FZ) and temporal (T3/T4) electrodes were selected for auditory and cognitive assessment. They employed a wavelet transform technique to extract alpha frequency waves from the EEG signals, as alpha waves are mainly linked to emotional activity linked with musical segments. Then, they used the MFDXA technique to evaluate two nonlinearities: the level of correlation between non-stationary signals (in this case, the output of an EEG signal and the input of an acoustic music signal). The results showed that the correlation was significantly increased in the music-induced state compared the auditorial control state. In the case of emotional music, the correlation coefficient showed clear evidence to support the quantification of emotion at specific electrodes in the human brain. In this experiment, a strong correlation was found between the music segment and the frontal pole of EEG. The correlation was found to decrease under the influence of happy and sad music. It was found that sad music resulted in a greater decrease in the correlation compared to that of happy music. Therefore, there is direct quantitative evidence for a correlation between music and EEG signals, as well as the level of arousal between the electrodes for mood music stimuli.

I did a study in 2022, which is described below.

(i) Subjects

The subjects involved were healthy junior music education students. The subject participated in the experiment voluntarily, and they were informed of the details of the experiment.

(ii) Materials

The audios used in this experiment were Chinese music "River Water" (sad) and "Step by Step High" (happy), which are pieces that depicts two types emotions. The duration of each audio clip was 2 minutes. Because of the individual differences of the subjects, no audio clip was cut off for each stimulus.

(iii) Procedure

The EEG experiment was carried out in a room at about 2 pm. In the experiment, the subjects were placed in a relaxed environment and sat on a comfortable chair, and they listened to the soundtracks with their eyes closed. Nineteen electrodes were positioned according to the International 10/20 system on the subjects' EEG recording caps (refer to **Figure 1**). Impedance tests indicated readings below 5 K Ω . The EEG recording system (Recorders and Medicare Systems) functioned at a recording

rate of 256 samples per second, using custom software for root mean square (RMS) calculations. Raw EEG signals were filtered through both low-pass and high-pass filters with a cut-off frequency range of 0.5 to 35 Hz. Electrical interference at 50 Hz was mitigated using notch filters, whereas an electromyography filter was used to eliminate muscle artifacts. Reference electrodes a_1 and a_2 were placed at the ears. The same reference electrode was placed across all channels for the sake of consistency. The frontopolar midline electrode (Fpz) was designated as the ground electrode.

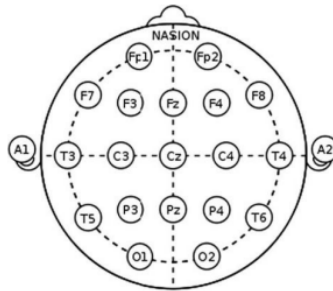


Figure 1. Electrode positions for each 10–20 system

(iv) EEG feature extraction

The first song “River Water” is a *guanqu* (wind instrument piece). Wind instruments are very expressive. There are two types of wind instruments, one is made of wood, and another type is made of bamboo. Woodwind instruments are more high-pitched, solid, resonant, and mellow; bamboo-wind instruments is more delicate, deep, and rich. The experimental piece was played by a woodwind instrument. The 2nd song “Step by Step High” is the Guangdong music, the melody is lively and exciting, and the piece has many layers and a motivating melody. The EEG signals of the two emotionally different pieces of music are shown in **Figure 2** and **Figure 3**.

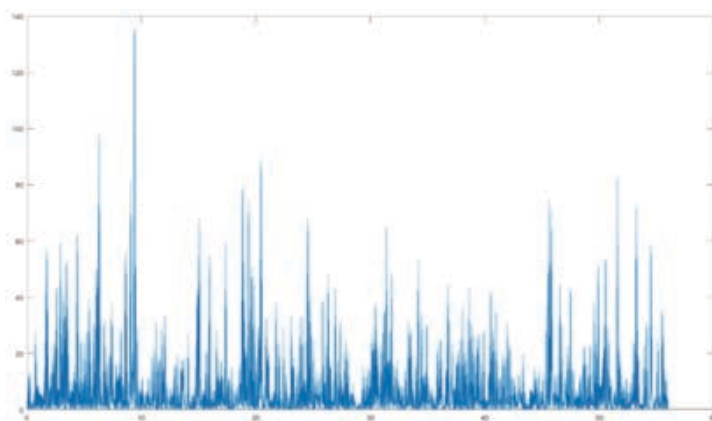


Figure 2. EEG signal after band-pass filtering of “River Water”

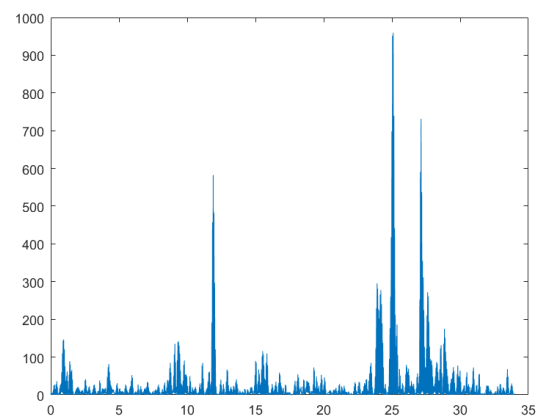


Figure 3. EEG signal after band-pass filtering of “Step by Step High”

Through the observation of the graph, the processing patterns in positive and negative emotional stimuli are distinctive. The correlation between frontal electrode and frontal electrode decreased for happy music; while for sad music, the same correlation increased strongly. When listening to “Step by Step High” When listening to “Step by Step High,” the association was most pronounced for F3-FP1, F3-FP2, F4-FP1, T3-T4, and F4-T4,

indicating closer communication between brain regions and increased synchronous activity. The F3-FP1 and F3-FP2 combinations were less correlated when listening to “River Water,” indicating that the signals between the two electrodes were less correlated. It also indicates decreased synchronous activity between different brain regions. These observations reveal how neuronal signals from different lobes are related to each other in the cognitive process of emotional music stimuli. The classification of emotions is most prominent in the increase or decrease of interlobar/intralobar correlations in the temporal lobe. In addition, activity in the different lobes of the brain corresponding to the processing of certain musical emotions is an interesting finding of this study. Further studies corresponding to other electrodes and various emotional music stimuli are still needed to obtain more robust and concrete results in this field.

2.2.3 Event-related potential (ERP)

ERP is a technique for recording brain signals by electroencephalography (EEG). ERP recordings usually involve presenting participants with a piece or an element of music and recording the brain’s response to that stimulus. In general, EEG signals are recorded using software that presents the stimulus. Commonly used stimuli include individual notes, chords, melodies, songs, and so on. The main characteristic of ERP signals is the wave response that appears within a few hundred milliseconds after being stimulated, forming a set of peaks and troughs with positive and negative phases and shorter duration.

ERP signals are usually analyzed using the following ways: selecting specific ERP components and performing quantitative analysis, calculating the temporal and spatial characteristics of ERP signal, and comparing the ERP signals with other studies through component analysis.

In 2016, Daniele Schön Mireille Besson *et al.* ^[6] conducted research using both electrophysiological and behavioral methods to investigate how pitch and interval are processed during music reading. Specifically, they examined whether pitch and duration in music reading are processed separately or together. In their study, participants were presented with target notes that varied in pitch or duration, and they were asked to make judgments regarding matches or mismatches in the corresponding dimensions. The results showed that the consistency of the target notes in the unrelated dimensions had no effect on ERP, indicating that pitch and duration were processed independently.

ERP is used to understand cognitive, emotional, sensory, and motor processes, and it represents a direct measure of neural activity. These methods are challenging for ERP researchers, as the accuracy and psychological reliability of the methods are questionable. Furthermore, scholars have been investigating the accuracy of data quality assessment in characterizing ERP scores. To improve the measurement methods, researchers focused on identifying psychometrically reliable measures of brain activity to determine whether these measures could be used to make valid statistical inferences in surveys within and between subjects. The conclusion that statistical inferences lead to unreliable data can be achieved by quantifying the internal consistency of the measurement, which is the reliability of a psychological measurement and characterizes the quality of the measurement. Measurements with a high degree of internal consistency are essential for inter-subject study about neurometry and correlations between individuals.

3. Conclusion

The development of neuroscience shows us the structure, function and psychological mechanism in the brain. This paper focuses on the application of neuroscientific methods to investigate the mechanism of music perception. These methods include fMRI, EEG, ERP, and other signal analysis techniques. Through the application of these technologies, we can better understand the neural basis of music processing, cognition,

emotion recognition, and expression, in relation brain function. In addition, neuroscientific research is of great significance in the fields of music creation and appreciation, music therapy, and music education. Although there have been some breakthroughs, there are still some technical limitations in exploring the mechanism of music processing in terms of neuroscience. For example, brain imaging cannot provide detailed images at the level of individual neurons, which may be useful in understanding the richness and diversity of an observer's auditory experience.

In the future, we look forward to the continuous development and innovation of brain science and technology to further refine our understanding of music processing, cognitive and emotional processing, etc. These developments will further contribute to fields such as music education, music therapy, and music theory. In addition to exploring the mechanism of music perception, neuroscience and technology can also be applied to music therapy, which can be used to treat a variety of diseases. For example, learning difficulties, insomnia, anxiety, and depression. In addition, neuroscience have also contributed to the development of music education. Research on children's brains has indicated that those undergoing musical training experience accelerated development. Neurological areas associated with music exhibit higher activity rates in children with musical education compared to those without. Conversely, in non-musically trained children, the activation of these brain regions is notably slower. These findings imply that music education can potentially enhance cognitive abilities and language development in children. In short, neuroscience and technology are an important method to explore the mechanism of thoughts and behaviors. Besides, it is also important in the field of music research. Music is an important part of human culture that brings joy and affection. Through neuroscience and technology, we can understand music processing more deeply, which will be useful for music creation, appreciation and education. Although there are still limitations in neuroscience and technology, we believe that with the continuous progress and development of technology, we will have a deeper understanding of music from the perspective of neurology and psychology, so as to make further breakthroughs and create a better future.

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Disclosure statement

The author declares no conflict of interest

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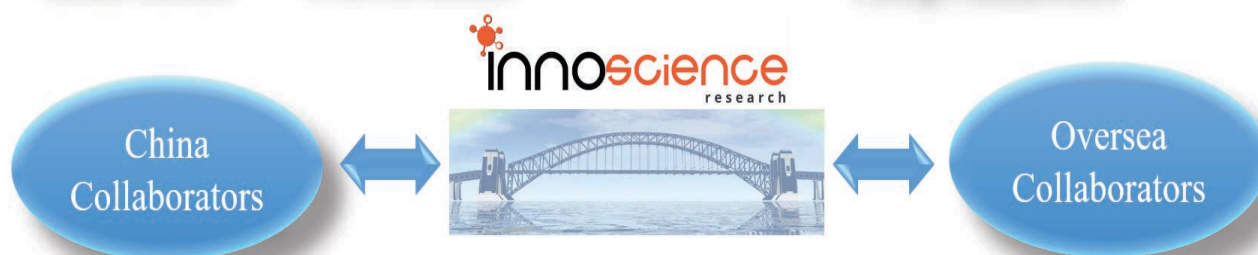
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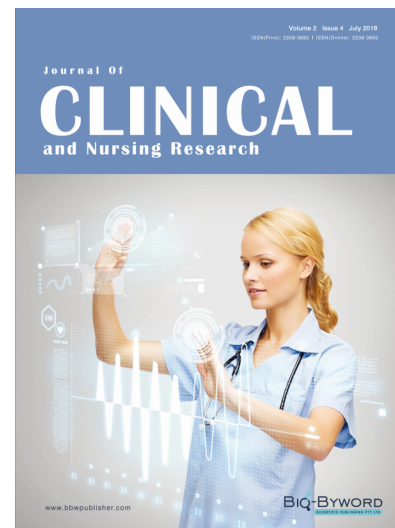
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- Electronics and Communications Engineering
- Power Systems and Power Electronics
- Signal Processing
- Telecommunications Engineering
- Wireless and Mobile Communication

