

A Study of Traditional Ecological Culture in Ming Dynasty Furniture, and Research of The “Furniture Design” About Green Design Curriculum-Based Education

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Abstract

This article examines the ecological culture and design characteristics of Ming Dynasty furniture, with the aim of establishing a comprehensive framework for green ecological furniture design. The framework includes the ideological core of design, basic principles, and technical methods. It advocates for a design approach that integrates materials and spirituality in green furniture and stresses the need to incorporate traditional design philosophies into contemporary furniture design education. Utilizing a combined methodology of literature review and case analysis, the paper evaluates Ming Dynasty furniture's eco-design principles in comparison with modern environmental design standards. The study conducts a systemic analysis of Ming-style furniture's form, structure, materials, and craftsmanship to explore the integration of these elements into contemporary furniture design education. The results show Ming furniture design not only mirrored the ecological awareness and pursuit of sustainability of its era but also positively impacts the cultivation of environmental responsibility within modern furniture design education. Ming design principles and methods inspire students to balance inheritance and innovation and to deepen their understanding of eco-aesthetics. The conclusion highlights the importance of improving ecological civilization quality among university students in China's new era and the pressing need for curriculum reform in furniture design education. The study provides guidance for applying Ming Dynasty's eco-aesthetic principles to modern furniture design and proposes an innovative educational reform path that merges traditional wisdom with modern design needs.

Keywords: Ming Furniture, Furniture Culture, Furniture Design, University Education, Eco-Education Concepts

Introduction

In China, since the 18th National Congress of the Communist Party, with Comrade Xi Jinping at its core, the Party Central Committee has attached great importance to the construction of socialist ecological civilization. It has distinctly put forward the scientific proposition of "steadfastly adhering to green development and integrating the construction of ecological civilization into various aspects of economic development, political development, cultural development, and social development." (Chinese People's Political Consultative Conference newspaper, 2015)

On the evening of April 22, 2021, in response to an invitation from U.S. President Biden, President Xi Jinping of China attended the Leaders' Climate Summit via video from Beijing and delivered an important speech titled "Building a Common Community of Life for Man and Nature." General Secretary Xi Jinping's remarks on ecological civilization, in line with the trends of the times, have presented a macro-level development concept at the national level by emphasizing that "man and nature form a community of life" (Jinping, 2021)

Furniture industries worldwide, including China's, encounter issues such as resource shortages, significant waste, and pollution, and "green consumer barriers" to world trade. (TianNa, 2015) Against the backdrop of steady economic development, consumption upgrades and technological advances, green eco-furniture with artistic qualities has a stronger market competitiveness. This brings new impetus to the development of the furniture design industry. However, the current state of Chinese higher education in furniture design often finds art students overly focused on formal aesthetics and innovation while ignoring the functional needs of the audience and technical elements. Students must continually learn and master new design concepts and, more importantly, cultivating a green ecological consciousness that benefits humanity, society, and the environment as a whole. (Haiyan, 2020)

Objective of the Study

The purpose of this study is to analyse the cultural connotation of furniture design by guiding students in learning about the ecological ideas present in the traditional Chinese furniture culture from the Ming Dynasty. This allows them to gain a deeper understanding of the ecological and cultural concepts embedded in the distinctive features of Ming Dynasty furniture, which represents a quintessential aspect of Chinese classical furniture. In the context of furniture design education and teaching, focusing on the rich imagery rooted Ming traditional culture and guiding students to explore the ecological and cultural ideas of traditional furniture is the inheritance of the exquisite culture of traditional Chinese furniture - a heritage of traditional furniture's exquisite culture.

This study integrates the concept of ecological civilization into furniture design education within colleges and universities. It involves consolidating the theoretical foundations of ecological civilization among college students, primarily focusing on classroom teaching in furniture design, and promotes the innovation of furniture design courses in higher education institutions.

Significance of the Study

To establish a cultivation mode centred on the construction of furniture ecological culture in furniture design teaching. The model aims to assist students in discovering the synergy between traditional furniture design concepts and modern design principles, while guiding them to draw from the ecological wisdom of traditional Chinese and embrace green design

principles. Combined with the Furniture Design course curriculum, it forms a comprehensive green eco-knowledge system that equips students with the tools necessary need for modern furniture design. Ultimately, our research aims to provide clear guidance for the training of future furniture design students, to promote the deep integration of sustainable furniture manufacturing and cultural heritage with green design, and to address the furniture industry's needs for environmental protection and cultural heritage in modern society. This endeavour holds practical significance and provides theoretical guidance to elevate future furniture talents' technical expertise.

In summary, the study of furniture culture can assist us in better cultural preservation, nurturing aesthetics, enhancing cultural confidence, inspiring innovation, and promoting sustainable development. Through furniture culture education, it can stimulate creativity and foster innovation among students in the field of furniture design.

Literature Review

Culture and furniture culture

The most important viewpoint of Chinese scholars on the definition of "culture" is that "culture is a complex of different forms of traits created by human beings" (Yunjie, 1996)

"In Chinese culture, furniture holds significant importance. Chinese-style furniture, as a typical form of craftsmanship, exhibits distinctive characteristics in terms of materials, craftsmanship, techniques, and aesthetics"(Jifeng, 2009)

"Traditional Chinese furniture embodies the profound traditional thoughts and cultural significance of Chinese civilization, carrying the heritage of Chinese culture over thousands of years. From the ancient origins of traditional furniture to the flourishing Ming and Qing dynasty furniture, from the low-profile seating arrangements to the later more visually striking high-rise furniture, it gradually reveals its enduring development. Chinese traditional furniture encompasses a wide variety of types, including diverse chairs and stools, rustic and elegant beds and couches, as well as storage cabinets and decorative screens, all reflecting the cultural spirit and tastes of the Chinese people.

The term 'culture' has existed in the early vocabulary of various parts of the world. In cultural anthropology, the term 'culture' was first defined by the British anthropologist Edward Burnett Tylor in 1871. He stated, 'Culture or civilization, taken in its broad, ethnographic sense, is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society.' In other words, 'culture' is humanity's response and reaction to time, documenting the behavior, ways of thinking, and lifestyles of human societies at different times. It is a product of time, the memory of human history, and values. It represents the identity and recognition of a group. The core of 'culture' is traditional concepts, especially values. From the evolution of the word 'culture' and related definitions and understandings, culture is relative to nature, with a social and holistic nature. The depth and origins of culture lie in human thoughts, while its surface lies in human behavior and the material environment created by humans, including architecture, furniture, and more."

Ming Dynasty furniture symbolises tradition, distinctive characteristics, and ethnicity; it has evolved into a cultural form, a cultural vessel, and a cultural phenomenon; it has become a synthesis of material, spiritual and artistic culture as well as it has become a way of life and a mode of behaviour of a particular group formed by certain customs, concepts, and norms (Tao, 2003)

Within the framework of Chinese tradition, furniture holds significant cultural value. Chinese-

style furniture, as an emblem of craftsmanship, not only exhibits distinct features in material composition and artisanal techniques but also embodies broader aesthetic principles. When exploring tradition further, Ming Dynasty furniture emerges as a cultural icon—a convergence of tradition, ethnic identity, and a fusion uniting material, spiritual, and artistic cultures. It serves as a testament to the cultural norms, customs, and ideologies of its era, offering insights into the lifestyles and behaviors of its creators. As a window into that period, it provides a deeper understanding of how people lived during that epoch.

Cultural Ecology Theory

Cultural ecology is an emerging interdisciplinary discipline that applies ecological approaches to the study of culture. It is a science that studies the resources, environments, states, and laws that govern the existence and development of culture. (Baidu online encyclopedia, 2022) In 1955, American scholar J.H. Steward first put forward the concept of cultural ecology, pointing out that it is "a doctrine that studies the laws of cultural emergence, development, and mutation from the interaction of various factors in the natural and social environments in which human beings live" (Yunjie, 1990)

Cultural ecology advocates the study of the laws of cultural emergence and development through the interaction of human, natural, social, and cultural variables, and seeks to identify the particular shapes and patterns of cultural development of different peoples.

Origin and Sources The concept of "cultural ecology" is mainly derived from the term "ecology", which was proposed by the German biologist E.H. Haeckel in the 1870s to study the relationship between culture and the whole set of living organisms in the environment. In 1955, the American cultural anthropologist J.H. Steward first put forward the concept of "cultural ecology", advocating the establishment of a specialised discipline to explore the origins of particular cultural characteristics and cultural patterns with regional differences. Since then, cultural ecology for more and more anthropologists and ecologists pay attention to, and gradually formed a new discipline.

The "Ecological View" in Traditional Chinese Furniture

Ancient Chinese furniture is an integral part of traditional Chinese culture, boasting a rich history and distinctive eco-aesthetic characteristics. The production of ancient Chinese furniture placed significant emphasis on material selection. It frequently featured premium wood varieties such as huanghuali, zitan, sourwood, and redwood, revered for their beauty and durability (Kewang, 2017). Craftsmen skilled in carpentry were adept at carving wood into exquisite ornamentation and intricate structures. They adhered to traditional joints, including inlays and mortise and tenons, to ensure the furniture's robust and stable construction. This not only underscored the furniture's practicality and aesthetics but also mirrored the reverence for sustainability and resources deeply rooted in ancient Chinese culture.

These timbers were prized not only for their physical beauty and enduring qualities but also for their scarcity. The ecological consciousness embedded within traditional Ming furniture design serves as a testament to the historical and cultural richness that defines its aesthetic and functional qualities. Through the careful selection of materials and dedication to crafting techniques, this furniture reflects a deep-seated respect for sustainability and resource stewardship.

In traditional Chinese furniture, natural wood is exclusively used as the primary material, with no use of modern wood composite panels. All assembly and covering techniques adhere to traditional craftsmanship." (Chen Baoguang, 2018)

The design of ancient Chinese furniture prioritized harmony with nature, aligning with the traditional Chinese ecological perspective. The furniture often served multiple functions, aligning with the frugality and pragmatism of ancient Chinese culture. Its versatility resonates with the ancient Chinese philosophy of "the unity of heaven and mankind," which highlights the harmonious coexistence of humans and nature. Furthermore, the carvings and motifs on ancient furniture frequently held symbolic significance, representing wealth, good fortune, and happiness for the family, reinforcing the connection to the natural world. Thus, ancient Chinese furniture epitomizes the superb craftsmanship, profound cultural connotations, and eco-aesthetic principles inherent in traditional Chinese culture. These pieces of furniture are not just utilitarian household items; they also carry significant historical and cultural value.

The ecological concept and green design embodiment in the traditional furniture culture of the Ming Dynasty

Natural minimalist design. The style is "simple, natural, not carved".

The way of material - the way of nature. Simple texture, quiet and light colours reflect the philosophical idea of "the way of nature".

The way of modelling - the way of the middle, the way of heaven and earth. The philosophical concept of "the circle of heaven and earth" perfectly blends the ancient worldview and furniture - the ecological manufacturing of the unity of heaven and man. Functionality and Practicality: Ming furniture is designed to be simple and practical. This practicality helps to reduce waste and reflects the core concept of green design. The interconnections between components rely on mortise and tenon and frame construction. (Ren Hao, 2017)

The Ming Dynasty's traditional furniture culture stands as a paragon of the ecological concept in design. As described by Ren Hao (2017), the Ming style is characterized by its simplicity, practicality, and unadorned elegance, embodying the philosophical notion of "the way of nature." This minimalist design philosophy is reflected in the choice of materials, the serene and unobtrusive hues, and the construction methods that emphasized the ancient philosophical concept of a harmonious "circle of heaven and earth." The functional and practical aspects of Ming furniture design align with contemporary principles of green design, as they advocate for the efficient use of resources and emphasize the longevity and sustainability of the created pieces.



Figure 1. Late ming dynasty huanghuali plain wreath chair



Figure 2. Ming furniture tenon structure (Flower Lai Sheng Ming, 2022)

The study of Ming style furniture should not be limited to the level of artistry, but the study of its design idea and influence on contemporary design is more important. Ming-style furniture artistry systematically embodies the ecological culture thought from design to manufacture. The design of Ming-style furniture is brief but not simple. It is a classic work of Chinese ancient philosophers' natural creation thought. Ming-style furniture saves and cherishes precious materials. Its whole manufacturing process is ingenious on the basis of fully respecting the natural attributes of wood. Decorations of Ming-style furniture are mainly natural elements. Its decoration techniques and natural beauty of themes complement each other. Ming-style furniture is not only the master of Chinese ancient arts and crafts, but also the master of ecological culture. In today's increasingly scarce wood resources, the Eco-cultural concept of Ming style furniture design has important reference value for contemporary furniture design, especially for solid wood furniture design (Lihua Liu An & Yuan, 2019)

One of the critical elements in optimising furniture design teaching in colleges and universities is to focus on cultivating eco-responsibility awareness among furniture design students, enabling them to develop into design talents with a strong sense of responsibility for the society.

The cultivation of individuals through culture is both a historical tradition that spans thousands of years among the Chinese nation and a requirement of the new era. It is the essence of the fundamental task of fostering virtue and talent, a key element of the "holistic education" approach and ideological education within curricula, as well as a vital means to achieve cultural confidence (Haibo, 2023)

Xiong Xianqing, Wan Ruiying, Xu Xiutong, Zhang Mei's concept of "carbon neutrality" was mentioned in the course design and teaching practice literature of "Wood Furniture Manufacturing Technology" "The Artisanry of Wood Furniture Fabrication," a cornerstone course imperative for students of Furniture Design and Engineering, intrinsically aligns its pedagogical content with the tangible specifics of production. Amidst the 'dual carbon' initiative, elevating the caliber of this premier educational offering necessitates a harmonious fusion with the Zeitgeist and the evolutionary trajectory of the industry, thus warranting the

seamless integration of 'carbon neutrality' doctrines into the academic framework.

A meticulous examination of the course's existing inadequacies under the 'dual carbon' precept underscores the urgent need for its strategic redevelopment. Emphasis is placed upon a profound amalgamation within the furniture sector and the innovative overhaul of the professional curriculum, all orbiting the 'dual carbon' ethos. This approach not only demands an inventive paradigm in course construction but also propels the pedagogy towards a 'carbon-neutral' educational trajectory, harmoniously resonating with the environmental benchmarks of our times (Xianqing et al., 2023)

Methodology

Research into furniture culture ecology is a multidisciplinary endeavour aimed at exploring the manufacturing, usage, and disposal processes of furniture within social, environmental, and cultural contexts, as well as its relationship with sustainability. Research methods encompass literature review, field surveys, interviews, lifecycle analysis, Historical research methodologies, socio-cultural analysis, policy studies, and necessitate interdisciplinary collaboration and data analysis to advocate for and implement sustainable furniture culture.

Research Objective and Methods:

The study centers on exploring the intersection of furniture design and ecological culture across historical and contemporary contexts. It employs a multidisciplinary approach encompassing literature review, field surveys, interviews, lifecycle analysis, historical research, socio-cultural analysis, and policy studies. Collaboration across disciplines is integral, facilitating comprehensive data analysis and advocacy for sustainable furniture culture.

Materials Analysis

The investigation employs a comprehensive approach to evaluate furniture materials by assessing their lifecycle, encompassing sourcing, production, and disposal impacts. Supplementary to this analysis, field studies and interviews with material suppliers and manufacturers offer invaluable insights into the availability, viability, and challenges associated with employing renewable, sustainable, and recyclable materials.

Recycling and Reuse Assessment

To evaluate furniture's recyclability and reusability, on-site observations during disassembly processes are conducted. Collaborative engagements with recycling facilities and furniture assemblers augment this assessment, providing nuanced insights into the practicality and challenges of disassembly. These interactions offer a deeper understanding of waste reduction strategies and the potential for future reusability.

Ecological Aesthetics

Data collection involves surveys and focus groups engaging designers, artists, and consumers to gauge perceptions and preferences regarding furniture designs imbued with ecological themes. Incorporating visual data like images and sketches, coupled with qualitative feedback, enriches the assessment of how natural forms and colors are perceived and valued in furniture design.

User Experience and Satisfaction

Encompasses user experience surveys, interviews, and usability tests with individuals interacting with eco-friendly furniture. This approach aims to delve deeper into understanding user preferences, behavioral patterns, and the correlation between ecological values and user satisfaction. Analyzing feedback from diverse user groups facilitates a comprehensive assessment of adherence to ecological cultural principles in furniture design. Through a diversified data collection strategy encompassing interviews, field studies, surveys, and usability tests, this research endeavors to offer a holistic perspective on the interaction between ecological cultural principles and furniture design. This comprehensive understanding aims to illuminate their alignment and influence on environmental sustainability within the context of scholarly discourse, particularly in the realm of environmental sciences.

Case Studies and Industry Trends

Case studies delve into ecological elements within contemporary furniture design, analyzing successful instances and industry trends, thereby gauging the influence of ecological culture in the sector.

Ming Dynasty Furniture and Green Design Integration

Research into the ecological significance of Ming Dynasty furniture aims to integrate traditional values into contemporary furniture design within green design principles. The analysis includes design characteristics, material usage, manufacturing processes, and their relevance to ecological culture.

Methodological Approach

Case Study: Site visits, museum/exhibition data collection, and comparative literature analysis.

Comparative Analysis: Gathering modern furniture design data via surveys, interviews, and literature review.

Curriculum Analysis: Utilizing course syllabi, textbooks, assignments, and interviews to assess green design integration in courses.

Expert Interviews: Conversations with furniture designers, historians, ecologists, and educators provide critical insights.

The revised content emphasizes the comprehensive methodology employed, the integration of historical contexts, and the rigorous approach to understanding and integrating ecological culture into modern furniture design.

The scope of the study encompasses the historical context, design characteristics, craftsmanship, and the interconnection of Ming Dynasty furniture with ecological culture. The research aims to explore the ecological significance and impact of Ming Dynasty furniture, and how these traditional values can be integrated into contemporary furniture design within the framework of green design principles.

Case studies concentrate on Ming dynasty furniture, analyzing its design, material usage, and manufacturing processes in relation to ecological culture. Comparative analyses delve into the application and evolution of green design principles between Ming dynasty furniture and modern design. Course analyses evaluate current furniture design courses with particular attention to those incorporating green design principles. Expert interviews gather insights from furniture designers, historians, ecologists, and education specialists on the role of traditional ecological culture in modern education.

Tab 1

Research methods and Content of research

Research Method	Content of research
Material Analysis	Assessment of eco-friendly material usage
Recycling and	Evaluation of furniture's recyclability
Ecological	Examination of natural inspiration in design
User Experience	Understanding user contentment and alignment with ecological principles
Case Studies and	In-depth analysis of contemporary ecological elements and industry trends

Case Study: A thorough investigation of Ming dynasty furniture can be conducted via site visits or data collection in museums or exhibitions. This involves examining the furniture's construction, materials, manufacturing techniques, and physical properties, alongside comparative literature analysis.

Comparative Analysis: Gathering data on modern furniture design may include collecting design schematics, descriptions of manufacturing processes, and impacts of environmental policies. Data can be obtained through surveys of modern furniture factories, interviews with designers, or analysis of professional literature.

Curriculum Analysis: Data for courses integrating green design principles can be sourced from course syllabi, textbooks, student assignments, and teaching evaluations. Interviews with teachers or students can provide insights into teaching methods and learning outcomes.

Expert Interviews: Conversations with furniture designers, historians, ecologists, and educational experts can be conducted face-to-face, over the phone, or through online surveys. These interviews offer professional opinions, insights, and perspectives as an important source of research data.

These methods contribute to the analysis of whether modern furniture design genuinely reflects furniture ecological culture, responds actively to the demands of environmental sustainability, and incorporates the values of ecological culture into various aspects of furniture manufacturing and design. By comprehensively considering these factors, we can assess the performance of modern furniture design in terms of ecological culture.

Through a comprehensive consideration of these methods, a more holistic assessment of modern furniture design's performance concerning ecological culture can be achieved, consequently fostering the advancement of sustainable furniture culture.

Ecological Concepts and Modern Transformation in The Traditional Furniture Culture of The Ming Dynasty

Definition of the concept of ecological education

Eco-education refers to the rational and effective integration of the ecological ideology, principles, and methods into modern education. Its goal is to achieve sustainable development and create an ecologically civilised society to realise the strategic concept of sustainable development, thereby promoting the long-term development of society (Fu Yang,

2017)

Influence of traditional furniture ecological culture view on contemporary furniture design
The influence of traditional furniture's ecological cultural perspective on contemporary furniture design is also evident in Ming-style furniture. As one of the representatives of traditional Chinese furniture, Ming-style furniture emphasizes the exquisite processing of wood and unique craftsmanship. The ecological cultural perspective has the following impacts in this tradition:

Sustainable Wood: Ming-style furniture often uses natural wood such as rosewood, walnut, and ash, which are all renewable resources. Designers tend to prefer wood sourced from responsibly managed forests to ensure that excessive damage to forest ecosystems is avoided.

Handcrafted Artistry: Ming-style furniture places a strong emphasis on handcrafting, reducing energy consumption and waste production. Highly skilled craftsmen, trained over generations and steeped in traditional techniques, minimize material wastage and ensure that each piece of furniture is of high quality and uniqueness.

Classic Design: Ming-style furniture design has evolved over generations, emphasizing simplicity, elegance, and humanism. This makes these furnishings highly desirable for their aesthetics and practicality, meeting the contemporary demand for high-quality, durable, and visually appealing furniture.

Traditional Values: Ming-style furniture upholds traditional Chinese values, including modesty, harmony, and balance. This also aligns with the ecological cultural perspective as it encourages people to seek a simple, sustainable, and harmonious way of life.

In summary, traditional Ming-style furniture design, influenced by the ecological cultural perspective, emphasizes the sustainability of wood, the value of craftsmanship, and traditional values. These aspects make Ming-style furniture a choice that aligns with contemporary values of environmental responsibility, high quality, and cultural significance.

The Construction of Ecological Furniture Culture Science

Developing the theory of human-society-nature eco-design systems aims to promote more sustainable furniture manufacturing and usage. The objective in this domain is to reduce the consumption of natural resources while focusing on social and spiritual needs. To achieve this objective, several factors must be considered holistically, including material selection, design processes, manufacturing techniques, and usage habits. This integrated approach promotes the realisation of more environmentally friendly and sustainable patterns in furniture production and usage. Tab.1 (Wu Xinlin, 2020)

The construction of ecological culture aims to create a culture that is concerned with the environment and sustainability to meet the needs of modern society. In furniture design education, it highlights the close connection between humans, society, and nature and guides students to consider the impact of furniture material acquisition, production, use, and recycling on the environment through these threefold connections. At the same time, it emphasizes the concept of the circular economy, focusing on reusing resources after the end of furniture's lifespan to reduce waste and resource waste. Incorporating green design and ecological design into education:

Emphasizing sustainability principles such as the circular economy, energy efficiency, and material selection, as well as their application in furniture design and manufacturing.

By integrating these principles into design and engineering education, incorporating the concepts of green design and ecological design helps students think more comprehensively

about the development of environmentally friendly and sustainable furniture production and usage patterns.

Furthermore, combining traditional elements of Ming Dynasty furniture with modern green and ecological design principles can create furniture designs that have both historical heritage and modern sustainability. This can contribute to the advancement of furniture manufacturing.

In summary, the study of ecological furniture culture aims to make furniture manufacturing and usage more sustainable, reducing the consumption of natural resources while considering societal and spiritual needs. This requires a comprehensive consideration of factors such as material selection, design, manufacturing, and usage habits to achieve more environmentally friendly and sustainable furniture production and usage patterns.

Introducing the theoretical framework of ecological design systems in design and engineering education to cultivate students' understanding of sustainable design principles.

Tab.2

Product design attributes based on the “human-society-nature” system

Design Elements	Product Attributes	Value Attributes
Human	Based on humanised user experience and a longer product lifecycle that aligns with the human lifecycle, the goal is to satisfy both functional and spiritual needs	Satisfying functional and spiritual needs while reflecting humanistic care
Socially	Products address societal pain points and respond to social problems	Balancing social and natural ethics
Nature	Product production, distribution and recycling are environmentally friendly and pose no harm to human health	Environmentally friendly and resourceefficient

The construction of an ecological culture aims to cultivate an environmentally and sustainability-conscious culture that aligns with the needs of modern society. In furniture design education, the close connection between humans, culture and nature is highlighted. Students are guided to explore this intricate relationship, considering the impact on nature across the lifecycle of acquiring, producing, using and recycling materials for furniture. At the same time, placing a strong emphasise on the concept of a circular economy, promoting the reuse of resources at the end of a furniture’s useful life to reduce waste and resource depletion.

By integrating these principles into design and engineering education and aligning them with the concepts of green design and ecological design helps students comprehensively address the environmental and sustainable development challenges in furniture production and usage.

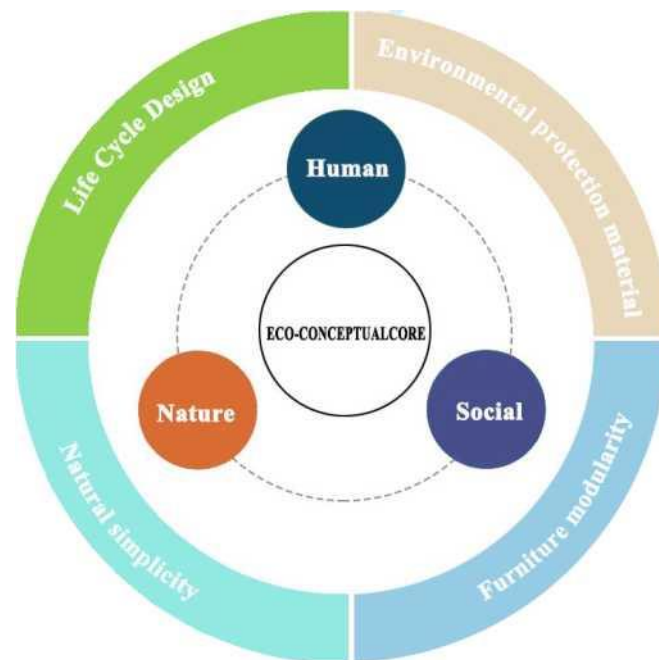


Figure 3. Closing the loop of furniture eco-design "Human - Nature - Society"(Flower Lai Sheng Ming, 2022)

Ways to Cultivate Design Concept

Students often concern with modelling and decorative materials in furniture innovation and lack awareness of the eco-design concepts; by guiding students to incorporate eco-design principles into their furniture design, treating designs as a part of nature, with full respect for the nature mechanism and following the 3R principles of green design: "Reduce, Reuse, and Recycle". Wenqi & Changge (2020), in promoting the sustainable development of our natural society.

Guiding students to assess the resource consumption and environmental impact of modern furniture design, encouraging the responsible use of natural materials such as bamboo, wood, and rattan, which offer significant advantages in terms of sustainability and eco-friendliness. Cultivating students' ecosystem thinking, enabling them to comprehend how design decisions can have cascading effects throughout the entire ecosystem, including considering the impact of furniture on other organisms and natural processes within the ecosystem. Guiding students to consider cultural and regional characteristics, incorporating local ecological and traditional knowledge into their designs, leading to the creation of furniture designs with unique identities and sustainability.

Exploring the concept of ecological art, viewing furniture design as a form of ecological expression, and encouraging students to convey respect for nature and the values of ecological culture through their furniture designs. Cultivating students' consideration of maintainability and repairability in design, emphasizing features that make furniture easy to repair and maintain, thereby extending the furniture's lifespan. Encouraging students to engage in ecological innovation, brainstorming ways to apply new technologies and materials to reduce resource waste and environmental impact.

When delving into the notions of reform in furniture design pedagogy, grounded in the principles of ecological education, one might embark from the vantage point of instructional approaches and curricular substance. By weaving together the strands of ecological ethos and verdant design philosophies, the objective becomes to nurture within learners a profound

appreciation and understanding of environmental design principles and ethics, thereby fostering a commitment to the enduring progression of a harmonious natural society.

Conclusions and Future Work

The ecological wisdom embedded in Ming dynasty furniture illuminates a path towards sustainable development. This research extensively delves into the ecological insights inherent in Ming dynasty furniture, encompassing the ingenious application of materials, structures, and resources. The material selection and craftsmanship employed in Ming dynasty furniture production not only prioritize aesthetics but also underscore ecological sustainability. These ancient insights have profoundly influenced contemporary furniture design, signposting a sustainable developmental trajectory. Incorporating the concept of eco-education into teaching methods and course contents will help students develop a new perspective on eco-design, eco-values, eco-worldview and eco-civilisation.

Redefining furniture culture to prioritize human education in teaching nurtures talented designers who deeply value their roots and national identity. This approach aims to revitalize Chinese furniture design comprehensively. By emphasizing that furniture design serves not only human needs but also contributes to building a harmonious ecological society, it ensures the sustainable development of both nature and culture.

Through an investigation into the traditional ecological culture of Ming dynasty furniture, coupled with reference to green design curriculum education, we explore the educational reform and research within the domain of furniture design. This inquiry bears significance for the practicality of furniture design education and its specific impact on students. By integrating these discoveries into the curriculum of green design education, students acquire a deeper understanding of ecological design and cultivate innovative thinking. Through the reform of educational paradigms, students no longer perceive design solely as the creation of singular products but integrate sustainability into their design philosophies. This educational model lays the groundwork for nurturing a new generation of designers with environmental consciousness and responsibility. This study advocates for educational institutions to adopt similar educational models aimed at fostering more environmentally conscious designers.

Research findings underscore the profound influence of Ming dynasty furniture's ecological culture on contemporary furniture design and education. This insight provides pivotal guidance for the transformation and sustainable development of the furniture industry. It delineates new developmental directions for manufacturing and design sectors, encouraging the adoption of more environmentally friendly and sustainable strategies in product development and production. This endeavor will contribute to constructing a more sustainable future, Perpetuating the ecological wisdom of Ming dynasty furniture, inheriting ancient knowledge and experience to address present and future environmental challenges. In conclusion, the study profoundly elucidates the significance of Ming dynasty furniture's ecological culture in contemporary furniture design and education. Future endeavors will continue to deepen the exploration of ecological wisdom embedded in ancient furniture, endeavoring for its broader integration into educational and industrial practices. Such integrated efforts will propel the furniture industry towards a more environmentally friendly and sustainable direction, making meaningful contributions to global sustainability goals. major in Higher vocational Colleges based on the inheritance and innovation of Guizuo technique. (Art Education Research (12),134-136.)

References

- Baoguang, C. (2018). Analysis of furniture industry and design development in China. *Furniture and upholstery(06)*, 9-10. doi:10.16771/j.cn43-1247/ts.2018.06.001
- Baoguang, C. (2018). *A preliminary definition of Chinese traditional furniture*. <https://www.cnzhengmu.com/shangxueyuan/lingxiu/19217.html>
- B. O. encyclopedia. (2022). Cultural ecology. In. <https://baike.baidu.com/item/%E6%96%87%E5%8C%96%E7%94%9F%E6%80%81%E5%AD%A6/799606>
- Berger, A. A. (2009). *What Objects Mean: An Introduction to Material Culture (Vol. 16)*.
- Cha, L., Wang, X., & Chen, Z. (2010). Research of furniture design based on Chinese traditional sustainable ideology *In E3S Web of Conferences 179*.
- Haiyan, Z. (2020). Application of curriculum Ideological and political elements in Furniture Design teaching practice. *Textile Industry and Technology, 49(07)*.
- Hao, R. (2017). *Research on ecological culture of furniture in Ming Dynasty*. Nanjing Forestry University.
- Jifeng, X. (2009). *Research on Harmonisation Design System of Modern Chinese Furniture*. (PhD dissertation), Jiangnan University.
- Jinping, X. (2021). Xi Jinping's speech at the Leaders' Climate Summit (full text) Jointly building a community of life between mankind and nature--Speech at the Leaders' Climate Summit Xi Jinping.
- Kewang, M. (2017). *Research on the design of circle chair in Ming and Qing dynasties*. (Master's degree), Henan University of Technology.
- Lihua, T., An, L., & Yuan, Y. (2019). Ecological culture view of Ming style furniture. *Journal of central south forestry university of science and technology (socialscience edition)*, 04, 26-30.
- Ming, F. L. S. (2022). Huanghuali Ming furniture mortise and tenon (2): digging tobacco pot tenon. <https://baijiahao.baidu.com/s?id=1750471474046270326&wfr=spider&for=pc>
- Newspaper, C. P. S. P. C. C. (2015). Integration of ecological civilisation into all aspects and processes of economic, political, cultural and social construction. <http://dzb.rmzxb.com:18081/index.aspx?date=2015-05-21&verOrder=05&banzi=4&paperType=rmzxb>
- Taiyuan, W., & Hongyu, R. (2022). Integration of Chinese traditional ecological aesthetics and furniture design and manufacturing. *Literature and Art Controversy, 07*.
- Tao, T. (2003). Chinese culture in traditional Chinese furniture. *Furniture and Interior Decoration*.
- Haibo, W. (2023). National Inheritance and Cultural People: Research and practice on cultural education teaching reform of Furniture Art designmajor in Higher vocational Colleges based on the inheritance and innovation of Guizuo technique. *Art Education Research (12)*,134-136.
- Xinlin, W. (2020). Eco-furniture design based on "human-society-nature" system. *Packaging Engineering, 41(18)*. doi:10.19554/j.cnki.1001-3563.2020.18.022.
- Yang, F. (2017). *Research on Modern Seat System Based on Chinese Chair*. (Ph.D. Dissertation), Guangdong university of technology, <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CDFDLAST2018&filename=1017205265.nh>
- Yunjie, S. (1996). *Cultural sociology*. Jinan: Shandong People's Publishing House.

- Yuewen, G., Zaoqun, Z., & Bing, Z. (2023). Nurturing Chinese Modernisation with Excellent Traditional Chinese Culture. *Guangming Daily*.
- Yuhong, L. (2000). *History of Chinese and Foreign Furniture Development* (1st ed.). Northeast Forestry University Press.
- Zhidong, W. (2019). The fine traditional Chinese culture is the most profound cultural soft power of contemporary China.