

Education Innovation Research

Whioce Publishing Pte. Ltd.

10 Anson Road #10-13a International Plaza

Singapore (079903)

Editor-in-Chief

Sarab Abu-Rabia-Queder

Ben-Gurion University of the Negev, Palestine

Editorial Board Member

Fei Liu

Sichuan University of Science & Engineering, China

Interests: Vocational education; Economics of education

Dr. M. Prasad Naidu

Narayana Medical College Biochemistry, India

Interests: Pharmaceutical intervention; drug discovery; drug development; pharmacokinetic effect; pharmacodynamics effect; microbiological effect; biochemical effect

Prof. Hongde Gao

Hebei University of Architecture, China

Interests: Education

Maryam Poorbakhtiar

Shahid Beheshti University of Medical Sciences, Faculty of Midwifery and Nursing, Iran, Islamic Republic of

Interests: Midwifery; Reproductive Health; Primary Care

Prof. Yunchang Xia

Political Teaching and Research Office, Urumqi Campus, Armed Police Engineering University, China

Interests: Education

Chircu Sorina

Polytechnic University Of Bucharest, Romania

Interests: Psychology; Education; Coach; training

Feng Yin

Chang'an University, China

Interests: Education

C

ONTENTS

- 1 A Discourse Study of New Energy Academic Paper Abstracts Based on LancsBox**
Hanting Jia, Yingchun Ren
- 12 Comprehensive Financial Planning for Tim and Jane Janis: A Case Study**
Zhuoyuan Chen
- 16 A Study on Design Innovation Methods for Song Dynasty Patterns in Contemporary Contexts**
Ran Wang, Jieying Chen, Xiaopeng Li
- 22 New Challenges and Opportunities in Quantitative Economics under the Background of the Digital Economy**
Lifei Chen
- 29 Research on the Construction of Digital Advanced Intelligent Music Courses under the Background of Artificial Intelligence**
Qian Liu
- 35 Integrating Human-AI Collaboration in Education: A New Approach to Curriculum Design**
Yuhao Ge
- 40 The Application and Value of Props in Dance Creation: A Case Study of the Hakka Scarf Language Dance**
Shiqin Xiao
- 44 The Interaction of Narrative and Visual Style with Time, History, Memory, and Ethnic Identity in *A City of Sadness* (1989)**
Jiayu Chen
- 50 Technological Innovation and Classical Dance Education: Application and Impact of Digital Tools in Teaching**
Aonan Zhu, Leng Poh Gee

C

ONTENTS

56 University Administrative Major Practice Applied Talent Training Mode

Ming Sima

62 Discussion on the Application of Experiential Piano Teaching Method in Colleges and Universities Under the Background of “Internet +”

Xiongyuan Bai

A Discourse Study of New Energy Academic Paper Abstracts Based on LanksBox

Hanting Jia, Yingchun Ren*

China University of Petroleum, Qingdao 266580, Shandong Province, China

**Corresponding author:* Yingchun Ren, yingchunren@126.com

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract:

The abstract is a critical component of a thesis and a key method for disseminating research findings. This study uses the term “new energy” as a search criterion to construct a corpus of abstracts from academic papers related to the topic of new energy. Abstracts of recent publications in this field were collected from the Science Citation Index (SCI) and the Chinese Science Citation Database (CSCD). Using the corpus tool LanksBox, this research analyzes word frequency and collocation to identify patterns of vocabulary usage in new energy research texts and their role in advancing the field. The study provides insights into how vocabulary usage in academic papers contributes to the promotion of new energy development.

Keywords:

Corpus
LanksBox
New energy
Dissertation abstracts
Discourse research

Online publication: February 22, 2025

1. Introduction

With the progression of globalization and the increasing prevalence of academic exchanges in recent years, interactions within scholarly communities have significantly intensified. Both domestic researchers and international experts actively contribute to their respective disciplines, disseminating their latest findings in many esteemed academic journals recognized both nationally and globally. In this era of knowledge proliferation, the importance of academic papers has grown substantially. The abstract, representing the core of a paper’s content, naturally draws the attention of academic scholars.

As a vital component of academic papers, the abstract enables readers to quickly grasp the fundamental concepts and research significance of the work. A concise and well-crafted abstract serves as a critical tool for information retrieval, providing readers with an efficient pathway to access the full text. Additionally, in terms of citation, the abstract facilitates the widespread dissemination of academic findings, fostering knowledge exchange and collaboration. An exemplary academic abstract typically showcases the author’s novel ideas, rigorous research methodologies, and distinctive insights, thereby attracting greater interest and engagement

from peers. As such, the abstract plays an essential role in academic publishing and communication, serving as the foundation of a paper while also acting as a significant driver of academic progress and disciplinary development.

Energy, often regarded as the lifeblood of human civilization, is not only a fundamental resource for daily life and industrial production but also a complex and strategically important asset. It intersects with numerous disciplines, including economics, political science, natural science, culture, and ethics. Energy reflects humanity's concerns over issues such as national security, economic growth, and environmental preservation. Globally, energy has evolved from a basic necessity to a symbol of national strength and a critical bargaining tool in international politics.

As the global population and economic activity expand, energy demand continues to rise, posing significant challenges due to the depletion of traditional fossil fuel resources. Fossil fuels, including coal, oil, and natural gas, generate energy but cause irreversible damage to the environment. Their combustion releases substantial greenhouse gases, exacerbating the risk of global climate change and inflicting lasting harm on ecosystems. Furthermore, the limited availability of these resources, often influenced by geopolitical factors, increases vulnerabilities in energy security.

Under these circumstances, the pursuit of alternative energy sources to achieve sustainable development and reduce dependence on fossil fuels has become an urgent global priority. The energy transition not only impacts the well-being of future generations but also serves as a key mechanism for driving societal progress and enhancing individual quality of life. Consequently, efforts at all levels—ranging from policy formulation and technological innovation to raising public awareness—are focused on developing cleaner, more efficient, and diversified energy solutions. The advancement of new energy technologies and the optimization of energy structures represent significant strides toward greener, low-carbon, and sustainable development.

This paper centers on new energy as its primary theme. It constructs a corpus of abstracts from new energy research papers, employs the LancsBox corpus tool to extract high-frequency vocabulary, generates visual maps,

and analyzes vocabulary collocations. The study aims to explore the linguistic characteristics of energy research texts and their contributions to advancing new energy development.

2. Research status

Dissertation research in the energy sector primarily focuses on analyzing energy discourse within individual nations. Jones provided data and critiques the academic community's fixation on energy humanities, arguing that an excessive focus on oil impedes the transition toward renewable energy ^[1]. Yu explored the dynamics of energy discourse and the evolution of international institutions, emphasizing that energy security encompasses not only global trends but also the vital interests of major energy-consuming and energy-producing nations. As China and other emerging economies undergo economic transformation and adjustment, they need to prioritize improving the energy security environment while addressing the robustness of institutions within global governance frameworks ^[2]. Cui examined the global transition to clean energy and the development of China's technical standard discourse, asserting that active participation in international standardized governance is critical for enhancing China's influence and authority in clean energy governance ^[3].

Sun and Zhang applied the denotative space theory of cognitive linguistics to analyze the discourse surrounding "zero nuclear power" in the context of Japan's nuclear power restart. Their study focuses on discourse producers related to the "central government" and "nuclear power." They investigate the differences in discourse strategies employed by producers in editorials addressing "restarting nuclear power" versus "zero nuclear power" and the cognitive mechanisms behind these strategies, considering three categories of social practice actors: "the central government," "nuclear power companies," and "the local populace" ^[4].

Corpus technology is predominantly used for qualitative and quantitative analysis in linguistic research. Baker analyzed the term "troops" as a focal word to examine its usage in *The Sun* and the societal sentiments it reflects ^[5]. Lillqvist and Harju studied discourse patterns on the Facebook community platform, using the

collocation network of LanksBox to identify associations among the terms voice, give, you, and our, us, we^[6]. Germond and Ha curated texts on climate change and maritime safety from the International Maritime Organisation (IMO) website and analyzed collocation networks and common collocations using LanksBox. They recommended that IMO practitioners acknowledge the intrinsic connection between climate change and maritime safety and incorporate this into relevant narratives^[7].

Wen *et al.* conducted a comparative analysis of learner corpora and found that advanced written English by Chinese learners, similar to that of other foreign language learners, exhibits a marked colloquial tendency. However, as English proficiency improves, this colloquial inclination gradually diminishes in written expressions^[8]. Pu performed a corpus analysis of Chinese English learners, focusing on class connections and collocations—two critical dimensions of vocabulary depth. The study revealed deficiencies in students' vocabulary and highlighted their limited understanding of class connections and collocations of common words^[9]. Drawing on Bloom's cognitive development theory, He analyzed a corpus of over 170,000 words of English classroom discourse from high school, junior high school, and elementary school classes in China. He outlined the cognitive thinking-oriented characteristics of teachers' discourse and its educational and pedagogical functions^[10].

As demonstrated above, studies on integrating new energy and corpus technologies in China remain limited. Corpus technology, as an innovative research tool, significantly facilitates the analysis of energy sector discourse, particularly in new energy, by uncovering patterns and ideologies through subject word examination and the expansion of collocation networks, among other functionalities. This paper examines the abstracts of domestic and international publications related to new energy, employing a methodology that integrates corpus and discourse analysis. It aims to investigate the characteristics of new energy discourse systems and reveal the underlying social influence factors.

3. Corpus and research tools

3.1. Corpus selection

This study retrieved and downloaded abstracts from the latest publications in the field of new energy from the Science Citation Index (SCI) and the Chinese Science Citation Database (CSCD) available on the Web of Science. A total of 972 abstracts were collected, with 486 from each source, forming a comprehensive corpus of cutting-edge research in the domain of new energy. The combined word count of the corpus reached 179,304 words.

A corpus-assisted critical discourse analysis methodology was employed in this study. Through high-frequency word analysis and collocational word analysis using corpus software, valuable stylized insights hidden beneath the surface of the text were uncovered. This approach facilitated the interpretation of recurring linguistic patterns and enabled the identification of discourse trajectories through qualitative methods^[11]. By bridging the gap between quantitative and qualitative research, this method provided discourse researchers with a robust foundation for conducting quantitative analyses^[12].

3.2. Research tool: LanksBox 6.0

Advancements in science and technology have led to rapid evolution in research methodologies, with various effective tools now available for corpus retrieval and analysis. This study adopted the corpus analysis methodology and selected LanksBox as its primary analytical tool.

LanksBox, developed by Vaclav Brezina's team at Lancaster University, represents a new generation of visual corpus software. It is a free, cutting-edge tool that combines traditional functionalities with innovative capabilities. The software supports multilingual and multi-format corpora, enables the multi-tiered expansion of collocation networks, and offers advanced retrieval and statistical features. It also incorporates significant improvements in retrieval techniques, statistical algorithms, data processing, and visualization^[13]. Key features of LanksBox include: (1) Lexical, syntactic, and semantic retrieval, as well as word class annotation. (2) Advanced, customizable data algorithms. (3) Multi-tiered collocation network expansion. (4) Data visualization capabilities. (5) Comparison across over 20 varieties

of English, Chinese, French, German, and Russian. (6) Compatibility with various file formats, including TXT, XML, DOC, PDF, ODT, XLS, DOCX, XLSX, ZIP, and CSV. (7) Bidirectional import of local and some online corpora. (8) The ability to parse and compare multiple text databases on a single screen. The application of LancsBox in China is still in its early stages, with only a few dozen articles referencing its use in the Knowledge Network.

This paper seeks to further explore the role of LancsBox in analyzing and applying Chinese corpora. The research process involved building a custom corpus, named CSCD & SCI Abstracts, using LancsBox 6.0. High-frequency words and collocation networks were analyzed to generate various visual maps and tables. This analysis aimed to reveal connections between energy policy and ideology within contexts such as politics, economics, culture, and education.

3.2.1. Subject matter index: KWIC

KWIC, an acronym for Key Word in Context, is a program designed to generate search terms through indexing, arrange occurrences in the corpus within a specified span, and display these search terms or node words centrally.

The primary functions of KWIC are: (1) Retrieving the frequency of various word classes in the corpus, including nouns, verbs, and adjectives. (2) Extracting complex linguistic structures through intelligent search capabilities. (3) Organizing and refining index rows for clarity and usability. (4) Examining the usage of retrieved words across two corpora and conducting comparative and statistical analyses.

3.2.2. Matching: GraphColl

Corpus linguistic research highlights that semantics are not derived from isolated words but rather emerge from their co-occurrence. Words typically appear in characteristic collocations that encompass associations, connotations, and implied assumptions^[14]. GraphColl, short for graphical collocations, is a tool within LancsBox that visualizes collocations. This function clarifies the co-occurrence patterns of node words and their associated terms, enabling a deeper understanding of their contextual environments. By analyzing the

frequency and distribution of collocations, GraphColl provides insights into various linguistic relationships^[15]. The GraphColl program identifies collocations, presenting them in both tabular formats and graphical networks. While the KWIC index allows for a fragmented analysis of collocations, GraphColl's statistics feature organizes them into ascending or descending order, offering a more coherent and visual representation through graphs.

GraphColl performs the following tasks: (1) Retrieving collocations of words or phrases. (2) Identifying co-occurrences of grammatical categories. (3) Visualizing collocations and their networks. (4) Highlighting common collocations of words or phrases.

3.2.3. Search term distribution: Whelk

The Whelk tool provides insights into the distribution of search terms within the corpus. It determines both absolute and relative frequencies, filters search results based on various criteria, and organizes documents according to the absolute and relative frequencies of the search terms.

Whelk aids in analyzing the discrete distribution of retrieved items within the corpus by illustrating: (1) The spread of retrieved items across subfiles. (2) Index line information related to the search terms. (3) The absolute and relative frequency of terms within the entire corpus and its subfiles. By integrating frequency data with distribution patterns, researchers can achieve a more intuitive and comprehensive understanding of how retrieved items are utilized across the corpus.

3.2.4. Vocabulary module: Words

The Words vocabulary module consists primarily of word lists and thematic word lists. The word list includes the terms used in the corpus along with their frequencies, enumerating the various inflected forms of each word individually. The thematic word list highlights terms that occur more frequently in the corpus compared to a reference corpus. In addition to enabling corpus comparison through the keyword technique, the module facilitates detailed analysis of the frequency of lexical items, elements, and attributes.

The key features of the vocabulary module are as follows: It can automatically generate word lists without requiring pre-existing lists for reduction. It can produce

word class lists based on assigned word class categories. It supports the generation of thematic word lists categorized by word classes, enhancing classification to identify the subject or content characteristics of the target corpus.

3.2.5. N-element structure: Ngram

Ngrams represent sequences of contiguous lexical items (types), lemmas, or parts of speech (POS). They can be used to identify Ngrams, word strings, and phrase frames by comparing two corpora to derive significant Ngrams. This involves calculating the frequency and distribution of Ngram lexical items, lemmas, and properties, as well as visualizing the frequency and distribution of Ngrams within the corpus, including identifying key Ngrams.

The main characteristics of Ngrams are as follows: They allow for the filtering of specific N-metric structures and the generation of assignment sequences for these structures based on lexical attributes. They facilitate the creation of collections of thematic assignment sequences.

4. Corpus analysis

4.1. Lexical characterization of new energy dissertation abstract texts

This study utilizes the terms function in LancsBox 6.0 to identify high-frequency terms within the corpus. To ensure the validity of the analysis, tense verbs, auxiliary verbs, prepositions, conjunctions, and articles in English

are excluded. High-frequency words are defined as those occurring 100 times or more across the text. The top 20 high-frequency words identified are presented in **Table 1**.

Table 1 demonstrates that the concept of “energy” has produced a diverse range of high-frequency terms across various levels, predominantly consisting of nouns. Essays on new energy primarily focus on four central themes: (1) Energy types: gas, fuels, nuclear; (2) Energy infrastructure: infrastructure, pipelines; (3) Energy development trajectories: innovation, technologies; and (4) Energy strategic objectives: system, security. These findings accurately reflect the framework and principles of the contemporary global energy system, encompassing a broad spectrum of energy sectors that exhibit multi-tiered development.

The category of energy types reflects the current global energy configuration, particularly the development of oil and gas resources. Oil and natural gas, as conventional fossil energy sources, are widely regarded as major contributors to climate change and recurrent environmental disasters due to their high carbon emissions and pollution levels. Consequently, there is a global consensus on reducing reliance on fossil fuels, advancing renewable energy alternatives, and pursuing low-carbon development pathways to address climate change and environmental challenges.

Energy infrastructure and energy development trajectories emphasize technological advancements and future-oriented developments within the energy

Table 1. List of high-frequency words (real words) in abstracts of new energy papers

Serial number	High-frequency words	Frequency	Serial number	High-frequency words	Frequency
1	energy	3771	11	proposed	583
2	new	2516	12	nuclear	565
3	gas	1102	13	policy	551
4	innovation	930	14	security	520
5	fuels	820	15	industry	464
6	development	679	16	infrastructure	446
7	technologies	650	17	based	426
8	vehicles	618	18	network	404
9	method	617	19	control	393
10	system	603	20	pipelines	393

sector, as highlighted in contemporary academic discourse. The term “innovation,” ranked fourth in frequency, underscores the global focus on scientific and technological progress. The technological transformation of conventional fossil energy sources is perceived as a viable development pathway, offering a balance between maintaining traditional fossil industries and jobs while addressing public demands for environmental protection. This dual approach aims to rejuvenate fossil energy sectors, safeguard employment, and align with environmental conservation priorities. Thus, there is a global focus on strengthening energy infrastructure, revitalizing the manufacturing industry, encouraging the reshoring of manufacturing processes, and achieving the objectives outlined in strategic energy plans.

The energy strategic objectives highlight the global effort to promote the development of new energy sources and foster innovation within the energy sector, particularly to ensure energy security and establish a new strategic energy framework.

The adjective “new” ranks as the second most frequently used term, reflecting the current prioritization of “new energy” in the global energy discourse. As the world population and economy grow, the earth’s finite energy reserves face increasing pressure, even as renewable energy technologies advance. Environmental pollution caused by conventional energy sources continues to worsen, with issues such as smog, photochemical smog, and acid rain being compounded

by the long-validated prediction by Arrhenius in 1896 that rising atmospheric carbon dioxide levels would lead to global warming. In recent years, terms such as “carbon footprint,” “low-carbon economy,” “low-carbon technology,” “low-carbon development,” “low-carbon lifestyle,” “low-carbon society,” “low-carbon city,” and “low-carbon world” have gained prominence. These expressions reflect the emergence of numerous new concepts related to “new energy.” The development and utilization of new energy sources have once again captured global attention. Currently, nations worldwide are vigorously promoting energy transitions, prioritizing sustainable development, focusing on renewable energy advancements, and accelerating the adoption and application of new energy technologies.

The Ngrams function was utilized with a parameter of 2 to identify word clusters containing “energy” that frequently appeared in the corpus. High-frequency word clusters were compiled, invalid clusters were discarded, and the top 20 high-frequency word clusters are presented in **Table 2**.

The table highlights high-frequency word clusters, reflecting various critical domains within the energy sector. This sector encompasses a wide range of technologies and goods, making it a highly relevant subject of study. For instance, terms such as energy vehicles, energy industry, vehicle industry, new industry, and electric cars illustrate efforts in energy conservation, pollution reduction, and sustainable

Table 2. High-frequency word clusters in abstracts of new energy papers

Serial number	High-frequency word clusters	Frequency	Serial number	High-frequency word clusters	Frequency
1	new energy	2040	11	energy industry	87
2	energy vehicles	457	12	vehicle industry	77
3	energy vehicle	355	13	energy power	75
4	energy consumption	213	14	control strategy	73
5	energy storage	162	15	new industry	70
6	power grid	145	16	government subsidies	69
7	power system	121	17	electric vehicles	67
8	renewable energy	118	18	energy automobile	66
9	the government	108	19	energy sources	65
10	power generation	92	20	supply chain	64

mobility. Furthermore, energy infrastructure, as the backbone of energy conversion and transportation, has received significant attention. Terms like energy system, power grid, control plan, and supply chain emphasize the importance of security, economic stability, and environmental conservation in energy provision.

In addition, the classification and allocation of energy resources represent key areas of scholarly interest, as seen in terms such as power generation, energy sources, and energy power. These areas are integral to the sustainable provision of energy and the improvement of the global energy framework. Lastly, concepts such as energy consumption and energy storage shed light on strategies for optimizing energy management and utilization, minimizing waste, and enhancing energy efficiency.

Energy has become a critical global concern, underpinning human survival and progress while significantly influencing environmental sustainability and climate change. The depletion and overuse of conventional energy resources have led to ecological crises, while carbon emissions have exacerbated global warming. These issues demand collective action from society. Recent research in the energy sector addresses these challenges, focusing on the role of technological innovation in energy transformation and distribution. Advancements in renewable energy technologies, including wind, solar, and geothermal energy, have opened new pathways for energy transformation. Simultaneously, the integration of information technology, such as smart grids and big data analytics, has modernized energy management and supply chain operations.

Research and development in emerging sectors are crucial for addressing energy challenges. Innovations such as electric bicycles, motorbikes, buses, and drones have revolutionized energy consumption, while advancements in clean energy sources and energy storage technologies are helping to bridge the gap between energy supply and demand. These efforts are vital for reducing dependence on fossil fuels and achieving a green, low-carbon energy system.

The analysis of high-frequency word clusters underscores the need for proactive measures to address the challenges facing the energy sector. It is essential to accelerate research and development in traditional energy

alternatives while fostering the growth of new industries and clean energy technologies. This dual approach aims to transform and upgrade the energy structure, protect the ecological environment, and promote sustainable economic and social development. Achieving these goals requires the collaborative efforts of governments, corporations, and the public, alongside international cooperation and knowledge exchange, to explore energy solutions aligned with future development trends.

4.2. Characterization of discourse collocation in abstracts of new energy papers

Collocation provides a clear representation of the associative characteristics and discourse meaning of words in speech analysis. Using the high-frequency word analysis discussed earlier, we utilize the GraphColl function in LancesBox 6.0 to generate a graphical collocation map automatically (**Figure 1**). The MI algorithm is employed as the benchmark, with a span distance of 5 and a collocation frequency threshold exceeding 50 occurrences, to identify the nearest word collocations with the primary high-frequency term “energy.” These collocations are then visually presented in the graphical collocation map (**Figure 1**).



Figure 1. Collocation network mapping for “energy”

Figure 1 reveals that the terms strongly collocated with “energy” in the abstracts of new energy research publications can be categorized as follows: Primary category: Key terms include “China’s,” “renewable,”

“resources,” “wind,” “solar,” “enterprises,” and “development.” Based on their semantic fields, these terms can be divided into two subgroups. first subgroup, represented by “China’s,” reflects China’s international perspective on energy. As a national energy entity, China positions itself within the global energy landscape, engaging in self-assessment, strategic positioning, and decision-making. This reflects the Chinese government’s approach to managing energy issues within an interconnected international and domestic context. The second subgroup comprises terms such as “resources,” “renewable,” “wind,” “solar,” “enterprises,” and “development.” These terms highlight the current state of global energy practices. Energy is regarded as a critical natural resource, with the global energy composition still heavily reliant on fossil fuels. While the immediate decarbonization of fossil fuels remains a significant challenge, the drawbacks of fossil energy are undeniable. Therefore, nations must prioritize mitigating the adverse effects of fossil fuels and advancing renewable energy development, particularly wind and solar power. The shift toward a low-carbon or decarbonized energy transition necessitates leveraging market-driven regulatory mechanisms.

Secondary category: High-strength collocations include core conceptual vocabulary such as “innovation,” “technology,” “efficiency,” “structure,” and “policies.” Scholars emphasize that the primary tools for advancing energy development and ensuring energy security are technological innovation, improved energy efficiency, policy collaboration, and restructuring energy systems. Nations worldwide advocate for mutually beneficial collaboration across various domains, including the energy sector. Such collaboration fosters equality and constructive discourse among energy stakeholders, contributing positively to the global energy ecological framework. The overall analysis suggests that the global new energy sector should align with the unique energy contexts of individual nations, draw insights from emerging trends in international energy development, and actively pursue energy transformation. This transformation should adopt an ecological perspective characterized by openness, inclusivity, harmony, and mutually beneficial cooperation.

The secondary collocation expansion graph (Figure

2) was derived by analyzing the collocation of “new,” which exhibits the highest degree of correlation with the term “energy,” serving as a novel node word.

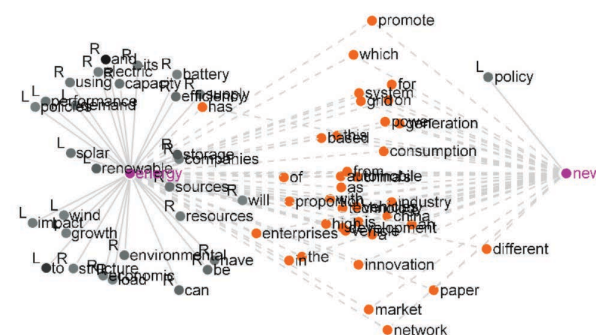


Figure 2. Secondary collocation network with “energy” and “new” as nodes

Figure 2 illustrates the secondary collocations associated with “energy” and “new” as nodes, including terms such as promote, system, grid, generation, consumption, automobile, industry, proportion, technology, development, enterprises, vehicle, innovation, market, and network. An analysis of **Figures 1** and **2** reveals that the terms “energy” and “new energy” within the corpus exhibit multi-level collocations.

The primary development objectives of the modern energy system focus on enhancement and innovation across several critical domains. These objectives encompass the utilization of renewable energy sources (e.g., solar, wind, etc.), which are considered fundamental components of future energy systems. Advances in science, technology, and policy initiatives have positioned renewable energy as a vital solution for mitigating the depletion of conventional fossil fuels and addressing environmental pollution. Enhancing energy efficiency remains a key priority; through technological innovation, businesses can reduce energy consumption, lower operational costs, and contribute to sustainable development.

Moreover, the advancement of energy storage technologies plays a pivotal role in modern energy systems. Improved energy storage solutions enable more efficient management and storage of power, addressing unforeseen demand fluctuations or supply disruptions. This capability is essential for maintaining grid stability during unexpected events and ensuring functionality

during periods without solar or wind energy generation. Consequently, research and development in efficient energy storage technologies are critical to establishing a reliable and cost-effective energy system.

Current research in the energy sector adopts a multifaceted approach, focusing on both the transformation and enhancement of conventional energy sources and the progression of the clean energy revolution. This comprehensive strategy aims to create a sustainable, resilient, and environmentally friendly energy future. By integrating diverse energy types and technologies, the sector is paving the way for a clean, low-carbon energy landscape that will ultimately benefit humanity as a whole.

The second tier of development objectives emphasizes methods of energy production. In contemporary society, energy generation extends beyond traditional production and consumption practices. With technological advancements and growing market demand, energy production methods have expanded to encompass markets, innovation, technology, enterprises, and resources. This multifaceted approach underscores the critical role of infrastructure in driving economic development.

Currently, nations worldwide are focusing on advancing energy development. Infrastructure development is particularly vital for countries with strong economic foundations and significant market potential. Enhancing energy infrastructure not only ensures the efficient operation of the energy sector but also attracts investment, creates jobs, and enhances the overall competitiveness of the economy. A notable example is the advancement of the electric vehicle industry. As a clean energy transportation solution, electric vehicles not only reduce greenhouse gas emissions but also generate millions of jobs in related sectors such as manufacturing, sales, maintenance, and the development of charging infrastructure, battery recycling, and other areas.

Furthermore, research, technology, and innovation play a pivotal role in the energy transition process. Achieving sustainable energy development requires continuous improvements in energy technology standards. China, for instance, is committed to enhancing its autonomous innovation capabilities in energy science and technology. The country is accelerating the establishment

of a technological innovation system that integrates enterprises, markets, and academia. This effort not only narrows the gap with globally advanced standards but also provides robust technological support for China's energy strategy.

In summary, all aspects of energy development—including markets, innovation, technology, enterprises, and resources—must be evaluated holistically. A comprehensive and multifaceted approach is essential to address future energy challenges, maintain a leading position in the global energy sector, and ensure a cleaner, more sustainable planet for future generations.

5. Conclusion

This study explores the discursive construction of global clean energy development in contemporary academia, employing a self-constructed corpus of abstracts from academic articles on new energy. By focusing on high-frequency phrases and collocations, the analysis highlights the critical role of technological innovation in addressing traditional energy challenges and driving energy transitions. Technological solutions are promoted as essential for mitigating the climate and environmental issues caused by conventional energy sources and for harnessing natural resources to support sustainable human development.

Throughout history, energy acquisition and utilization have been pivotal drivers of societal progress. The exploitation and consumption of natural resources have undergone continuous evolution, with each shift profoundly influencing human productivity and lifestyles. In the early stages, humans primarily relied on firewood for sustenance and heating. This rudimentary method was not only inefficient and costly but also contributed significantly to environmental pollution. With advancements in science and technology, the discovery and utilization of coal became a crucial enabler of economic growth, providing abundant energy resources and facilitating industrialization. However, coal is finite, and its extraction has increasingly harmed the environment. This reliance was later challenged by the emergence of oil and natural gas, which became foundational to modern industry due to their cleaner and more efficient characteristics. The extensive extraction of

oil and gas brought about a major transformation in the global energy landscape, but it also exacerbated issues related to ecological security and climate change.

In the 21st century, the concept of new energy has gained prominence, leading to significant advancements in renewable energy sources such as solar and wind power. The growing development and consumption of non-traditional energy resources signal a shift in the energy sector toward a new paradigm, one characterized by the coexistence of oil, natural gas, coal, and renewable energy.

Despite the abundance of global mineral resources, they cannot be exploited indefinitely. Technological progress and environmental conservation have necessitated a transition from prioritizing economic gains to achieving sustainable development. An inevitable shift is underway, moving from reliance on conventional fossil fuels to cleaner and more sustainable energy sources. The rapid development of new energy technologies offers the potential to alleviate the challenges associated with fossil fuels while ushering in a new energy era. However, while technological innovation can address some of the issues related to fossil fuels, it cannot entirely resolve broader challenges, such as resource depletion, environmental

degradation, and climate change.

To achieve genuine sustainable development, humanity must adopt a more accurate perspective on ecological energy. This requires abandoning an anthropocentric view of natural energy resources and recognizing that the natural world is inherently interconnected with living systems. Embracing the ecological principle of harmonious coexistence between humans and nature is essential. It also necessitates rejecting consumerist behaviors and reshaping lifestyles and societal structures that have led to the excessive exploitation of energy resources.

To build a better future, it is imperative to transform human behaviors, organizational frameworks, and societal values. By establishing appropriate principles, advocating for a societal green revolution, and transitioning comprehensively from fossil fuels to renewable energy sources, humanity can pave the way for a harmonious world. Only by fundamentally altering behaviors that hinder environmental protection and resource conservation can we achieve a sustainable future characterized by blue skies, white clouds, and clear waters.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Jones CF, 2016, Petromyopia: Oil and the Energy Humanities. *Humanities*, 5(2): 36.
- [2] Yu H, 2017, The Discourse Right, Energy Competition and the Changing International System. *Frontiers*, (04): 32–37.
- [3] Cui S, 2022, Global Clean Energy Transition and the Construction of China's Discourse Power in Technical Standards. *People's Tribune*, (09): 50–54.
- [4] Sun C, Zhang J, 2021, An Analysis of the Referential Space of Energy Discourse in Mainstream Japanese Media: Taking Editorials on the Restart of Nuclear Power Plants as an Example. *Foreign Languages Research*, (02): 50–57 + 83.
- [5] Baker P, 2016, The Shapes of Collocation. *International Journal of Corpus Linguistics*, (2): 139–164.
- [6] Lillqvist E, Harju AA, 2018, Discourse of Enticement: How Facebook Solicits Users. *Critical Approaches to Discourse Analysis across Disciplines*, 10(1): 63–80.
- [7] Germond B, Ha FW, 2019, Climate Change and Maritime Security Narrative: The Case of the International Maritime Organisation. *Journal of Environmental Studies and Sciences*, 9(1): 1–12.
- [8] Wen Q, Ding Y, Wang W, 2003, Features of Oral Style in English Compositions of Advanced Chinese EFL Learners: An Exploratory Study by Contrastive Learner Corpus Analysis. *Foreign Language Teaching and Research*, (04): 268–274 +

321.

- [9] Pu J, 2003, Colligation, Collocation and Chunk in ESL Vocabulary Teaching and Learning. *Foreign Language Teaching and Research*, 35(06): 438–445 + 481.
- [10] He A, 2003, A Corpus-Based Analysis of Teacher Talk in English Classes. *Modern Foreign Languages*, 26(2): 161–170.
- [11] Qian Y, 2010, Thematic Word Analysis of the British Newspaper The Sun’s Discourse on Terrorism. *Journal of Zhejiang Institute of Media and Communications*, 17(4): 98–103.
- [12] Qian Y, 2016, Discursive Constructions Around Low Carbon Economy in British Mainstream Newspaper. *Foreign Languages and Their Teaching*, (2): 25–35 + 144–145.
- [13] Brezina V, McEnery T, Wattam S, 2015, Collocations in Context: A New Perspective on Collocation Networks. *International Journal of Corpus Linguistics*, 20(2): 139–173.
- [14] Stubbs M, 1996, *Text and Corpus Analysis: Computer-Assisted Studies of Language and Culture*, Blackwell, Oxford.
- [15] Gablasova D, Brezina V, McEnery T, 2017, Collocations in Corpus-Based Language Learning Research: Identifying, Comparing, and Interpreting the Evidence. *Language Learning*, 67(S1): 155–179.

Publisher’s note

Whioce Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Comprehensive Financial Planning for Tim and Jane Janis: A Case Study

Zhuoyuan Chen*

University of New South Wales, Sydney 2052, Australia

**Corresponding author:* Zhuoyuan Chen, 383846346@qq.com

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract:

This paper presents a detailed case study on the comprehensive financial planning conducted for Tim and Jane Janis, a middle-aged couple residing in Australia. The financial plan addresses key aspects such as retirement funding, superannuation consolidation, insurance coverage, debt management, and investment strategy. By employing a holistic approach, the study aims to secure the long-term financial stability and well-being of the Janis family.

Keywords:

Financial planning
Superannuation
Insurance
Debt management
Investment strategy

Online publication: February 21, 2025

1. Introduction

This assignment, an integral component of the FINS 3631 course titled “Risk, Insurance, and Superannuation,” evaluates students’ ability to provide scaled advice on insurance, risk management, and superannuation. Contributing 40% of the total course grade, it requires the preparation of a professional and compliant Statement of Advice (SOA) based on a case study that adheres to the Australian Securities and Investments Commission (ASIC) regulations.

The case study focuses on the Janis family, comprising Tim and Jane, both professionals with young children. The family seeks adequate insurance coverage, superannuation consolidation, and investment strategies aligned with their financial goals. Their objectives include securing sufficient superannuation savings for a

comfortable retirement, funding private school education for their children, and repaying their home loan at the earliest opportunity.

In drafting the SOA, students must comply with ASIC’s RG175 guidelines, emphasizing clarity, conciseness, and effective communication. The advice should meet the Best Interest Duty, adhere to the switching advice rules outlined in ASIC Info Sheet 182, and fulfill all disclosure obligations. These requirements ensure that recommendations are both technically accurate and aligned with the clients’ best interests.

Students are tasked with analyzing the Janis family’s current financial position, including income, assets, liabilities, and expenses. Based on this analysis, they must propose strategies that address the family’s objectives and concerns, offering alternative options where appropriate.

Key areas of focus include risk management plans with detailed insurance needs analyses, superannuation consolidation, investment strategies, and retirement planning.

To ensure compliance and high-quality advice, students must justify their recommendations with appropriate projections, assumptions, and clear explanations. Full disclosure of fees, commissions, and other benefits associated with the advice is mandatory. Additionally, the SOA must be professionally presented, reader-friendly, and compliant with all relevant financial services regulations.

Strict adherence to the submission deadline is required, with late submissions subject to penalties. Students are encouraged to submit their work well in advance to avoid potential system slowdowns. Plagiarism and the use of unauthorized sources, including AI, are strictly prohibited and will result in disciplinary measures.

In summary, this assignment challenges students to apply their theoretical knowledge of risk management, insurance, and superannuation to a real-world scenario. By preparing a compliant, client-focused SOA, students demonstrate their capability to deliver professional financial advice.

2. Study background

Financial planning overview: Financial planning involves a systematic and strategic approach to managing personal finances to achieve long-term life goals and maintain financial stability. This process includes setting clear objectives, such as saving for retirement, funding education, and executing estate planning strategies ^[1]. It requires a thorough assessment of current financial standing, a clear understanding of future needs, and the development of a roadmap to navigate various life stages. Financial planners utilize tools such as budgets, savings plans, investment portfolios, insurance policies, and tax strategies to help individuals and families build wealth, mitigate risks, and preserve assets for future generations. By adopting a proactive and disciplined approach, individuals can achieve peace of mind and confidence in their ability to reach their aspirations.

Case study background: This paper examines the financial planning journey of Tim and Jane Janis, a couple

in their early 30s with two young children.

3. Personal and financial background

Personal details: Tim and Jane are professionals employed in the financial services and marketing industries, respectively. They are parents to two children, aged 4 and 2.

Financial situation: The couple earns a substantial combined annual income of AUD 340,000, reflecting their strong financial position. Alongside their impressive earnings, they have significant balances in their superannuation funds, which are critical to securing their financial future. Currently, they hold a mortgage of AUD 750,000 on their primary residence ^[2]. Additionally, they own a car for transportation and various household contents that contribute to their overall asset base. With a combination of liquid assets, investments, and tangible property, the couple is well-positioned to effectively manage their finances and plan for long-term security and goals.

4. Retirement planning

Goals and objectives: Tim and Jane aim to retire in 35 years with an annual expense of AUD 70,000 in today's dollars.

Funding needs: Based on inflation and investment return assumptions, their estimated retirement funding need is calculated to be AUD 2,352,107.9.

Superannuation analysis: Their current superannuation balances, combined with expected contributions and returns, are projected to exceed their retirement funding requirements.

5. Superannuation consolidation

Current accounts: Tim and Jane each hold two superannuation accounts.

Consolidation strategy: Consolidating multiple superannuation accounts into a single account for each individual is a widely recommended approach to streamline financial management and enhance overall financial health ^[3]. This strategy can significantly reduce fees associated with maintaining multiple accounts, as many financial institutions offer discounts or waivers

for consolidated services. In addition to cost savings, consolidation simplifies tracking expenses, monitoring balances, and managing investments. It also facilitates regular reviews and updates to insurance policies, ensuring that assets and liabilities are adequately protected. By implementing this strategy, individuals can gain a clearer understanding of their financial status, make more informed decisions, and achieve their financial goals more effectively and efficiently.

6. Insurance coverage

Current insurance: The Janises currently have life and Total and Permanent Disability (TPD) insurance within their superannuation accounts.

Recommended coverage: Expanding one's insurance portfolio to include additional life insurance, TPD insurance, and income protection insurance outside of superannuation funds is strongly recommended to secure financial stability in the face of unforeseen events ^[4]. Life insurance provides crucial financial support to dependents following the insured's death, helping cover expenses such as mortgage payments, education costs, and daily living needs. TPD insurance offers a lump-sum payment if the insured becomes permanently disabled and unable to work, covering medical treatments, lifestyle adjustments, and ongoing financial obligations. Income protection insurance ensures that a portion of the insured's income is replaced if they are unable to work due to illness or injury, enabling the payment of essential bills and living expenses. Incorporating these insurance measures mitigates financial risks associated with death, disability, or income loss, offering peace of mind and long-term security for individuals and their families ^[5].

7. Debt management

Mortgage situation: The Janises currently hold a mortgage of AUD 750,000 with a variable interest rate.

Debt reduction strategy: Allocating a portion of the annual surplus towards accelerating mortgage repayments and building an emergency fund is a prudent financial strategy. Accelerated mortgage payments reduce the principal balance more quickly, shortening the loan term

and potentially saving thousands of dollars in interest. Concurrently, establishing or enhancing an emergency fund strengthens financial resilience by providing a safety net for unexpected expenses, such as medical emergencies, car repairs, or temporary income loss. By balancing these priorities, individuals can improve financial stability and preparedness for life's uncertainties ^[6].

8. Investment strategy

Risk profile: Tim and Jane Janis exhibit a growth-oriented risk profile but prefer a conservative investment approach to minimize unnecessary risks.

Portfolio allocation: A balanced investment portfolio is recommended, comprising 20–40% growth assets and 60–80% defensive assets. This allocation aims to achieve long-term financial goals while effectively managing risk. Growth assets, such as stocks and property, offer potential capital appreciation and higher returns over time but are typically more volatile. In contrast, defensive assets, including bonds, cash, and cash equivalents, provide stability and income with lower risk but generally deliver more modest returns ^[7,8]. By allocating a larger proportion to defensive assets, the Janises can mitigate the potential for significant losses during market downturns. However, incorporating growth assets allows them to benefit from market upswings, thereby fostering long-term wealth creation. This strategic allocation balances risk and return, aligning their investment portfolio with their financial objectives, risk tolerance, and investment horizon.

9. Risks and mitigation strategies

Potential risks: Lower investment returns, loss of insurance coverage, and missed opportunities to capitalize on better investment prospects

Mitigation measures: To address these risks, the Janises should conduct regular reviews of their financial plans, insurance coverage, and investment strategies, ensuring they adapt to evolving circumstances ^[9].

10. Conclusion

The financial plan designed for Tim and Jane Janis

incorporates a comprehensive approach to secure their financial stability and ensure long-term prosperity. Key recommendations include: (1) Consolidating superannuation accounts: Streamlining their retirement savings to potentially reduce fees and enhance efficiency. (2) Increasing insurance coverage: Expanding life, disability, and income protection insurance to establish a robust safety net for unforeseen events. (3) Accelerating mortgage repayments: Building equity in their home while reducing long-term financial obligations. (4) Adopting a conservative investment strategy: Prioritizing stable and predictable returns over high-risk, high-reward opportunities. By implementing these strategies, the Janises are well-positioned to achieve a secure and

prosperous financial future.

Through the diligent application of these tailored recommendations, Tim and Jane Janis have embarked on a path that aligns with their financial aspirations. Their plan incorporates prudent savings strategies, thoughtful investment decisions, and disciplined expense management, ensuring both current financial stability and future security. This approach not only supports the Janises in achieving their financial goals but also reinforces their commitment to creating a legacy of financial well-being for their children. With determination and perseverance, they are set to turn their financial dreams into reality, fostering a foundation of prosperity and security that will endure for generations.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Tahani N, Robinson C, 2024, Comprehensive Financial Planning for a Sustainable Retirement. *Financial Planning Research Journal*, 10(1): 0002.
- [2] Thanapal S, 2023, Book Review: Financial Planning for Families Having Children with Special Needs: A Comprehensive Guide to Plan for Two Generations. *Indian Journal of Psychological Medicine*, 45(3): 314–315.
- [3] Computer Weekly News, 2016, Advicent Solutions; Mutual Financial Group and Advicent Partner to Offer Comprehensive Financial Planning Strategy to Customers across Wisconsin.
- [4] Li Y, 2024, Analysis of Mixed Teaching Mode of Financial Accounting Comprehensive Simulation and Practical Training Courses in Colleges and Universities. *Evaluation of Educational Research*, 2(4): 4481.
- [5] Wang LL, Xu HR, 2024, Development of a Rapid Tool for Screening Financial Toxicity based on the Comprehensive Score for Financial Toxicity. *Journal of Cancer Policy*, 40: 100475.
- [6] Luo Y, 2024, Research on Comprehensive Management Optimization of OTC Derivatives Business in Financial Institutions. *Modern Economic Management Forum*, 2(3): 4541.
- [7] M2 Presswire, 2024, LUMOSY's Progressive Approach to Comprehensive Financial Management.
- [8] Zhao L, 2024, Construction of Comprehensive Evaluation Model for Financial Risk Management in Colleges and Universities Based on Fuzzy Logic. *Applied Mathematics and Nonlinear Sciences*, 9(1): 1310.
- [9] Abrori RS, Hendrawaty E, Hasnawati S, 2023, Corporate Governance and Financial Distress: A Comprehensive Analysis of Indonesian Manufacturing Companies. *Asian Journal of Economics, Business and Accounting*, 23(24): 268–278.

Publisher's note

Whioce Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

A Study on Design Innovation Methods for Song Dynasty Patterns in Contemporary Contexts

Ran Wang^{1*}, Jieying Chen², Xiaopeng Li²

¹Academy of Fine Arts, Minzu University of China, Beijing 100081, China

²Academy of Arts & Design, Tsinghua University, Beijing 100084, China

*Corresponding author: Ran Wang, mucwangran@163.com

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract:

The Song Dynasty marks a pinnacle in traditional Chinese aesthetics, with its patterns embodying profound historical and cultural significance. In contemporary design, the innovative application of Song Dynasty patterns has emerged as a key research focus for expressing Chinese style. This paper examines the theoretical and practical challenges of design innovation involving Song Dynasty patterns in the context of the information age. By exploring their historical origins, cultural connotations, and aesthetic characteristics, the study highlights their defining feature: harmony and *youya* (优雅, elegance). Through the integration of digital technologies, this research conducts various design innovation experiments to explore effective methods for adapting Song Dynasty patterns to modern contexts. The findings provide valuable theoretical references for incorporating traditional Chinese patterns into art education and contemporary design practices.

Keywords:

Song Dynasty patterns
Chinese traditional culture
Contemporary context
Digitalization
Design innovation methods

Online publication: February 21, 2025

1. Introduction

Chinese traditional patterns boast a long history, reflecting a rich cultural heritage and a distinctive artistic style. Aesthetically, they are renowned for their *youya* (优雅, elegance), characterized by a harmonious balance among color, pattern, material, and structure. This refined sense of harmony and beauty reached its zenith during the Song Dynasty. Rather than pursuing overly vibrant or intricate designs, Song Dynasty patterns emphasize a finely tuned elegance (*youya*). As a cultural treasure of China, these

patterns encapsulate significant historical narratives, cultural symbolism, and aesthetic philosophies.

2. Current research on Song Dynasty patterns

The Song Dynasty represents a pinnacle in Chinese aesthetics, inheriting the roots of Chinese civilization that had evolved over thousands of years and showcasing remarkable creativity. During this period, the textile industry flourished,

characterized by exquisite craftsmanship and a pursuit of *youya* (优雅). Fields such as weaving, dyeing, ceramics, and painting were regarded as aesthetic paradigms, leaving a profound impact on subsequent generations. The concept of *youya* (优雅) can be traced back to the Zhou Dynasty. In the early Chinese anthology of poetry, *Shijing*, it is stated: “To speak of the affairs of the world is called ‘*ya*’ (雅).” Here, the term “*ya*” denotes the propriety and normativity of things^[1]. Additionally, the term *youya* (优雅) encompasses meanings of richness and fullness, as “*you*” (优) refers to abundance and fertility. In the *Zhouli* commentary, it is stated: “*Ya* is correctness; what is considered correct today serves as a model for future generations,” thus positioning “*ya*” (雅) as a paradigm for emulation^[2]. The introduction of the concept of *ya zheng* (雅正) elevated “*ya*” to a guiding principle in the philosophy of creation. According to the *Modern Chinese Dictionary (7th Edition)*, *youya* (优雅) is defined as “graceful elegance” or “beautiful and refined”^[3]. This definition reflects the aesthetic qualities associated with the term, highlighting its emphasis on beauty and sophistication. In the *Aesthetic Dictionary*, *youya* (优雅) is described as a synthesis of “beauty” and “elegance,” reflecting an aesthetic state characterized by gracefulness, femininity, refinement, gentleness, and cultured demeanor^[4].

The Song Dynasty was indeed an era of *youya*, setting aesthetic benchmarks for literature, art, and social life. Its cultural achievements are widely recognized in academic circles. The renowned Chinese scholar Mr. Shang Gang once remarked in *A New Compilation of the History of Chinese Arts and Crafts* that “the epitome of elegance and beauty is precisely the Song Dynasty”^[5]. As an important expression of traditional Chinese culture, Song Dynasty patterns have garnered increasing attention in contemporary design due to their high aesthetic achievements and rich cultural connotations. The protection, inheritance, and innovation of these patterns constitute significant topics in cultural research, injecting new inspiration and vitality into the design industry.

In summary, the legacy of the Song Dynasty continues to influence modern aesthetics and design practices, underscoring the importance of preserving and promoting this rich cultural heritage.

In recent years, research on design innovation methods for Song Dynasty patterns has made significant progress, although there is still room for further

development. Current academic studies on these patterns primarily focus on their historical background, cultural symbols, and aesthetic characteristics (**Figure 1**). Scholars have analyzed the design language of Song Dynasty patterns from the perspectives of art history and cultural history, exploring their refined *youya* (优雅) style, the use of natural elements, and the influence of Confucianism, Buddhism, and Daoism. This body of research has provided important theoretical guidance for contemporary design and has been applied in fields such as fashion design, packaging design, interior decoration, and bookbinding.

In practice, the translation and contemporary application of Song Dynasty patterns have developed into established models. Designers typically employ methods such as direct replication, deconstruction and recombination, and fusion innovation to incorporate Song Dynasty patterns into modern creations. These approaches aim to transform traditional aesthetics into innovative products that meet modern consumer demands while also yielding notable economic benefits.

Thus, while significant strides have been made in applying Song Dynasty patterns to modern design, further exploration and innovation in this field remain essential.

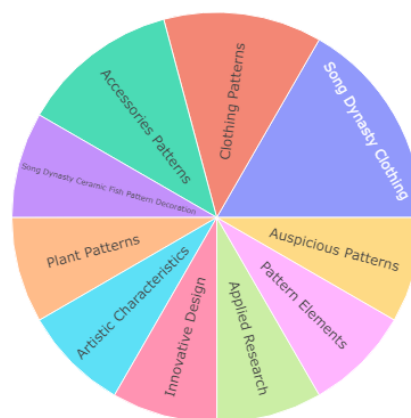


Figure 1. Research themes and keywords of “Song Dynasty Patterns” in CNKI over the past decade

Research on design innovation methods for Song Dynasty patterns in contemporary contexts continues to face significant shortcomings and challenges. On one hand, the lack of systematic studies on Song Dynasty patterns restricts designers’ ability to fully comprehend their overall style and deeper meanings during the

innovation process. Consequently, design innovations often lack coherence and depth. On the other hand, in practical applications, some designers place excessive emphasis on formal novelty and reconstruction. They frequently deconstruct and recombine elements of Song Dynasty patterns or mimic their superficial characteristics without truly appreciating the cultural essence and aesthetic subtleties embedded within these patterns. This superficial approach, which neglects an in-depth interpretation of the core cultural values of Song Dynasty patterns, results in designs that prioritize form over substance. While such designs may appear novel in the short term, they fail to establish lasting emotional resonance.

Moreover, contemporary designers face the critical challenge of balancing innovation, commercialization, and the preservation of cultural essence. Striking this balance is essential to ensure that the rich cultural and aesthetic heritage of the Song Dynasty is not only safeguarded but also seamlessly integrated into modern design practices.

3. Cultural connotations and the *youya* style of Song Dynasty patterns

Song Dynasty patterns represent a vital component of traditional Chinese culture, distinguished by their unique artistic style and profound cultural connotations. These patterns hold significant reference value for the reproduction and development of contemporary culture. The Song Dynasty, often regarded as a pinnacle of Chinese cultural refinement, is synonymous with the *youya* (优雅) style, which embodies elegance and sophistication. To analyze the narrative techniques employed in Song Dynasty patterns, the authors conducted extensive research, including a review of relevant literature, images, and physical artifacts. Field investigations and comparative studies further enabled the identification and synthesis of the overall characteristics of these patterns, which were found to exemplify a finely balanced aesthetic that encapsulates the essence of *youya*.

Song Dynasty patterns are rich in cultural symbolism and artistic significance. They are generally categorized into two main types: floral patterns and geometric patterns (**Figure 2**). Floral patterns commonly feature

elegant representations of flowers such as plums, orchids, bamboo, and chrysanthemum, which symbolize the noble and *youya* (优雅) character of a gentleman. Bird motifs, including magpies, peacocks, and mandarin ducks, convey auspicious meanings associated with good fortune and loyalty. These patterns are often centered on natural elements, emphasizing a vivid and lifelike realistic style.

In contrast, geometric patterns are characterized by their simplicity and symmetry, reflecting an appreciation for the beauty of lines and their emotional resonance within Chinese culture. Common geometric motifs include linked coin patterns, diamond shapes, and the “Ba Da Yun” (八达晕 , Eightfold Radiance) pattern. These patterns, transitioning from realism to abstraction, symbolize prosperity, inclusivity, infinity, and vastness. Their balanced and symmetrical structures evoke a rhythmic sense of *youya* (优雅). For example, the symmetrical structure of the “Ba Da Yun” pattern symbolizes expansion from a central point outward, representing connectivity and the smooth flow of energy in all directions.

Whether floral or geometric, all Song Dynasty patterns share an uplifting spiritual orientation, with *youya* (优雅) serving as their central value. This concept is closely linked to the idea of “Zheng” (正), or uprightness, embodying the traditional cultural pursuit of positive and beautiful ideals. The *youya* aesthetic is reflected not only in the motifs selected but also in the meticulous craftsmanship and design processes, culminating in patterns of exceptional elegance and artistic refinement.

In the ancient dictionary *Yu Pian*, *youya* (优雅) is defined as simplicity. For instance, the phrase “淡妆素抹旧罗衣, 雅致天姿覩竺归” (“A simple adornment with faded silk, graceful and elegant, presenting celestial beauty as it returns to the monk’s abode”) illustrates how ancient scholars associated simplicity with *youya*. The aesthetic pursuit of “valuing simplicity” inspired a restrained approach to design, often characterized by monochromatic or analogous color schemes. The patterns emphasized a balanced relationship between rigidity and flexibility, while their intricate, lifelike details ensured exceptional craftsmanship.

In terms of artistic expression, these exquisite patterns harmonized seamlessly with the delicate,

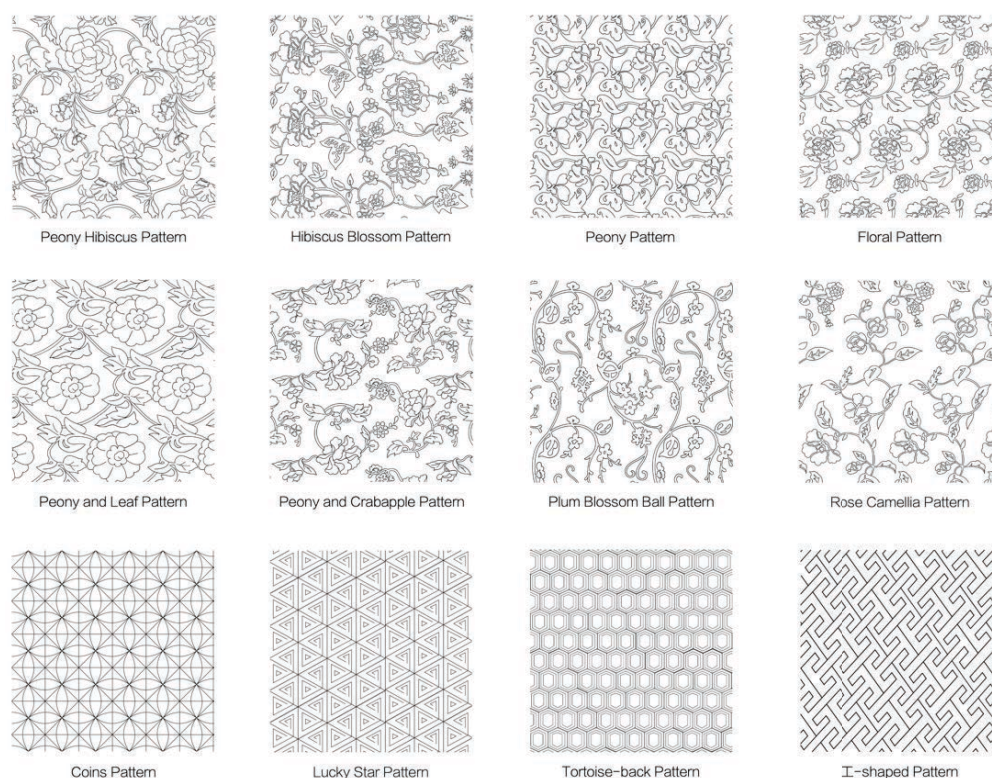


Figure 2. Typical Song Dynasty patterns (floral and geometric themes)

breathable qualities of silk fabrics, embodying the essence of *youya*. The weaving and embroidery techniques of the Song Dynasty were both sophisticated and diverse, encompassing embroidery, painting, *kesi* (缙丝 , a form of silk tapestry), and jacquard weaving. Ming Dynasty scholar Dong Qichang praised Song Dynasty embroidery, stating, “The embroidery of the Song people was fine and detailed, with threads as thin as a hair, and the colors were exquisitely delicate, radiating brilliance...” [6]. Such craftsmanship brought vitality and vividness to the patterns.

Artifacts from the tomb of Huang Sheng of the Southern Song Dynasty, for example, reveal garments made of jacquard-patterned textiles with painted borders. These pieces reflect a remarkable level of artistry, as the fine patterns integrated harmoniously with the silk fabric structure. The close relationship between *youya* patterns and silk fabrics lies in their mutual refinement—coarse or poorly crafted patterns appear clumsy, disrupting the harmony when paired with silk. The intricate craftsmanship of Song Dynasty patterns, combined with the light, breathable qualities of silk, created a perfect union.

This fusion not only represented aesthetic appeal but also conveyed profound cultural significance, reflecting a positive attitude and an aspiration for an enriched life. *Youya* patterns symbolized the noble character of a gentleman, expressing a love for beauty and mindfulness. In form, they achieved a perfect balance between strength and softness, while their meticulous craftsmanship ensured outstanding quality. Together, these elements encapsulated the unique and captivating *youya* (优雅) temperament of Song Dynasty patterns.

4. Digital empowerment in the design innovation of Song Dynasty patterns

The Song Dynasty represents a pivotal era in the inheritance and evolution of Chinese culture, during which a profound unity between ideology and social existence was achieved. Rooted in the *youya* (优雅) cultural essence, Song Dynasty patterns seamlessly integrated material form with spiritual depth, embedding cultural connotations into various aspects of social life, production, dissemination, and consumption. This interconnectedness between cultural transmission

and material production facilitated the effective transformation of ideas into tangible forms, creating a closed loop in cultural production. The Song Dynasty not only established the *youya* aesthetic as a cultural benchmark but also developed a systematic mechanism for cultural production. A comprehensive understanding of its principles, pathways, and methods offers valuable insights for the reinterpretation and innovative design of cultural elements in contemporary China. The *Liji: Daxue* states, “If there is daily renewal, daily renewal, and further renewal”^[7]. Innovation demands the courage to explore new ideas, methods, and forms continually. It also necessitates the development of new modes, carriers, and forms of cultural construction, promoting the creative transformation and innovative development of cultural resources through advanced science and technology, with creativity and innovation as its core^[8].

In the late 20th century, humanity transitioned into the information age, where globalization, digitalization, and virtual interaction began to reshape cultural narratives profoundly. As Altai Toffler noted in *The Third Wave*, the information age represents a third wave following agricultural and industrial civilizations—a transformative new era^[9]. The rapid progress of digitization has ushered the information age into an advanced phase, characterized by widespread internet use, intensified globalization, and the emergence of virtual reality (VR) interaction. These developments have significantly altered cultural expressions and communication modes^[10]. Digitalization has redefined human cognition, opening up new possibilities for adapting traditional patterns in contemporary contexts. This shift highlights the need to harness information technology effectively to construct communicative discourses, presenting unprecedented opportunities for the design innovation of Song Dynasty patterns.

Modern design concepts and digital technologies offer innovative approaches to integrating Song Dynasty patterns with contemporary contexts. Techniques such as scanning, computer-aided design (CAD), and parametric design enable the digital collection and reconstruction of these traditional patterns, preserving their intricate details while allowing flexible modifications. Additionally, VR and augmented reality (AR) technologies can incorporate Song Dynasty patterns into virtual environments, creating novel visual effects.

Innovations in materials and craftsmanship further revitalize Song Dynasty patterns. The application of environmentally friendly materials and digital manufacturing techniques—such as 3D printing and laser engraving—has become widespread in modern design. Moreover, cross-disciplinary approaches and integrations with other art forms or cultural symbols, such as clothing, ceramics, and furniture design, enhance the cultural and aesthetic value of these products, embedding the *youya* aesthetics of the Song Dynasty into everyday life.

In response to the characteristics of the current era, the author explores the use of digital technology to redesign representative Song Dynasty patterns (**Figure 3**). The selected patterns include peony and hibiscus, peony and leaf, rose camellia, peony and crabapple, linked coin, and the “Gong” (工) character patterns. Song Dynasty clothing patterns prioritize symmetry between content and form. Thus, the redesign process focuses on preserving the integrity of the original patterns while adopting innovative design languages.

The design process begins by preserving the complete outlines of traditional patterns and converting them into line-drawing vector images using computer software. Next, the color palette is simplified to a monochromatic scheme, with a thematic color tone selected to support the application of analogous colors. Finally, artificial intelligence is used to generate the internal structures of the patterns, reconstructing them through points, lines, and surfaces. This approach presents Song Dynasty patterns in a reimagined form, reflecting a contemporary interpretation while honoring their traditional essence.

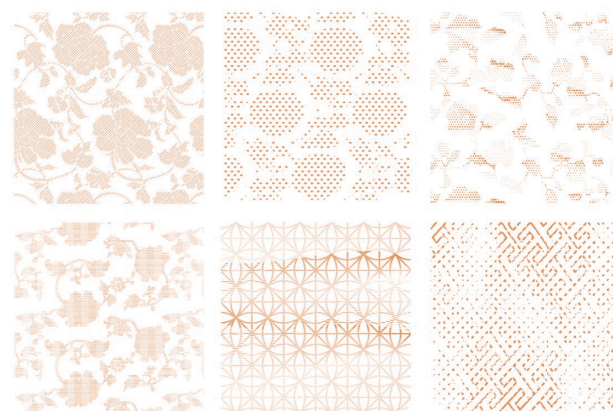


Figure 3. Experimental innovation in Song Dynasty pattern design

5. Conclusion

Emphasizing the centrality of Chinese national culture and deeply exploring the inherent principles of its inheritance and development is a vital mission for advancing the value innovation of outstanding traditional culture. In the process of design innovation for Song Dynasty patterns, it is crucial to preserve the *youya* (优雅) aesthetic character, ensuring that the cultural essence is carried forward while continuously creating new value. Cultural dissemination must incorporate distinct cultural symbols, as the creation of a *youya* image not only underpins the revival of cultural consciousness but also represents an essential pathway for enhancing the international influence of Chinese civilization.

In the context of the information age, digital technology is driving the innovative development of Chinese national culture across multiple dimensions of production and dissemination. This integration not only supports the global inheritance and promotion of Chinese culture but also breathes modern perspectives and vitality into traditional cultural expressions. By effectively linking Song Dynasty patterns with the cultural industry, the focus can shift from simple formal production to cultural reproduction through industrial innovation. This fusion of culture and industry has the potential to enhance industrial efficiency while fostering the healthy, sustainable, and high-quality development of China's rich traditional heritage.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Wang XM, (Trans.), 2015, The Book of Songs, Zhonghua Book Company, Beijing.
- [2] Zheng X, Lu DM, (Eds.), 1900, Explanatory Notes on the Zhou Li (Vol. 23–8), Zhonghua Book Company, Beijing.
- [3] Institute of Linguistics, Chinese Academy of Social Sciences (Ed.), 2016, Modern Chinese Dictionary (7th ed.), The Commercial Press, Beijing, 1581.
- [4] Zhu LY, 2010, Dictionary of Aesthetics, Shanghai Lexicographical Publishing House, Shanghai, 61.
- [5] Shang G, (Ed.), 2015, New Edition of the History of Chinese Arts and Crafts (2nd ed.), Higher Education Press, Beijing, 193.
- [6] Dong QC, (Ming), Secret Records of the Bamboo Grove.
- [7] Liu ZW, (Trans.), 2015, The Great Learning, People's Education Press, Beijing, 8.
- [8] Li FL, Liu XF, 2022, The Value Implications and Cultural Practice of Integrity and Innovation in the New Era. Fujian Forum (Humanities & Social Sciences Edition), 2022(10): 43–54.
- [9] Toffler A, 2018, The Third Wave (Huang MJ, Trans.), CITIC Press, Beijing.
- [10] Harari YN, 2017, Homo Deus: A Brief History of Tomorrow (Lin JH, Trans.), CITIC Press, Beijing.

Publisher's note

Whoice Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

New Challenges and Opportunities in Quantitative Economics under the Background of the Digital Economy

Lifei Chen*

School of Economics, Shanghai University of Finance and Economics, Shanghai 200433, China

**Corresponding author:* Lifei Chen, 383846346@qq.com

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract:

This paper examines the challenges and opportunities confronting quantitative economics in the era of the digital economy. The rapid advancement of digital technologies has posed significant challenges, such as heightened demands for data processing capabilities and the intricate evolution of market structures and consumer behavior. Concurrently, emerging technologies like big data and artificial intelligence offer abundant data resources and innovative research tools, creating opportunities to enhance research accuracy and efficiency. The paper underscores the need for quantitative economics to pursue theoretical innovations and practical adaptations to better align with the dynamics of the digital economy. It also envisions promising prospects for development in areas such as expanding research fields, optimizing methodologies, and fostering interdisciplinary collaboration.

Keywords:

Quantitative economics
Digital economy
Econometrics

Online publication: February 21, 2025

1. Introduction

The digital economy is reshaping the global economic landscape through the key dimensions of digitization, networking, and intelligence. Digitization converts information into data, streamlines business processes, and improves both corporate efficiency and consumer experiences. Networking eliminates geographical barriers, facilitating the global flow of information and enhancing corporate collaboration. Intelligence, powered by artificial intelligence and machine learning technologies, enables automated decision-making and optimization. In this

evolving environment, quantitative economics must adapt by advancing research in data collection, processing, and analysis, alongside data-driven decision-making, to provide robust theoretical support for policymaking and corporate strategies.

2. Overview of the digital economy

The digital economy, as a novel economic paradigm rooted in digitized knowledge and information, leverages modern information technology, particularly the Internet,

as its central platform to drive economic development. It is increasingly becoming a pivotal engine for global economic growth^[1]. At its core, the digital economy aims to optimize resource allocation and boost production efficiency through effective data utilization and ongoing technological innovation, thereby fostering economic restructuring and social transformation.

2.1. Concept and main features of the digital economy

The digital economy is characterized by a high degree of digitization, where economic activities are represented and communicated in digital form. This encompasses not only the digitization of products and services but also the intelligent automation of production processes and the digital management of supply chains. Furthermore, the digital economy is defined by distinct attributes such as innovation, openness, and cross-border integration. Innovation serves as the driving force of digital economic development, with technological breakthroughs acting as key catalysts for its advancement. Openness signifies the unimpeded flow of data resources and international collaboration, creating expansive opportunities for the digital economy's growth. Cross-border integration underscores the digital economy's ability to dissolve traditional industry boundaries, fostering the development of new business models and forms^[2].

2.2. Current status of digital economic development globally and in China

Globally, the digital economy is expanding at an unprecedented pace. According to data from international agencies, its scale continues to grow, constituting an ever-increasing share of global GDP. Countries like the United States and China are leading this growth, boasting massive markets and rapid development rates. China, in particular, has achieved significant milestones in the digital economy, emerging as one of the largest digital consumer markets in the world. Its digital economy not only demonstrates rapid growth in market size but also showcases a diversified industrial structure, with sectors such as e-commerce, mobile payments, and the sharing economy leading on a global scale. Globally, key components of the digital economy include fintech, smart manufacturing, e-commerce, and cloud computing. In

China, these industries are complemented by the rapid rise of emerging fields such as 5G communications, the Internet of Things, and artificial intelligence, infusing fresh dynamism into the digital economy^[3].

2.3. Future development trends of the digital economy

Looking to the future, the digital economy is poised to remain at the forefront of global economic growth. Technological innovation will continue to be its central driving force. With ongoing advancements in cutting-edge technologies such as artificial intelligence, blockchain, and quantum computing, the digital economy is expected to reach new heights. Simultaneously, industrial integration will deepen further, blurring the lines between the digital economy and traditional industries and giving rise to more innovative business models and forms. From a policy perspective, governments worldwide are anticipated to enhance their support for the digital economy by introducing more favorable policies and strengthening international collaboration to improve the global governance framework for the digital economy.

3. New challenges for quantitative economics in the digital economy

3.1. Increased complexity in data processing and analysis

In the digital economy era, the volume of data is expanding rapidly, not only in terms of quantity but also in diversity, encompassing structured, semi-structured, and unstructured formats. This trend imposes unprecedented demands on the data processing capabilities of quantitative economics. Traditional data analysis methods struggle to meet the requirements for rapid processing, deep exploration, and real-time analysis of massive datasets^[4]. Consequently, there is an urgent need for the development of more efficient and intelligent data processing technologies and tools. Big data technologies provide powerful solutions for quantitative economics by leveraging distributed storage, parallel computing, and other advanced techniques. These capabilities enable effective management of the rapid expansion of data, ensuring efficient integration and swift analysis. Moreover, machine learning algorithms have the

ability to automatically learn patterns from data, uncover potential correlations, and identify trends, thereby offering new perspectives and methods for quantitative economic research. For instance, deep learning models excel at processing unstructured data, allowing quantitative economics to gain a more comprehensive understanding of and make better use of diverse economic datasets.

3.2. Adaptability challenges for economic models and assumptions

The digital economy has introduced significant challenges to the applicability of traditional economic models and assumptions. First, the structure of markets has undergone notable changes. The emergence of the Internet platform economy has shifted the competitive landscape from traditional oligopolies or multiparty competition to a coexistence of platform monopolies and multi-sided markets influenced by network effects ^[5]. These changes render traditional theories of market structures inadequate for explaining phenomena in the digital economy or for reflecting the distribution and influence of market forces.

Second, consumer behavior patterns have transformed dramatically. In the digital economy, information is highly transparent, and acquisition costs are minimal, making consumer decision-making processes more rational and increasingly focused on personalized experiences. Traditional consumer behavior theories, which often rely on choice models under conditions of limited information, struggle to capture the full scope of consumer behaviors in this new era, particularly the dynamic shifts in preferences and willingness to pay for digital products and services.

To address these issues, quantitative economics must develop new models and assumptions tailored to the characteristics of the digital economy. These models should account for the profound impact of digital technology on market structures, consumer behaviors, and the broader economic system. They should introduce new variables and parameters to accurately describe economic phenomena in this context. Additionally, interdisciplinary integration is essential, drawing on advanced theories and methodologies from information science and computer science to provide fresh insights and tools for quantitative economic research ^[6].

3.3. Increased complexity in policy evaluation and decision-making

The rapid development of the digital economy has profoundly influenced policy evaluation and decision-making processes, particularly in the multidimensionality of policy objectives and the unpredictability of policy outcomes. In the era of the digital economy, policymakers must not only consider traditional economic indicators such as GDP growth and employment rates but also address a range of additional objectives, including data security, privacy protection, technological innovation incentives, and the promotion of fair competition. This multidimensionality adds significant complexity to policy design, requiring careful balancing of the diverse needs and interests of various stakeholder groups.

Simultaneously, the dynamic and uncertain nature of the digital economy further complicates the prediction of policy effects ^[7]. The rapid iteration of new technologies, evolving market environments, and changing consumer behaviors amplify the uncertainties surrounding policy implementation outcomes. Policymakers are increasingly required to process complex datasets and employ advanced analytical tools to assess potential policy impacts.

For the field of quantitative economics, this presents both challenges and opportunities. On the one hand, quantitative economics must continually update and refine its theories and methodologies to meet the demands of policy evaluation and decision support in the digital economy. For instance, more sophisticated econometric models are needed to capture the intricate relationships and mechanisms inherent in the digital economy. On the other hand, the integration of novel data sources and analytical techniques can enhance the accuracy and timeliness of policy evaluations.

4. New opportunities for quantitative economics in the digital economy

4.1. Expansion and innovation of research fields

The thriving digital economy has unlocked vast new opportunities for research in quantitative economics, giving rise to emerging fields such as digital economy statistics, digital finance, and digital trade. These new areas not only enrich the theoretical framework of

quantitative economics but also expand its practical applications ^[8].

In digital economy statistics, advancements in big data technology have transformed vast, multidimensional, and real-time economic data into crucial resources for research. By leveraging advanced statistical methods and computational techniques, quantitative economists can thoroughly analyze these datasets, uncovering the fundamental principles and characteristics of the digital economy. This analysis serves as a scientific foundation for policymaking and decision support.

Digital finance, as a critical component of the digital economy, introduces both challenges and opportunities for quantitative economics. The rapid evolution of digital finance has reshaped traditional financial models and service structures, making financial markets increasingly complex and dynamic ^[9]. Quantitative economists have developed innovative financial models and analytical frameworks to explore topics such as risk management, market efficiency, and regulatory policies in digital finance, contributing to the stability and growth of financial markets.

Similarly, digital trade has emerged as a new dimension of global economic integration, eliminating the geographical and temporal constraints of traditional trade and enhancing the efficiency and convenience of international transactions. By applying econometric methods and big data analysis, quantitative economists have conducted in-depth studies on trade flows, structures, barriers, and other aspects of digital trade. These studies provide valuable insights for shaping international trade policies and fostering the coordination of global trade relations.

The emergence of these new research areas has not only driven theoretical innovation in quantitative economics but also expanded its practical applications. Looking ahead, as the digital economy continues to grow and evolve, the research horizons of quantitative economics will further broaden, resulting in groundbreaking advancements in both theory and practice ^[10].

4.2. Enrichment and optimization of research methods

In the field of quantitative economics, the integration and application of cutting-edge technologies such as big

data, machine learning, and blockchain are progressively enriching and optimizing traditional research methods, infusing new vitality into the discipline's development.

The adoption of big data technology has enabled quantitative economists to process and analyze unprecedentedly large datasets. These datasets include not only structured information from traditional economic statistics but also diverse unstructured data such as social media sentiment, online transaction records, and geolocation tracking. By leveraging big data processing and analysis techniques, researchers can uncover more nuanced and complex economic phenomena and principles, thereby enhancing the accuracy and depth of their studies ^[11].

Machine learning algorithms, particularly advanced methods like deep learning, offer robust predictive and classification capabilities for quantitative economics. These algorithms can automatically learn from data, extract features, and construct more accurate economic models. For instance, in predicting consumer behavior, financial market fluctuations, or macroeconomic trends, machine learning models can consider multiple factors and dynamically adjust forecasting parameters in real time, significantly improving both the precision and timeliness of predictions.

Blockchain technology, characterized by decentralization, transparency, and immutability, introduces new data sources and verification mechanisms for quantitative economics research. Through blockchain, researchers can access authentic and reliable economic transaction data, enabling in-depth analysis of critical economic indicators such as market structures and transaction behaviors. Additionally, blockchain's smart contract functionality provides an automated and traceable framework for the implementation and evaluation of economic policies ^[12].

In summary, the application of advanced technologies such as big data, machine learning, and blockchain has not only diversified the research methods in quantitative economics but also substantially enhanced the accuracy and efficiency of research. These innovations are emerging as pivotal drivers of progress in quantitative economics, injecting fresh impetus into the discipline's development.

4.3. Strengthening interdisciplinary integration and cooperation

In the context of the rapid development of the digital economy, the integration of quantitative economics with disciplines such as computer science, information science, and management has become increasingly prominent. This cross-disciplinary collaboration is profoundly transforming the research paradigms and boundaries of quantitative economics.

Computer science offers robust tools for data processing and analysis in quantitative economics. Advancements in big data, cloud computing, artificial intelligence, and related technologies enable quantitative economists to process vast amounts of economic data with unparalleled precision and speed, uncovering the complex economic laws and phenomena embedded in the data ^[13]. Moreover, techniques such as algorithm optimization and data mining in computer science provide critical support for the construction and validation of quantitative economic models.

Information science introduces novel perspectives to the study of quantitative economics. Concepts such as information asymmetry, information value, and network effects hold particular relevance in the digital economy. Research outcomes in information science equip quantitative economists with powerful tools to address these issues. For instance, leveraging concepts like information entropy and complexity theory allows for a deeper analysis of the mechanisms underlying information transmission and knowledge diffusion in the digital economy.

Management contributes a wealth of practical cases and application scenarios to quantitative economic research. In the era of the digital economy, fields such as business management, marketing, and supply chain management are facing unprecedented challenges and opportunities. The integration of quantitative economics and management bridges economic theory with practical management, providing more scientific and precise support for decision-making in enterprises.

The significance of interdisciplinary cooperation in advancing quantitative economic research cannot be overstated. Collaboration and dialogue between different disciplines foster the generation of innovative research ideas and methodologies, driving the in-depth

development of the field. Furthermore, interdisciplinary efforts often yield groundbreaking research results, offering novel solutions and perspectives for addressing complex challenges in the digital economy ^[14].

5. Conclusion and prospects

In the era of the digital economy, quantitative economics—a key branch of economics—faces both unprecedented challenges and opportunities. Research in this field must not only keep pace with technological advancements but also deeply analyze how the digital economy reshapes and influences traditional economic models, thereby driving theoretical innovation and practical adjustments.

Firstly, the explosive growth and diversification of data brought about by the digital economy have set higher standards for the data processing capabilities of quantitative economics. The vast, rapid, and multidimensional flow of data requires advanced technologies for storage, processing, and analysis to ensure timely and accurate research outcomes. Additionally, the digital economy has significantly transformed market structures, consumer behavior, and corporate competitive strategies, rendering traditional economic models and assumptions insufficient to fully explain or predict emerging economic phenomena.

However, challenges often come hand in hand with opportunities. The development of the digital economy offers abundant data resources and extensive application scenarios for research in quantitative economics. The emergence of cutting-edge technologies, such as big data, artificial intelligence, and blockchain, provides quantitative economists with a robust toolkit to explore economic principles with unprecedented depth and breadth. Furthermore, new business forms and models, including digital finance, digital trade, and the sharing economy, present fresh research topics and objects of study. Research in these areas not only holds significant theoretical value but also provides essential support for policymaking and corporate decision-making ^[15].

To adapt to the transformations brought by the digital economy, quantitative economics must pursue both theoretical innovation and practical advancements. Theoretically, it is crucial to deepen the understanding

of the digital economy's characteristics and develop new economic models and hypotheses tailored to these features. Interdisciplinary approaches should also be emphasized, incorporating insights from computer science, information science, management, and related fields to establish a multidisciplinary research framework. Practically, quantitative economists should explore how emerging technologies can enhance data processing and analysis to improve research accuracy and efficiency. Additionally, fostering collaboration with governments, enterprises, and other institutions is essential to translate research findings into actionable applications, contributing to socio-economic development.

Looking ahead, quantitative economics in the

context of the digital economy is poised for expansive growth. The scope of research will broaden to address an increasing number of issues and domains related to the digital economy. Research methods will continue to evolve, leveraging advanced technologies to achieve more precise and efficient data analysis and model development. Interdisciplinary collaboration will intensify, facilitating knowledge sharing and innovation across disciplines. Through these advancements, quantitative economics will maintain its critical role in economic analysis and decision-making, providing valuable insights and support for the healthy development of the digital economy.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Li B, 2021, Innovation Path of Econometrics Active Integration of Big Data. Qinghai Social Sciences, (06): 92–103.
- [2] Wang L, 2023, Design and Practice of Thinking and Politics in Econometrics Course. China University Teaching and Learning, (05): 48–52.
- [3] Cai Y, Ma Y, Niu X, 2023, The Positioning, Trend and Challenge of China's Digital Economy Development in the New Development Stage. Xinhua Abstract, 2023(13): 49–53.
- [4] Chen J, 2022, Changes, Opportunities and Challenges in the Development of Digital Economy under the New Situation. High Technology and Industrialization, 2022(12): 12–15.
- [5] Wang Q, 2023, Digital Intelligence Empowerment of New Business Construction under the Background of Digital Economy: Opportunities, Challenges and Responses. Journal of Beijing Vocational College of Finance and Trade, 39(2): 19–24.
- [6] Chen J, 2023, Analysis of New Retail Business Model under the Background of Digital Economy. Information Industry Report, 2023(3): 85–87.
- [7] Zhao L, 2022, Research on the Challenges and Countermeasures of the New Path of Local Poverty Alleviation under the Background of Digital Economy—A Case Study of “Baixian Wanpin” Project in Yiwu. Industrial Innovation Research, 2022(1): 54–56.
- [8] Li J, 2023, New Trends and Challenges of International Trade in the Era of Digital Economy. International Business Finance and Accounting, 2023(16): 7–10.
- [9] Meng H, 2022, Security Challenges Facing the High-Quality Development of China's Digital Economy under the New Situation. China Sankei, 2022(14): 28–31.
- [10] Fan Q, 2020, Opportunities and Challenges Facing the New International Tax Order under the Digital Economy. Marketing Weekly: Business Marketing, (056): 1.
- [11] Zhu H, Wang C, 2021, Industrial Digital Transformation under the Strategic Background of “Double Cycle” New

Development Pattern: Theories and Countermeasures. Finance and Trade Economics, 2021(3): 14.

- [12] Wang J, 2023, Opportunities and Challenges Faced by Wealth Management Industry under the Background of Digital Finance. Tianjin Economy, 2023(7): 42–47.
- [13] Wang X, 2021, Research on Development Opportunities, Challenges and Countermeasures of Qingyuan in Guangdong Province under the Background of Digital Economy. Modern Business, 2021(33): 3.
- [14] Song Y, Li F, 2023, The Implication of the Development of China's Digital Economy: Changes, Challenges and Opportunities. Taxation and Economics, 2023(3): 58–65.
- [15] Bai X, 2021, Research on Digital Transformation of Commercial Banks under Internet Economy. Knowledge Economy, 590(23): 17–18.

Publisher's note

Whioce Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Research on the Construction of Digital Advanced Intelligent Music Courses under the Background of Artificial Intelligence

Qian Liu*

School of Music and Dance, Chongqing College of International Business and Economics, Chongqing 401520, China

**Corresponding author:* Qian Liu, 249047868@qq.com

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract:

The deep application of artificial intelligence (AI) and digital technology in the education field has been reshaping the curriculum design and teaching methods of higher music education. The construction of intelligent music courses needs to be focused not only on the cultivation of music theory and practical ability but also on the integration of personalized and interactive teaching systems with AI technology. The advantages of AI in intelligent composition, real-time feedback, and virtual performance have been providing a broad space for curriculum innovation. However, challenges such as the shortage of qualified instructors and the unequal distribution of resources have been hindering the deep integration of technology and art. By analyzing the influence of AI on music courses, the core construction elements and innovative strategies are proposed, and the potential value and development prospects of digital intelligent courses in improving teaching quality and cultivating music talents are explored.

Keywords:

Artificial intelligence
Digitalization
Higher education
Intelligent music
Curriculum construction

Online publication: February 21, 2025

1. Influence of artificial intelligence and digital education on music curriculum

1.1. Overview of the application of artificial intelligence technology in music education

The rapid development of artificial intelligence (AI) technology has provided strong technical support for music education and has brought about profound changes in teaching tools and learning methods. The application of

intelligent composition and music arrangement tools has injected new vitality into music creation. By analyzing the style and structure of traditional music works through algorithms, new music with artistic value is generated. These tools can not only help students understand the composition theory, but also improve their musical expression ability through a variety of creative practices. In addition, AI technology can provide structural feedback

for students' work and effectively help them optimize their creative ideas ^[1].

AI-assisted performance and teaching systems are also gradually popularized in music education. These systems are able to provide personalized suggestions for improvement by analyzing student performance data. Machine learning-based aided performance software can identify incorrect notes, rhythm deviations, or timbre changes and visually present detailed feedback. This can not only help students quickly correct their mistakes, but also improve their sensitivity to the details of music.

1.2. Transformation of music learning style caused by digital education

The rise of digital education has changed the teaching mode of traditional music courses and provided students with a more flexible learning experience. Independent learning and personalized teaching are possible, and students can choose their own learning content and progress through the digital platform. The intelligent music learning platform can automatically recommend suitable teaching resources according to student learning history and performance. This way can not only fully stimulate students' interest in learning, but also help them deeply master music theory and practical skills ^[2].

The diversity and immediacy of digital resources have brought unprecedented convenience to music learning. Digital teaching resources include high-quality teaching videos, interactive music scores, virtual musical instruments, etc., so that students can learn anytime and anywhere ^[3]. Through an online database, students can have easy access to classical music scores, musical works, and academic resources around the world, providing a broader vision for the course study.

2. Core elements of higher music course construction

2.1. Intelligent and quantifiable course objectives

The construction of higher music courses needs to be intelligent and quantifiable as the core orientation to adapt to the application depth of AI technology in the field of education. The integration of professional music skills and AI technology is the key to the intelligence of the course

objectives. By introducing tools such as AI composition, intelligent accompaniment, and performance analysis, a high degree of combination of theory and practice can be realized in teaching ^[4]. In composition teaching, teachers can help students understand and imitate different styles of composition techniques through AI algorithms, so as to improve their creative ability. At the same time, the performance course can use the AI evaluation system to analyze students' intonation, rhythm, intensity, and other parameters in real time, and provide quantitative evaluation data. This not only optimizes the teaching process, but also encourages students to improve their professional skills with precise feedback.

2.2. Digital design of teaching content

The development of digital resources in music theory courses is an important part of teaching content design. In higher music education, music theory courses often involve a large number of abstract concepts and complex structures, and the traditional teaching mode can easily lead to a decline in student interest ^[5]. Through digital technology, multimedia teaching resources can be developed, including dynamic visual scores, interactive sound intervals, and chord practice tools. These resources can visualize abstract music theories and help students understand complex music concepts more intuitively. The application of an online course platform can break the limitation of time and space and enable students to learn music theory anytime and anywhere.

2.3. Innovation and diversification of teaching modes

The hybrid teaching mode integrating online and offline is an important feature of digital advanced intelligent music courses. By combining the traditional classroom with online teaching, the advantages of the digital platform can be fully utilized. Teachers can put the theoretical knowledge part on the online platform for students to study independently, and focus on practice and discussion in the class. This mode not only improves classroom efficiency, but also effectively meets the students' personalized learning needs ^[6]. By analyzing the big data of students' online learning behavior, teachers can further optimize the teaching design and align the teaching content with the actual needs.

3. Construction strategies of intelligent music course under the background of artificial intelligence

3.1. Optimizing teaching resources and promoting the intelligent transformation of music education

With the support of AI technology, optimizing teaching resources is the primary task in the construction of intelligent music courses. The establishment of an intelligent music teaching resource library is the key to realizing this goal. The resource base should cover music theory, practical skills, and music history, and integrate multimedia and interactive technology. The music teaching resource library can generate dynamic and personalized learning materials through AI technology, such as recommending suitable music scores or teaching videos according to students' learning trajectories ^[7]. At the same time, the resource library should integrate the audio analysis technology and decompose the classical music works into melody, harmony, rhythm, and other elements, for students' in-depth analysis. The construction of a resource database needs to pay attention to the scientific and interesting content, so as to stimulate students' interest in learning and improve the teaching effect.

Promoting open sharing of educational resources is another vital strategy to promote intelligent transformation. The construction of smart music courses needs to break through the limitations of region and platform and use cloud technology and blockchain technology to achieve efficient circulation of resources. Colleges and universities can cooperate with industrial institutions and music education platforms to build an open music resource ecosystem, and share high-quality teaching content and cases with more teachers and students ^[8]. Through the open platform, students can obtain rich music scores, famous teacher courses, and virtual musical instrument playing guidance, and teachers can also share teaching experiences and research results using the platform. This open resource mode can alleviate the problem of lack of teaching resources in traditional teaching, and effectively improve the coverage and popularization of teaching. Intelligent transformation also needs a close combination of technology and teaching objectives to realize the precise application of educational

resources. AI technology can analyze the data in the resource library, understand the differences between students in the learning process, and design personalized teaching content accordingly.

3.2. Emphasizing interesting teaching to create an active classroom atmosphere

In higher music courses, interesting teaching is an essential strategy to stimulate students' interest in learning. Combining the characteristics of music majors and AI technology can effectively improve classroom activity and teaching effect. Fun teaching should not only be entertainment-oriented but also be integrated into the professional content of music discipline, so that students can master solid theoretical knowledge and practical skills in a relaxed and pleasant atmosphere.

The technology of using AI to generate music is one of the important tools of interesting teaching. Such techniques can generate melodies, harmonies, and even complete music through algorithms, providing an experimental learning environment for students. For example, AI composition tools can generate music that meets their characteristics based on specific musical styles (such as Baroque or jazz). Students can intuitively understand the characteristics of different styles in melodies, rhythm, and harmony by analyzing the structure of the music generated by the AI ^[9]. This real-time generated music creation practice not only enhances the interest of the classroom, but also deepens students' understanding and application ability of composition techniques. The introduction of interactive gamification teaching design in classroom teaching can be more directly combined with the music professional content.

3.3. Focusing on the cultivation of practical ability to enhance students' musical expression

In higher music education, the cultivation of practical ability is directly related to students' musical expression and professional competitiveness. With the support of AI technology, digital intelligent music courses can provide more efficient and scientific solutions for music practical teaching. To emphasize the cultivation of practical ability, we need to take multi-level and multi-dimensional approaches for the in-depth integration of students and music professional theory through technical means and

enhance students' expression and creativity^[10].

Practical courses integrated with AI technology can achieve personalized guidance and efficient feedback. The AI-assisted performance system can conduct real-time analysis of students' intonation, rhythm, and strength in real time, and visually present the problems in the performance. This system can provide specific suggestions for improvement by comparing the differences between students and the standard model, so that students can optimize their performance skills in continuous adjustment. AI-based timbre analysis technology can help students more accurately control the vocal characteristics of musical instruments and improve their ability to grasp the details of music. For example, in stringed instrument courses, AI can provide students with a precise direction of improvement by analyzing changes in arch speed, pressure, and vocal points. Virtual rehearsal technology can provide students with a more diverse practice environment. Through AI and virtual reality technology, students can simulate rehearsals in the virtual band, and the system can coordinate and adjust according to each members' performance^[11]. This technology not only solves the problem of lack of skills caused by insufficient rehearsal time, but also helps students get familiar with the cooperation mode with different bands or conductors, thus enhancing their cooperation and adaptability abilities in musical performances. At the same time, the virtual rehearsal technology can also record and replay the rehearsal process, providing students with comprehensive self-assessment opportunities.

The digital platform can support a variety of music practices to further enhance students' performance. For example, online playing platforms can present students' works to a global audience and get feedback from the audience through real-time interaction. This platform not only provides students with opportunities to perform but also helps them accumulate practical performance experience and improve their stage performance. Online practice courses can also combine technical means, such as AI generation of accompaniment or imitating specific musical styles, to provide more possibilities for students' performance practice. In practical teaching, we also need to pay attention to the multi-dimensional cultivation of music expression ability.

3.4. Cultivating compound talents and promoting interdisciplinary integration

Under the promotion of AI technology, higher music education not only needs to pay attention to the cultivation of music professional ability, but also focuses on the cultivation of compound talents, so as to meet the demand for multi-disciplinary knowledge integration in the digital era. In the construction of intelligent music courses, interdisciplinary integration can expand students' knowledge breadth and innovation ability and lay a foundation for their development in the interdisciplinary field of music and technology^[12].

The diversification of teacher teams is a critical guarantee to promote interdisciplinary teaching. The construction of music courses requires hiring educators with AI technology backgrounds and designing the teaching content together with traditional music teachers. Through cross-field collaboration, the course can combine the depth of the music major and the breadth of technology application.

4. Challenges and prospects of digital intelligent music course construction

4.1. Main challenges in the curriculum construction

The construction of the digital intelligent music curriculum has made remarkable progress in the advancement of technological progress and teaching demand, but it still faces many challenges in practical implementation. The deep integration of technology and music teaching presents a primary issue. The existing AI technology pays more attention to the realization of technology but lacks an understanding of the needs of music majors, thus it is difficult to fully support the complex artistic expression and personalized needs in music education.

The adaptability of the teaching staff also puts forward new requirements for curriculum construction. Many music teachers lack an AI technical background and are incompetent in teaching tasks involving digital content^[13]. This technical gap not only affects the quality of teaching but also restricts the popularization scope of the curriculum.

4.2. Opportunities and directions for future development

With the continuous progress of technology, the construction of the digital intelligent music course has ushered in a new development opportunity. The optimization and upgrading of AI technology provide more powerful technical support for personalized teaching. For example, a deep learning-based music generation and analysis system can more accurately simulate music style and expression, providing students with a rich and creative practical environment^[14]. In addition, the popularization of 5G and cloud computing technologies enables large-scale online teaching and real-time interaction, which provides a solid foundation for resource sharing and distance learning.

International cooperation and resource opening are an important path for future development. By building a global music education platform, music teaching resources can be shared in a larger scope, and students and teachers can expand their horizons through cross-cultural communication^[15].

5. Conclusion

The construction of digital intelligent music courses under the background of AI is the key direction of the modernization of higher music education. By analyzing the far-reaching influence of AI and digital education, this article defined the core elements of intelligent curriculum objectives, digitalization of teaching content, and diversified teaching modes. The research points out that the application of technology needs to be combined with the essence of music art, and optimizing the teaching resources and cultivating interdisciplinary compound talents are the core strategies to realize the construction of an intelligent curriculum. At the same time, the practical challenges include technology integration and teacher adaptability. Looking forward to the future, digital intelligent music courses will continue to develop in the direction of openness and internationalization, providing more innovative paths for music education, and laying a solid foundation for cultivating music talents with both artistic and technical capabilities.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Lan Q, 2023, Research on the Teaching Reform of Music Major in Colleges and Universities under the Background of Ideological and Political Course. Shaanxi Education (Higher Education), (08): 28–30.
- [2] Luo S, 2023, Thoughts on the Application of Artificial Intelligence in Foreign Vocal Language Works Art Review, (08): 172–175.
- [3] Chang R, 2023, Analysis on the Intelligent Teaching of High School Music. Arts and Sciences Navigation, (04): 94–96.
- [4] Gao Y, Gao L, 2022, Reform of Music Teaching in Colleges and Universities under the Vision of “Five Education Simultaneously.” Educational Theory and Practice, 42(36): 61–64.
- [5] Gao W, 2022, Thinking and Embodiment of Philosophical View in College Music Course from the Perspective of Aesthetic Education. University, (35): 137–140.
- [6] Zhao H, 2022, Research on College Music Education in the Background of Smart City. Smart City, 8(09): 62–64.
- [7] Liu X, 2022, The New Development of University Music Education under 5G + Intelligent Technology. Contemporary Music, (08): 47–49.
- [8] Zhou S, 2022, On the Construction of Intelligent Classroom for Public Funded Normal University Students in College Music Major. Contemporary Music, (08): 53–55 + 205.
- [9] Wang L, 2022, Research on Music Teaching Reform in Universities under Intelligent Education Environment. Public Relations World, (13): 117–118.

- [10] Cui J, Bai X, 2022, Exploration on Music Education in Universities in the Era of “Internet +.” Heilongjiang Higher Education Research, 40(04): 156–160.
- [11] Ding Y, 2022, Thoughts on the Path of General Music Education in Universities. Music Education in China, (03): 66–70.
- [12] Jing L, 2021, Exploration and Practice of Wisdom Teaching of Piano Courses in Local Colleges and Universities. Intelligence, (35): 47–50.
- [13] Li Y, 2021, Research on Reform and Innovation of Music Courses in Local Universities. Art Education, (10): 45–48.
- [14] Mei D, 2021, Innovation and Development of the Mode of Music Education in Universities under the Background of the Internet——Comment of Research Methods of Music Education. Journal of Tropical Crops, 42(09): 2827–2828.
- [15] Lian W, 2021, Construction and Research of Intelligent Education Platform of Vocal Music Course in Gansu University. Journal of Lanzhou University of Arts and Sciences (Social Science Edition), 37(04): 125–128.

Publisher’s note

Whoice Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Integrating Human-AI Collaboration in Education: A New Approach to Curriculum Design

Yuhao Ge*

China University of Geosciences (Wuhan), Wuhan 430074, Hubei Province, China

*Corresponding author: Yuhao Ge, 2056439887@qq.com

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract:

This paper examines the role of digital technologies in enhancing personalized and collaborative learning in education. Drawing on theories of constructivism, personalized learning, and collaborative learning, it explores how adaptive platforms improve student outcomes. Case studies show that these technologies, along with collaborative tools in online courses, can foster greater engagement and deeper learning. However, their effectiveness depends on their integration with traditional teaching practices, where teachers remain central in guiding learning and providing emotional support. The paper concludes that while digital tools offer valuable benefits, their success relies on addressing challenges such as equitable access and teacher training.

Keywords:

Artificial intelligence
Educational innovation
Curriculum design
Human-AI collaboration
Personalized learning

Online publication: February 21, 2025

1. Introduction

In recent years, the role of artificial intelligence (AI) in education has expanded rapidly, driven by advancements in machine learning, data analytics, and automation. AI technologies are increasingly seen as a transformative force in education, promising to personalize learning, optimize curriculum design, and enhance teaching efficiency. As educational systems worldwide face growing demands for more individualized and effective learning experiences, AI offers innovative solutions that can adapt to the diverse needs of students^[1].

Historically, traditional educational models have

been based on standardized curricula that treat all students equally, often overlooking individual learning differences. This one-size-fits-all approach has been shown to be less effective in meeting the needs of students with diverse backgrounds and learning styles^[2]. In contrast, AI can provide more tailored educational experiences by analyzing student performance, predicting learning outcomes, and adapting content in real time to suit individual needs. By doing so, AI has the potential to not only improve student engagement and achievement but also assist educators in refining their teaching strategies and curriculum designs.

However, AI's application in education does not aim to replace teachers. Instead, it envisions a collaborative model where AI and educators work together to enhance the learning process. AI can be seen as an intelligent assistant that supports teachers in administrative tasks, data analysis, and personalized learning recommendations, while teachers continue to play a central role in fostering creativity, critical thinking, and emotional development. This human-AI collaboration model offers a promising avenue for educational innovation, where the strengths of both human expertise and machine efficiency are harnessed to improve educational outcomes.

Despite the promising potential of AI, its implementation in education presents significant challenges, such as ethical concerns, data privacy issues, and the need for teacher training ^[3]. The effective integration of AI into the curriculum requires careful consideration of these challenges to ensure that AI-enhanced education is inclusive, fair, and beneficial for all students. Moreover, the evolving role of teachers in an AI-powered educational environment requires continuous adaptation to new technologies and pedagogical approaches ^[4].

This paper explores how AI can be integrated into curriculum design through human-AI collaboration, with a focus on the development of personalized learning experiences and adaptive teaching strategies. The paper examines the theoretical foundations that support AI's role in education, presents case studies of AI applications in curriculum design, and discusses the challenges and opportunities associated with its implementation. In doing so, it provides insights into how AI can shape the future of education and offers recommendations for educators and policymakers.

2. Theoretical framework

The integration of AI into education is grounded in several well-established educational theories that provide a foundation for understanding how AI can enhance curriculum design and student learning. These theories include constructivist learning theory, personalized learning, human-computer interaction (HCI), and collaborative learning. Together, they offer valuable insights into how AI can support individualized learning

experiences while fostering meaningful teacher-student interactions.

2.1. Constructivist learning theory

Constructivism, as proposed by Piaget and Vygotsky, emphasizes the active role of learners in constructing their own understanding through interaction with their environment. In educational contexts, this theory suggests that knowledge is not passively received but actively built by students through experiences and social interactions ^[5,6]. AI's role in this context is to create adaptive learning environments that respond to individual students' needs and offer real-time feedback, helping students progress at their own pace. Studies have shown that personalized learning systems aligned with constructivist principles can significantly enhance student engagement and learning outcomes ^[7].

2.2. Personalized learning

Personalized learning focuses on tailoring educational experiences to meet the unique needs, preferences, and abilities of individual learners ^[8]. In this model, AI can play a central role by continuously assessing student performance, identifying learning gaps, and providing customized content or pathways for students. For instance, AI-driven tools can modify the difficulty level of tasks based on the learner's progress, ensuring that each student receives appropriate challenges ^[9]. This personalized approach not only increases motivation but also fosters a deeper understanding of the material by addressing the learner's specific needs ^[2].

2.3. Human-computer interaction

Human-computer interaction refers to the study of how people interact with technology, with the aim of creating systems that are intuitive, user-friendly, and supportive of human goals ^[10]. In educational settings, effective HCI design is essential to ensure that AI tools are accessible, engaging, and easy to navigate for both students and teachers. HCI principles guide the development of AI systems that offer seamless, interactive experiences, allowing students to focus on learning without being distracted by technological barriers. The importance of HCI in AI-enhanced education has been highlighted in several studies, which suggest that

poor user interfaces can diminish the effectiveness of educational tools.

2.4. Collaborative learning

Collaborative learning theory stresses the importance of peer interaction in the learning process. Research shows that when students work together to solve problems or discuss concepts, they develop a deeper understanding and improve their critical thinking skills ^[11]. AI can enhance collaborative learning by providing platforms that facilitate group work, peer reviews, and real-time communication, both in physical and virtual classrooms. AI-driven tools, such as collaborative platforms or group-based learning apps, can help students interact more effectively, fostering a sense of community and shared learning. Furthermore, AI can support teachers in managing group dynamics, ensuring that every student participates and contributes to the learning process ^[12].

2.5. Human-AI collaboration in curriculum design

The concept of human-AI collaboration emphasizes that AI should not replace teachers but rather complement their expertise by assisting in the design, delivery, and evaluation of curricula. In this model, teachers remain at the center of the learning process, guiding students and providing emotional support, while AI serves as a tool that aids in decision-making, content delivery, and personalized instruction ^[13]. Research has shown that AI can reduce the administrative burden on educators by automating tasks like grading or tracking student progress, allowing them to focus more on instruction and student engagement ^[14]. However, the success of this collaboration depends on a careful balance between human insight and AI capabilities, ensuring that technology serves to enhance—not replace—the teacher’s role.

3. Case studies and empirical research

In this section, we examine several case studies that illustrate the application of personalized learning systems, adaptive technologies, and collaborative learning models in education. These cases demonstrate how technology has been integrated into curriculum design and teaching

practices, and how educators can leverage digital tools to enhance student learning outcomes. We also explore the challenges and successes of these initiatives in implementing innovative educational practices.

3.1. Collaborative learning in online education

The rise of online learning platforms such as Coursera and edX has allowed students from around the world to collaborate on projects, engage in discussions, and peer-review each other’s work. In particular, the Coursera platform employs collaborative tools that encourage group work and interaction among students in online courses. A study by Koller *et al.* ^[15] found that the use of collaborative learning in online environments significantly improved students’ critical thinking skills and deepened their understanding of the subject matter. The integration of peer feedback, group assignments, and interactive discussion forums in these courses supports active learning, where students learn from each other’s experiences and perspectives. However, the success of these collaborative models depends on the active participation of all students, as well as the effective facilitation of group activities by instructors, who must guide the discussions and ensure equitable contribution from each participant.

3.2. Language learning through digital platforms

Digital language learning platforms such as Duolingo have become immensely popular for their ability to provide personalized, gamified learning experiences. Duolingo’s approach is based on the principles of spaced repetition and real-time feedback, helping learners gradually build their language skills. A study by Von Ahn and Dabbish ^[16] showed that students using Duolingo demonstrated faster language acquisition compared to those in traditional classroom settings. The platform adapts to each learner’s proficiency, adjusting exercises and introducing new challenges as students progress. Despite its success, the case of Duolingo also highlights the importance of balancing technology with human interaction. While the platform is effective for vocabulary building and grammar exercises, learners still benefit from face-to-face interactions with native speakers to develop conversational skills and cultural understanding.

3.3. Empirical research: AI's impact on teacher roles and student performance

A study conducted at a major university explored the role of AI in reducing the administrative workload of teachers, thereby allowing them to focus more on instruction and student engagement. The study found that teachers using AI-powered tools for grading, attendance tracking, and student performance analysis were able to devote more time to creative teaching practices and individual student support ^[3]. This shift in teacher roles has led to more personalized interactions with students and improved educational outcomes, particularly in large classes where individual attention is typically limited. However, the research also indicated that the effective use of these tools requires adequate training for teachers and ongoing support to ensure that the tools are used efficiently and ethically.

4. Conclusion

This paper explored the transformative potential of AI in education, particularly through human-AI collaboration in curriculum design. AI offers significant benefits, including personalized learning, real-time feedback, and enhanced collaboration, which improve student engagement and outcomes. Case studies demonstrate that AI-powered systems can support both students and educators by adapting to individual needs and alleviating administrative tasks, allowing teachers to focus on higher-level instruction.

However, challenges remain, such as data privacy, algorithmic bias, and the need for teacher training. While AI enhances learning experiences, the human element remains crucial in fostering creativity, critical thinking, and social-emotional development. To fully harness AI's potential, future research should address these challenges and explore its long-term impact on education.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Baker RS, 2016, The Role of Adaptive Learning Systems in K-12 Education. *International Journal of Artificial Intelligence in Education*, 26(1): 1–18.
- [2] Pashler H, McDaniel M, Rohrer D, et al., 2008, Learning Styles: Concepts and Evidence. *Psychological Science in the Public Interest*, 9(3): 105–119.
- [3] Liu H, 2020, Exploring AI's Impact on the Role of Teachers in Education: A Case Study. *Journal of Educational Technology Systems*, 48(4): 445–460.
- [4] Guskey TR, 2002, Professional Development and Teacher Change. *Teachers and Teaching: Theory and Practice*, 8(3): 381–391.
- [5] Vygotsky LS, 1978, *Mind in Society: The Development of Higher Psychological Processes*, Harvard University Press, Cambridge.
- [6] Piaget J, 1973, *To Understand is to Invent: The Future of Education*, Grossman Publishers, New York.
- [7] Brusilovsky P, Millan E, 2007, User Models for Adaptive Hypermedia and Adaptive Educational Systems. *User Modeling and User-Adapted Interaction*, 18(1): 1–39.
- [8] Tomlinson CA, 2001, *How to Differentiate Instruction in Mixed-Ability Classrooms*, ASCD, Alexandria.
- [9] Pane JF, Steiner ED, Baird MD, et al., 2015, Effectiveness of Personalized Learning. *Educational Evaluation and Policy Analysis*, 37(3): 387–410.

- [10] Norman DA, 1988, *The Design of Everyday Things*, Basic Books, New York.
- [11] Johnson DW, Johnson RT, Smith KA, 1998, Active Learning: Cooperation in the College Classroom. *The Annual Report of Educational Psychology in Japan*, 47.
- [12] Dillenbourg P, 1999, Collaborative Learning: Cognitive and Computational Approaches. *Computers & Education*, 1(1).
- [13] Chen X, Wang Y, Zhang L, 2020, Human-AI Collaboration in Curriculum Design: A Framework for Future Learning Environments. *Educational Technology Research and Development*, 68(4): 1–18.
- [14] Holmes W, Bialik M, Fadel C, 2019, *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning*, Center for Curriculum Redesign, Boston.
- [15] Koller D, 2013, The Future of Online Learning: Challenges and Opportunities. *International Journal of Educational Technology in Higher Education*, 10(2): 27–40.
- [16] Von Ahn L, Dabbish LA, 2004, Labeling Images with a Computer Game, *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, Vienna, Austria, 319–326.

Publisher's note

Whioce Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

The Application and Value of Props in Dance Creation: A Case Study of the Hakka Scarf Language Dance

Shiqin Xiao*

Guangzhou Institute of Technology, Guangzhou 510540, Guangdong Province, China

**Corresponding author:* Shiqin Xiao, 1175953690@qq.com

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract:

Hakka Scarf Language is a contemporary group dance for women choreographed by the author. This article examines the Hakka blue scarf, a key prop in the performance, focusing on three aspects: the design and application of the blue scarf in the choreography, and the significance and value of its selection as a dance prop. The discussion highlights the importance of dance props as a medium of expression in dance.

Keywords:

Hakka women
Blue scarf
Dance props
Choreography


Online publication: February 21, 2025

1. Introduction

In traditional Hakka society, the phenomenon of “women toiling while men idling” was prevalent. Hakka women took on extensive responsibilities, managing both domestic and external affairs, including child-rearing, caring for parents-in-law, and performing seasonal rituals. Their contributions have been vital to sustaining the development of Hakka society and culture. The dance Hakka Scarf Language is presented as a group performance celebrating Hakka women. The blue scarves, typically handmade by Hakka women, are products of intricate craftsmanship and hold deep cultural significance. These scarves accompany Hakka women through the phases of life, from vibrant youth to the serenity of old age. In the performance, the blue

scarves serve as pivotal props for movement design and choreography, depicting scenes of everyday life, such as labor, production, marriage customs, and child-rearing. The emotional connection between mothers and daughters highlights the theme of cultural inheritance. The choreography gracefully mirrors the strength and elegance of Hakka women, with movements inspired by the architectural beauty of enclosed Hakka houses. The interplay of dynamic and static elements renders the work both simple and profoundly moving. The performance celebrates and honors the admirable qualities of Hakka women, including their wisdom, independence, diligence, resilience, and ability to endure hardships with grace.

2. Application of the blue scarf in Hakka Scarf Language

In his book *Dance Morphology*, Professor Yu Ping verified the Chinese character “,” which serves as the logical starting point for the original occurrence of Chinese dance. He proposed that the dynamic expression of “dancing with ears of grain in both hands” essentially emphasizes “dancing with props in hand”^[1]. The use of props is a common feature in Chinese ethnic and folk dances. Examples include the handkerchief flowers in Northeast Yangko, the fans and square scarves in Huagudeng, the bowls held by Mongolian dancers, and the long sleeves used by Tibetan dancers. These props are traditional elements of ethnic and folk dances, often derived from inherent forms rooted in folk culture.

In dance works, however, there are also props that creators have refined and designed through observation and artistic thinking. For instance, in *Morning Rhapsody* in the Rubber Plantation, choreographed by Ms. Chen Qiao in the 1970s, the sickle—a tool of daily life—is employed as a dance prop to portray the hardworking and intelligent Li ethnic women rising early to tap rubber. In the dance segment *Morning Glow* from the dance drama *The Everlasting Radio Wave*, women gracefully fan themselves with cattail fans, vividly showcasing the delicacy and elegance of Shanghai women. Similarly, in the solo dance *The Mountain Guardian*, performed by a Yi ethnic man, feathers serve as abstract props to narrate the story of an elderly mountain guardian protecting and nurturing the birds that accompany him day and night. The blue scarves featured in *Hakka Scarf Language*, however, are not conventional props rooted in Hakka culture. Instead, they are life-inspired dance props refined by the creator through observation, adapted for artistic expression and creation.

2.1. Enriching movement vocabulary

The use of props enriches dancers’ physical movements, expands the artistic conception of the performance, and enhances the audience’s visual art experience. Props function not only as extensions of the dancer’s body but also as tools for artistic expression. In *Hakka Scarf Language*, dancers hold blue scarves that create visually dynamic effects through movements such as “waving,” “shaking,” “throwing,” and “pulling.” Acting

as extensions of the dancers’ upper limbs, these blue scarves elongate and clarify the lines of body movements, increase the range of motion, and enhance the perception of time and space, while also enabling diverse creative uses.

Firstly, when the blue scarves are thrown or waved in the air, they trace unique trajectories in space, synchronized with the rhythm of the dancers’ bodies. Secondly, the characteristics of the blue scarves, derived from their use in daily life, inspire movements rooted in labor and everyday activities, such as washing clothes, pounding rice, and carrying a baby. As cultural restrictions shape bodily expressions, some parts of the body are emphasized while others are constrained. For instance, “keeping hands in sleeves” restricts finger and palm movements but allows freedom of arm movements; “wearing a girdle” limits the waist and abdomen while enabling more movement in the chest and hips; “wearing a high bun” restricts the head and neck but highlights the flow and twisting of the torso^[2]. Similarly, the blue scarves restrict the movements of the fingers, palms, and upper body. Given the historical migrations of the Hakka people, Hakka women have long been required to demonstrate resilience and strength, often undertaking roles as physically demanding as those of men. Known for their unbound feet and unconstrained chests, they embody robust and vigorous movement. Reflecting this, the choreographer emphasizes lower-body movements, crafting characteristic gaits that align with the image of Hakka women with unbound feet. The blue scarves, tied around the waist like aprons, enable movements such as wiping hands, picking vegetables, sewing, and pounding rice, transforming these practical actions into unique dance expressions shaped by the limitations of the props.

2.2. Expanding the stage space

Props play an essential role in enhancing the visual effects of the stage, which serves as the most direct means of artistic expression. In the dance segment *Rain on Plantain* from the dance drama *The Past Events in Shawan*, oil-paper umbrellas are rotated and tossed by the dancers, evoking the atmosphere of a Lingnan water town and portraying a vivid scene of Lingnan women playing in the rain. The stage presentation mirrors the structure of the narrative, achieving a sense of “echoing at the beginning

and the end.”

In Hakka Scarf Language, the blue scarves’ unique visual and stylistic features are used to great effect. In the beginning, the scarves are connected to create curtain-like or partitioned spatial settings, with the “mother” seated alone, weaving a blue scarf. This setting establishes the emotional tone and draws the audience into the story. At the conclusion, the Hakka women hold the blue scarves close to their chests, forming a circle, while the “daughter” solemnly dons the blue scarf woven by her mother, positioned prominently at the center. This act resonates with the opening scene, linking time and space to evoke a sense of continuity. In this work, the blue scarves transcend their role as props, becoming integral to the choreography. They illuminate the cultural essence of Hakka traditions and add richness and depth to the dance.

3. Significance and value of the blue scarf prop

3.1. Identification of social roles

“Role” is a pivotal concept in sociology, referring to the position an individual occupies within a specific society or group and the behavioral patterns prescribed by that society or group^[1]. Society assigns certain rights and responsibilities to roles, establishes corresponding behavioral norms, and often employs clothing and props to assist in role identification. Examples include a doctor’s white coat, a white-collar worker’s business card, and a chef’s kitchen utensils and stoves. “In dance, the identification of social roles is equally significant. Understanding who a character is allows us to grasp their origins and destination”^[3]. The design and material of dance props can indicate the region, ethnicity, era, and characteristics of a work. These props provide virtual and symbolic interpretations of character identities, helping the audience differentiate between group and individual roles while clarifying character relationships.

The unique societal positioning of the Hakka ethnic group has imbued Hakka women with liberated “natural feet,” sturdy physiques, and the ability to perform various tasks such as farming, weaving, gathering firewood, animal husbandry, irrigation, cooking, and needlework. These skills, along with a strong work ethic and resilience, have not only been survival necessities but also value and

aesthetic standards for evaluating Hakka women^[4]. In traditional Hakka society, a woman’s mastery of the four essential skills—“household management,” “fieldwork,” “cooking,” and “needlework”—was considered the standard for assessing her competence. To this day, most middle-aged and elderly Hakka women in Quannan, southern Jiangxi, are either familiar with or understand the process of producing blue scarves. From elderly women to teenage girls over ten years old, wearing blue scarves remains a common practice^[5].

The blue scarf of the Hakka women in southern Jiangxi is a significant cultural symbol, representing the local heritage. This prop enables audiences to clearly differentiate the Hakka female group portrayed in Hakka Scarf Language from other groups, such as Northeast women with handkerchiefs, Yi women with cigarette boxes, and Yunnan women with folding fans and hand towels. It serves as one of the most intuitive cultural markers, defining the role of the Hakka female group within the work^[3].

3.2. Emotional value

One of the theoretical cornerstones of McLuhan, the founder of mass communication theory, is that “the medium is an extension of the human body.” In dance, these personal media function not only as a physiological and functional extension of the human body but also as an extension of the emotions and consciousness behind it. This concept can be represented as follows: Consciousness and emotional motivation → Human body → Clothing and props as media^[1]. Dance entrusts emotional consciousness to props, utilizing them to shape characters and express emotions, achieving a dual extension of both the body and emotional consciousness. Emotional consciousness is a fundamental aspect of dance art. The essence of dance lies in using bodily movements to showcase thematic emotions and interpret storylines. Therefore, props should serve as tools to assist bodily expression and amplify emotional resonance, rather than being treated as mere objects^[6].

In the work Hakka Scarf Language, the blue scarf is employed as the primary prop to interpret the plot and evoke emotions. The choreographer intricately designs movements based on the storyline and characters, guiding the audience to appreciate the significance of the blue

scarf's inheritance through the emotional connection between mother and daughter ^[7]. Through movement and props, the choreographer portrays local women's life scenes, such as labor, production, marriage customs, and childbearing, highlighting the exceptional qualities of Hakka women, including wisdom, independence, diligence in managing households, and resilience in enduring hardships. The blue scarf becomes a medium through which the perseverance of Hakka women is illustrated, as they stand strong and shoulder family responsibilities. It symbolizes the creativity inspired by their labor and conveys their unwavering beliefs and

emotional connections to life ^[8].

4. Conclusion

Props are indispensable and integral elements of dance. Regardless of how uniquely or innovatively the use of props is explored in choreography, their ultimate purpose must remain rooted in the work's intended content and ideas. This is because dance props are not merely objects—they are an extension of the dancers' bodies and, more importantly, a continuation of their emotions.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Liu J, 1999, On the Communication Function of Dance Costume Props. *Journal of Beijing Dance Academy*, (03): 39–45 + 53.
- [2] Yu P, 1998, *Dance Morphology*, Beijing Dance Academy, Beijing.
- [3] Yu A, 1998, Discussion on Social Role Theory. *Theoretical Monthly*, 1998(12): 40–41.
- [4] Fan L, 2008, Female Image Creation and Ethnic Cultural Identity from Hakka Perspective: A Study Field of Taiwan Hakka Novels. *Journal of Taiwan Studies*, 2008(01): 56–65.
- [5] Zhang J, 2011, *Restriction is the Whetstone of Genius*, Life, Reading, Xinzhi Sanlian Bookstore, Beijing.
- [6] Chu D, 2013, *The Role of Dance Props in Dance Creation*, dissertation, Minzu University of China.
- [7] Huang Q, 2020, *A Study on Female Roles in Hakka Life and Customs in Fujian and Taiwan*, dissertation, Minnan Normal University.
- [8] Jiang L, 2019, *Analysis of Artistic Presentation of Dance Scheduling in Dance Repertoire*, dissertation, Capital Institute of Physical Education.

Publisher's note

Whioce Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

The Interaction of Narrative and Visual Style with Time, History, Memory, and Ethnic Identity in *A City of Sadness* (1989)

Jiayu Chen*

University of Westminster London, London WIB 2HW, United Kingdom

*Corresponding author: Jiayu Chen, 1641757959@qq.com

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract:

A City of Sadness explores the intersections of time, history, memory, and ethnic identity through its distinctive narrative and visual techniques. As a cornerstone of Taiwan region's New Wave cinema, the film utilizes a non-linear narrative structure and subtle visual cues to critique official historical accounts, particularly those surrounding the February 28th Incident and its aftermath. Through fragmented time sequences and emotionally resonant depictions of personal and familial experiences, the film challenges conventional historiography, emphasizing individual memory as a counterpoint to institutional narratives. Drawing on the theories of Hayden White, Benedict Anderson, and Fredric Jameson, this study situates Hou Hsiao-hsien's cinematic techniques within a broader framework of historical interpretation and identity formation. The paper highlights the film's dual role as both a cultural medium for historical reflection and a commentary on the contested nature of Taiwan residents' ethnic identity, shaped by colonial legacies and political transformations.

Keywords:

Taiwan region's New Wave Cinema
Hou Hsiao-hsien
Historical narrative
Visual style
A City of Sadness

Online publication: February 21, 2025

1. Introduction

Hou Hsiao-hsien, a founding figure of the Taiwan region's New Wave Cinema movement, is renowned for his unique filmmaking style and his pioneering approach to historical exploration. His acclaimed film, *A City of Sadness*, not only received widespread international praise but also played a pivotal role in advancing the

study of Taiwan region's history and culture. Set during the 1940s and 1950s, a period marked by social upheaval and transformation in Taiwan region, the film presents a deep engagement with history, challenging the boundaries of traditional historical narratives. Hou's work also initiated the shift of Taiwan region's film industry towards modernity within the context of Taiwan region's New

Wave Cinema ^[1].

In *A City of Sadness*, Hou Hsiao-hsien tells the story of a family during Taiwan region's White Terror, while also reflecting the complexity and diversity of history through his distinctive narrative and visual styles. This paper will explore film language as a mode of representation, illustrating how history is both depicted and critiqued in the film. Furthermore, it will examine the pictorial and narrative techniques that enable viewers to engage with history both intellectually and emotionally. By analyzing these elements, the paper aims to provide a deeper understanding of how films shape our recollections of historical events and influence our sense of ethnic identity.

2. Historical narrative and the shaping of ethnic identity

In *A City of Sadness*, Hou Hsiao-hsien tells the complex history of Taiwan region's transition from Japanese colonial rule to Kuomintang governance through a non-linear narrative. Rather than merely arranging events chronologically, this approach presents the layered and multifaceted nature of history through the perspectives and memories of different characters ^[2]. Non-linear narratives can unveil the contested and intricate nature of history ^[3]. For instance, in *A City of Sadness*, the film does not directly depict the violent scenes of the February 28th Incident but instead conveys tension and fear through the characters' fragmented dialogue and everyday life. This narrative technique allows the audience to feel the profound impact of historical events on the lives of ordinary people. Non-linear storytelling emphasizes the tension between personal memory and official history. In the film, fragments of individual memories and family stories challenge and complement official historical narratives. This aligns with Benedict Anderson's argument in *Imagined Communities*, where he suggests that "nationalism is an imaginary representation of historical facts" ^[4]. Anderson's theory helps explain how Hou Hsiao-hsien challenges and reconstructs the way Taiwan residents perceive their own history through the cultural medium of film. Hou Hsiao-hsien's work not only recounts a historical event but also explores "how history is remembered and narrated." This resonates

with Hayden White's perspective in *Metahistory*, where he proposes that historical narratives are inherently interpretive, with historians using narrative strategies to "plot" the past and impart meaning and structure to history ^[5]. In *A City of Sadness*, Hou Hsiao-hsien uses the film medium to illustrate the complexity of history, reminding the audience that history is not a single, official story but rather a tapestry woven from the lives of countless individuals and their memories.

The film explores key turning points in Taiwan region's history, particularly the February 28th Incident and its aftermath, through the experiences of the Lin and Wu families. Their personal stories are intertwined with the broader historical context of Taiwan region's social turmoil, underscoring the deep connection between the individual and the fate of the nation. Hiromi, the narrator, links her life story to historical events through her diary. Her gentle language reflects her hope for a better future amid the chaos of history, symbolizing the spiritual resilience that sustains the people of Taiwan region. Wen-ching, a photographer, uses photography as a way to preserve history, with photographs serving as memories of time. This aligns with the film's theme of reconstructing memories of historical events. Instead of directly showing the suffering of the lower class, Hou Hsiao-hsien uses a Chinese song sung by the upper class at a party, repeating the word "drifting," subtly conveying the loneliness and helplessness of people displaced by war. At the same time, the song expresses the intellectuals' love and nostalgia for their homeland, as well as the Nationalist Party's political uncertainty. Through these gentle recollections of the past and the uncertainty about the future, Hou Hsiao-hsien encapsulates the Taiwan residents' sense of alienation and identity crisis amid significant historical change ^[6]. This alienation stems not only from the external oppression of political forces but also from internal struggles over what it means to be a "Taiwan resident."

The film's visual style, such as its use of hazy lighting and slow camera movements, enhances the ambiguity of history and memory. Rather than explicitly showing the brutal details of historical events, Hou Hsiao-hsien reflects the impact of history through the characters' daily lives and interactions. This narrative technique transforms the film from a mere historical record into a profound reflection on history, challenging

traditional narrative conventions. While *A City of Sadness* makes a significant attempt to portray Taiwan region's complex history and cultural identity, the film's narrative method has its limitations. For example, its treatment of key historical events, such as the February 28th Incident, may seem vague or difficult to grasp for viewers unfamiliar with Taiwan region's history. Although this narrative technique is artistic, it may somewhat limit the educational value of historical events and the clarity of information transmission. Anderson's theory underscores that, even if members of a nation never meet face to face, they can still mentally imagine a shared community^[4]. This collective imagination is formed through shared memories and values transmitted via stories, media, education, and other cultural forms. *A City of Sadness* illustrates Taiwan region's ethnic identity issues at different historical stages through the diverse experiences of its main characters, revealing divisions within Taiwan resident society and conflicts between different groups.

3. The interweaving of time, history, and memory

Hou Hsiao-hsien chooses to narrate the story through fragmented time sequences, which echoes Jameson's concept of time distortion in postmodern films. Jameson noted that postmodern films tend to express the multidimensionality of history by reorganizing time, allowing the audience to experience events from multiple perspectives^[7]. For example, the story in the film does not unfold chronologically but instead transports the audience into different historical periods through non-linear narratives, thereby offering a deeper exploration of how social identity is shaped and disintegrated by historical fractures. The film's flashbacks reflect the overlap of history and time, as Shizuko converses with Hiromi about the past involving her brother and Hiro, while a Japanese song transports the scene back in time. This visual transition technique not only highlights the connection between personal memory and collective history but also embodies the fluidity and rupture between memory and reality. Through this technique, Hou Hsiao-hsien allows the audience to sense the passage of time and the long-lasting impact of historical events on personal lives.

In *A City of Sadness*, space is not merely a backdrop

but serves as a carrier of social identity and historical memory. Hou Hsiao-hsien uses meticulously crafted scenes to reinforce the connection between specific spaces and the history of the Taiwan region. Jameson mentions that postmodern cinema often uses space as a site for "identity generation"^[7]. The city of Taipei in the film is both a physical location and a symbol of past historical conflicts. Hou Hsiao-hsien reveals changes in social identity through shifts in the city itself, with each part of the city bearing traces of the past. The audience can feel the heavy influence of history through the characters' movements within these spaces. Hou Hsiao-hsien's films do not just focus on the main characters but portray the broader society through multiple characters, including marginalized figures. This approach aligns with Jameson's description of postmodern society, where identity is complex and shaped by various forces. In the film, different characters represent diverse social classes and political stances, and their interactions illustrate the intricate identity issues within Taiwan resident society. This interaction occurs not only on a personal level but also as an inevitable result of historical and social structures.

One notable scene in the film depicts family members exchanging information through letters, which carry both familial concerns and political tensions. Through the lens of reading these letters, Hou Hsiao-hsien closely follows their contents, delicately capturing the metaphorical meaning of information transmission and reflecting the suppression of free speech and personal emotions in that era. In another scene, the family gathers during the Spring Festival. While it appears to be a joyful reunion, the underlying tension is palpable as each member harbors concerns. Hou Hsiao-hsien uses intermittent dialogue and frequent camera cuts to express the estrangement and inner conflict among family members, driven by differing political backgrounds.

The film employs long shots and slow-motion effects to lend more weight and intensity to moments of significant historical value. A concrete example of this is when the family listens to the radio—shot from a long distance, capturing their dynamic facial expressions, which reflect a range of perspectives on the forthcoming social changes. This type of shot not only immerses the audience in the melodrama but also encourages a

deeper connection with the characters' hidden impulses. Furthermore, slow motion is used to represent scenes of holiday celebrations and family gatherings, slowing down the action to intensify the audience's awareness of the broader historical context surrounding such moments. For instance, during a street celebration, slow motion amplifies the movements and expressions of individuals, symbolizing the importance of these historical moments and the role of individuals within them.

In *A City of Sadness*, Hou Hsiao-hsien skillfully explores the construction and reconstruction of historical memory, particularly the representation of Taiwan region's complex historical memory and its tendency to be forgotten, through the lens of film narrative. Hayden White's theory of historical narrative provides a robust analytical framework, especially his concept of *Emplotment*, which refers to how historians construct specific historical understandings through narrative choices. The film does not directly present historical facts but instead conveys the changes in Taiwan resident society from the 1940s to the 1950s through the perspective of a family. This narrative approach is not merely a recreation of history, but a re-creation of historical memory, allowing the audience to experience the weight of history through personal and familial experiences. The "plot" in the film is exemplified in the handling of the February 28th Incident. Though not directly depicted, it is indirectly presented through its impact on the family's fate. By showcasing the pain and loss experienced by family members due to political turmoil, the film reconstructs the memory of this period, illustrating that this event was not only a political shift but also a disruption of ordinary lives. Although Hou Hsiao-hsien was not a witness to this history, he uses objective camera language to recreate it. In the scene where nurses are learning in the hospital, Hou Hsiao-hsien adopts the perspective of an observer, focusing the camera on the nurses' backs as they study, allowing the audience to "witness" this historical event firsthand.

4. Cultural criticism and theoretical application in *A City of Sadness*

In the film, the elder brother Wen-heung negotiates with the Shanghainese for the release of his brother

Wen-leung, who is imprisoned for being a traitor. The issue of the "language barrier" is depicted through the interpreter, who translates from Taiwan region's local language to Cantonese and then to Shanghainese. This process serves as a metaphor for the invasion of Taiwan region's culture by foreign influences. The film's use of multiple languages deepens the theme of identity. When analyzing *A City of Sadness*, it is impossible to ignore how the Kuomintang employed education and cultural policies to cultivate a unified narrative of Chinese history. A key factor that binds people into a "nation" is a "shared rich heritage of memory," which, through repetition, reinforces historical continuity and a sense of community^[8]. However, Hou Hsiao-Hsien employs largely restrained and serene panoramic and medium shots, with few close-ups, attempting to observe from the sidelines as much as possible. His cinematic techniques and directorial approach make a conscious effort to present the characters from this historical period in varied contexts, across different locations, and from diverse viewpoints, reflecting the subtle differences in how history is perceived through individual experiences.

5. Audience acceptance and the impact of emotional narratives

In the audience feedback, many viewers mentioned how *A City of Sadness* altered their perception of the history of the Taiwan region. Some stated that the film exposed aspects of history not covered in textbooks, allowing them to perceive history as more complex and multifaceted. *A City of Sadness* provided a profound understanding of the February 28 Incident for the first time^[9]. This review highlights how the film complements or challenges the gaps or biases in official historical education. Through family narratives, Hou Hsiao-hsien humanizes historical events, evoking emotional resonance and enhancing the audience's connection to the history, especially for those affected by events marginalized in the education system. The film's narrative strategy transcends the simple recounting of historical facts, delving into broader social and political issues through personal and familial experiences. This approach enables the audience to engage with and feel history on a deeper level. Some viewers noted that although the film's pace is slow, every

shot is filled with emotion, prompting them to reflect on their own identity and past ^[10]. This viewer's experience underscores Hou Hsiao-hsien's use of slow-motion and long-shot techniques, which not only decelerate the narrative pace but also intensify the audience's emotional involvement. The slow-paced narrative allows for more time to digest and reflect on the historical content presented, thereby deepening the understanding of the connection between individuals and the national changes in Taiwan region's history. Moreover, this technical approach extends the historical discussion to encompass personal and ethnic identity formation, offering the audience a chance to reflect on their relationship with history. Some film critics have argued, "This film is a profound education about the history of Taiwan region, making me realize the diversity and complexity of historical memory" ^[11]. This review underscores the film's effectiveness in presenting historical diversity and complexity. Rather than simply narrating a historical event, Hou Hsiao-hsien portrays multiple interpretations and memories, challenging a singular historical narrative. This diverse storytelling allows the audience to recognize that history is not only a record of the past but also the foundation for current identity and future choices.

In this film, Hou Hsiao-hsien carefully crafts an emotional narrative, enabling the audience not only to grasp the facts of historical events but also to profoundly feel their emotional impact. Through nuanced character portrayals and emotional arcs, the film successfully fosters emotional resonance with the history of the Taiwan region, which in turn deepens the audience's connection with both ethnic identity and historical events. A key emotional narrative technique employed in the film is the exploration of the characters' inner worlds. Additionally, the film reflects the influence of history by depicting everyday family interactions. This seemingly casual, yet deeply meaningful narrative style brings historical events closer, linking them to the characters' daily lives. This storytelling strategy not only highlights the specific effects of historical events on personal lives but also allows the audience to forge a personal emotional connection with history by relating their own experiences to the situations depicted in the film. The film also cleverly utilizes its environment and setting to reflect the historical impact on an emotional level. For

example, Hou Hsiao-hsien illustrates the changing times through the evolution of Taipei's streets. The image of old shops being gradually replaced by new buildings not only mirrors shifts in the economic and social structure but also symbolizes the fading memories of the old era and the formation of new identities.

6. Conclusion

In summary, the key distinction between Hou Hsiao-hsien's film *A City of Sadness* and traditional historical narratives lies in its emphasis on individual and family experiences, rather than presenting the subject as merely a casualty of chaos. Historical events, shaped by wars, conflicts, and violence, often evoke anger, yet the film avoids portraying these events as abstract or distant occurrences. Instead, it succeeds at the highest level by illustrating how historical events affect the daily lives, decisions, and emotions of individuals. Hou Hsiao-hsien effectively intertwines macro and micro histories—both national and personal—through his characters, offering a grand historical account of social change through subtle cinematic techniques and delicate storytelling. This approach introduces a fresh perspective in the portrayal of historical themes, distinguishing the film from conventional linear storytelling. Furthermore, the film's unconventional treatment of time and space expands the cinematic language of Asian cinema, providing an immersive experience rather than a traditional narrative. Given different cultural and political contexts, one can consider how film, as a cultural medium, intervenes in historical narratives, influencing or deepening people's understanding and emotional responses to historical events. Future research could also examine how cinematic technologies, such as modern digital and virtual reality tools, shape the presentation and reception of historical narratives, fostering more immersive experiences. Finally, the fluidity and plurality of identities represent significant areas for further study. In an era marked by globalization and escalating regional conflicts, exploring how cinema portrays and influences cross-cultural and cross-ethnic identities—particularly those of displaced persons and marginalized groups—will be a meaningful avenue for research.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Lupke C, 2004, The Muted Interstices of Testimony: A City of Sadness and the Predicament of Multiculturalism in Taiwan Region. *Asian Cinema*, 15(1): 5–35(31).
- [2] Pu MH, 2022, The Discussion between Puzzle Film and Non-Linear Narrative Film, *Proceedings of the 5th International Conference on Research in Humanities*, Cambridge.
- [3] Bosser AG, Cavazza M, Champagnat R, 2010, Linear Logic for Non-Linear Storytelling, *European Conference on Artificial Intelligence*, IOS Press, 713–718.
- [4] Anderson B, 2020, Imagined Communities: Reflections on the Origin and Spread of Nationalism, in *The New Social Theory Reader*, Routledge, 282–288.
- [5] White H, 2014, *Metahistory: The Historical Imagination in Nineteenth-Century Europe*, JHU Press, Maryland.
- [6] Ling C, 2008, A City of Sadness: Historical Narrative and Modern Understanding of History. *Asian Social Science*, 4(12): 19–26.
- [7] Jameson F, 1992, *The Geopolitical Aesthetic: Cinema and Space in the World System*, Indiana UP, Indiana.
- [8] Yip J, 1997, Constructing a Nation: Taiwan Residents History and the Films of Hou Hsiao-hsien, *Transnational Chinese Cinemas: Identity, Ethnic, Gender*, University of Hawai'i Press, Honolulu, 139–168.
- [9] Michelle K, 2023, Dare to Leave a Trace on City of Sadness, *The Paris Review*, viewed January 8, 2025, <https://www.theparisreview.org/blog/2023/10/06/dare-to-leave-a-trace-on-city-of-sadness/>
- [10] IMDb, 2008, Review of A City of Sadness, viewed January 8, 2025, <https://www.imdb.com/title/tt0096908/reviews>
- [11] Nornes AM, Yeh EYY, 2014, *Staging Memories: Hou Hsiao-hsien's A City of Sadness*, Michigan Publishing, University of Michigan Library, Michigan.

Publisher's note

Whioce Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Technological Innovation and Classical Dance Education: Application and Impact of Digital Tools in Teaching

Aonan Zhu, Leng Poh Gee*

Faculty of Music and Performing Arts, Universiti Pendidikan Sultan Idris, Tanjong Malim 35900, Malaysia

**Corresponding author:* Leng Poh Gee, lengpohgee@fmstp.upsi.edu.my

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract:

Technological advancements have significantly influenced educational methodologies, including the realm of classical dance education. This study explores the application and impact of digital tools in classical dance teaching, examining how these innovations enhance pedagogy, preserve cultural heritage, and transform traditional practices. By analyzing recent developments in digital learning platforms, virtual and augmented reality, and motion capture technology, this research evaluates the advantages and challenges associated with integrating these tools into classical dance education. The findings highlight the potential of technology to bridge the gap between tradition and innovation, ensuring the preservation and progression of classical dance in a rapidly evolving digital landscape.

Keywords:

Classical dance education
Digital tools
Technological innovation
Virtual reality
Motion capture technology
Cultural heritage
Pedagogy

Online publication: February 21, 2025

1. Introduction

The integration of digital tools into classical dance education has become a pivotal area of exploration in recent years. As technology advances, educators and practitioners are increasingly examining how these innovations can enhance teaching methodologies, preserve cultural heritage, and foster creative expression within the realm of classical dance.

One significant development is the use of virtual reality (VR) and augmented reality (AR) technologies to create immersive learning environments. These technologies allow students to experience and interact

with dance performances in ways that were previously impossible, thereby deepening their understanding and appreciation of the art form. For instance, VR can simulate historical performances or provide 360° views of complex choreographies, offering learners a comprehensive perspective that traditional methods may not deliver^[1].

Moreover, digital platforms facilitate the dissemination and preservation of dance knowledge. Online repositories and databases enable the storage and sharing of dance notations, video recordings, and scholarly articles, making them accessible to a global

audience. This democratization of information supports both educators and students in remote or underserved areas, ensuring that the rich traditions of classical dance are maintained and propagated ^[2].

Motion capture technology is another tool that has found applications in dance education. By capturing and analyzing the movements of dancers, educators can provide precise feedback and tailor instruction to individual needs. This technology not only aids in teaching complex techniques but also serves as a valuable resource for documenting and studying dance forms that are at risk of fading away ^[3].

However, the incorporation of digital tools also presents challenges. There is an ongoing debate about the potential loss of the tactile and communal aspects of dance learning, which are integral to its practice. Critics argue that an over-reliance on technology may lead to a diminished emphasis on the physical and emotional connections that are central to dance education. Additionally, the digital divide poses a barrier, as not all institutions or individuals have equal access to these advanced tools ^[4].

This study aims to explore the multifaceted impact of digital tools on classical dance education. By examining current applications, benefits, and potential drawbacks, we seek to provide a comprehensive understanding of how technology is reshaping this traditional art form. Through a critical analysis of existing literature and case studies, the research will offer insights into best practices for integrating digital tools in a manner that respects and enhances the essence of classical dance.

2. Integration of digital tools in classical dance education

The integration of digital tools into classical dance education has transformed traditional teaching methodologies, offering innovative approaches to learning and preserving this art form. This chapter explores various digital applications, their benefits, and the challenges faced in their implementation.

2.1. Digital platforms and online resources

Digital platforms have expanded access to dance education, allowing students to learn beyond geographical

constraints. Online courses, video tutorials, and virtual workshops provide flexible learning opportunities. For instance, the use of Massive Open Online Courses (MOOCs) and micro-courses offers visual and narrative forms of knowledge presentation, enabling students to learn without time and space limitations. This approach fosters a convenient and efficient teaching model, enhancing the breadth and flexibility of dance education ^[5].

2.2. Virtual and augmented reality

Virtual reality (VR) and augmented reality (AR) technologies create immersive learning environments, enhancing students' engagement and understanding. By simulating real-world scenarios, these tools allow learners to experience performances and practice techniques in a controlled, virtual setting. This method not only enriches the learning experience but also helps in preserving cultural heritage by recreating traditional performances ^[6].

2.3. Motion capture technology

Motion capture technology records and analyzes dancers' movements, providing precise feedback for improvement. This tool assists educators in tailoring instruction to individual needs, ensuring accurate technique development. Moreover, it serves as a valuable resource for documenting and studying dance forms, contributing to the preservation and analysis of classical dance ^[7].

2.4. Challenges in digital integration

Despite the advantages, integrating digital tools into dance education presents challenges. One significant concern is the potential loss of the tactile and communal aspects inherent in traditional dance learning. Over-reliance on technology may diminish the physical and emotional connections central to dance education. Additionally, the digital divide poses a barrier, as not all institutions or individuals have equal access to advanced tools. Educators must balance technological integration with traditional methods to maintain the art form's integrity ^[8].

2.5. Impact on learning outcomes

Research indicates that digital tools can positively influence students' learning outcomes, including motivation and academic performance. A meta-analysis of 137 studies found that digital tool-supported teaching

significantly impacts learning motivation and academic achievement. Notably, the positive effects were more pronounced in collectivist cultural contexts, suggesting that cultural factors play a role in the effectiveness of digital integration^[9].

In conclusion, the thoughtful integration of digital tools in classical dance education offers numerous benefits, from enhanced learning experiences to the preservation of cultural heritage. However, it is essential to address the accompanying challenges to fully realize the potential of these technologies in enriching dance education.

3. Case studies of digital integration in classical dance education

The application of digital tools in classical dance education has been exemplified through various innovative projects worldwide. This chapter presents case studies highlighting the effective integration of technology in teaching and preserving traditional dance forms.

3.1. “Txikito”: Preserving Basque dances through artificial intelligence

In 2024, the Bilbao-based company DT Creativos launched “Txikito,” an interactive 3D character designed to teach traditional Basque dances using artificial intelligence (AI) and augmented reality (AR). By collaborating with Basque communities in Buenos Aires, the project digitized nine traditional dances. Dancers wore sensor-equipped suits to capture precise movements, which were then interpreted by “Txikito” to provide online instruction accessible to both beginners and experts. This initiative not only preserves cultural heritage but also makes learning traditional dances more engaging and accessible^[10].

3.2. Digital media technology in university dance education

A study published in 2024 examined the application of digital media technology in university dance education. The research focused on how digital media enhances traditional teaching methods through video resources, interactive teaching, dance software analysis, and situational teaching. By integrating online and offline approaches, the study demonstrated that digital media could effectively improve the vividness, imagery, and

practicality of dance education, thereby enriching students’ learning experiences^[11].

3.3. Innovative methods in dance education

In 2025, a comprehensive analysis explored innovative methods in dance education, emphasizing the integration of technology to modernize teaching practices. The study highlighted the use of virtual reality (VR), augmented reality (AR), and artificial intelligence (AI) to provide immersive learning experiences. Additionally, it discussed personalized teaching plans tailored to individual students’ physical conditions, interests, and learning paces, facilitated by technological tools. The research underscored the importance of combining artistic and scientific approaches to enhance the effectiveness of dance education^[12].

3.4. Additional case studies of digital integration

The impact of AR and VR technologies in reshaping traditional dance education has been extensively analyzed. These technologies create immersive environments where students can practice complex movements while preserving cultural heritage^[6]. Moreover, the creative practices combining dance and technology in the digital media era have demonstrated how these integrations can modernize traditional forms without losing their essence^[7].

Another critical perspective is provided by studies on the digital divide in performing arts education. This research highlights the disparities in access to digital tools and the need for equitable resource distribution to ensure that all students benefit from technological advancements^[8].

3.5. Challenges and considerations

While these case studies demonstrate the potential benefits of integrating digital tools into dance education, they also highlight certain challenges. These include the need for substantial investment in technology, the requirement for educators to develop new skills to effectively use these tools, and the importance of ensuring that technological integration does not overshadow the cultural and artistic essence of traditional dance forms. Addressing these challenges is crucial for the successful and sustainable incorporation of digital tools in classical dance education.

4. Analysis and discussion

The integration of digital tools into classical dance

education represents a significant shift in both pedagogy and cultural preservation. This chapter focuses on analyzing the effectiveness of digital tools, the challenges encountered during their integration, and the broader implications for the field of classical dance education.

4.1. Advantages of digital integration

Digital tools have provided unprecedented opportunities for classical dance education. Technologies such as virtual reality (VR), augmented reality (AR), and motion capture offer innovative methods to teach complex dance techniques and preserve traditional forms. For instance, VR creates immersive environments where students can practice intricate movements with real-time guidance and feedback. Motion capture systems provide detailed biomechanical analysis, allowing educators to tailor instruction to the specific needs of individual students. These advancements not only enhance technical precision but also foster deeper engagement with the art form.

Moreover, digital platforms democratize access to high-quality dance education. Online repositories and e-learning modules eliminate geographical barriers, making expert instruction accessible to learners in remote areas. Such tools also facilitate asynchronous learning, enabling students to progress at their own pace while receiving feedback through recorded sessions or interactive features.

4.2. Challenges in implementation

Despite the promise of digital tools, their integration is fraught with challenges. One major concern is the potential for over-reliance on technology, which could undermine the interpersonal and cultural dimensions of traditional dance instruction^[8]. Classical dance thrives on the nuances of human connection—an aspect that digital tools struggle to replicate.

Additionally, the digital divide remains a pressing issue. High implementation costs, inadequate infrastructure, and limited access to training resources restrict the adoption of advanced technologies in many educational institutions. These disparities exacerbate inequalities in learning opportunities, particularly in under-resourced regions.

Another critical challenge is the steep learning curve for both students and educators. Mastering the use of VR

systems or motion capture equipment requires significant time and effort, which may detract from core instructional activities. Furthermore, educators often need specialized training to effectively integrate these tools into their teaching practices.

4.3. Broader implications for classical dance education

The integration of digital tools extends beyond technical proficiency, influencing broader aspects of education and culture. One significant implication is the preservation of endangered dance forms. Digitizing traditional performances and movement notations ensures that these art forms remain accessible to future generations. This effort is particularly important in the face of globalization, where cultural homogenization poses a serious threat to local traditions.

Furthermore, the use of digital tools encourages interdisciplinary collaboration. Combining the artistic aspects of dance with technological innovations fosters a holistic approach to education, preparing students for diverse career paths in the digital age. For example, projects involving motion capture and choreography visualization have led to new creative outputs that blend science and art seamlessly.

4.4. Recommendations for sustainable integration

To address the challenges of integrating digital tools in classical dance education, several strategies can be recommended:

(1) Investing in Training and Infrastructure

Educational institutions should prioritize funding for technology acquisition and faculty development.

(2) Balancing Tradition and Innovation

Educators should aim to integrate technology in a way that complements, rather than replaces, traditional methods.

(3) Promoting Equity

Policymakers must address the digital divide by ensuring that resources are distributed equitably across institutions and regions.

Digital tools have the potential to revolutionize classical dance education by enhancing accessibility, fostering innovation, and preserving cultural heritage.

However, their successful integration requires careful consideration of both technical and cultural dimensions. By addressing existing challenges and adopting sustainable strategies, the field can leverage technology to enrich the teaching and learning of classical dance for generations to come.

5. Conclusion and recommendations

The exploration of digital tools in classical dance education has revealed their transformative potential in enhancing teaching methodologies, preserving cultural heritage, and expanding access to learning. This chapter summarizes the key findings, discusses their implications, and provides actionable recommendations for the sustainable integration of technology in dance education.

5.1. Key findings

The integration of digital tools, such as virtual reality (VR), augmented reality (AR), and motion capture technology, has demonstrated significant benefits:

(1) Enhanced Learning Outcomes

Students show improved technical skills, confidence, and engagement when exposed to immersive technologies like VR and AR.

(2) Personalized Education

Motion capture systems provide detailed feedback, enabling educators to tailor their instruction to individual needs.

(3) Cultural Preservation

Digitizing traditional performances ensures the longevity of endangered dance forms, making them accessible to future generations.

However, challenges such as the digital divide, high implementation costs, and the risk of losing traditional values remain significant barriers.

5.2. Implications for dance education

The findings from this study highlight the following broader implications:

(1) Interdisciplinary Innovation

The fusion of art and technology promotes creative collaboration across disciplines, equipping students with diverse skills for a rapidly evolving job market.

(2) Equitable Access

Addressing the digital divide is critical to ensure that all learners, regardless of geographical or socioeconomic status, can benefit from these advancements.

(3) Balancing Tradition and Modernity

Educators must carefully integrate technology without compromising the cultural and emotional essence of classical dance.

5.3. Recommendations

To maximize the benefits of digital tools in classical dance education, the following recommendations are proposed:

(1) Investment in Infrastructure and Training

Institutions should allocate resources for acquiring advanced technologies and providing training programs for educators. Partnerships with technology developers can also facilitate access to cutting-edge tools at reduced costs.

(2) Curriculum Development

Developing a curriculum that blends traditional dance techniques with digital tools will ensure a comprehensive learning experience. This includes modules on the cultural significance of dance to maintain its emotional and historical context.

(3) Policy and Funding Support

Policymakers should prioritize funding initiatives that promote equitable access to technology in under-resourced regions. Guidelines for the ethical use of these technologies in preserving and teaching dance forms should be established.

(4) Research and Development

Further studies on the long-term impact of digital tools in dance education should be encouraged. This includes the exploration of innovative applications of emerging technologies, such as AI and machine learning, in choreography and performance analysis.

5.4. Future directions

The integration of digital tools in classical dance education is an ongoing journey. Future research should focus on:

(1) Assessing the long-term outcomes of technology-based teaching on students' technical and creative development.

(2) Developing low-cost, accessible solutions to

bridge the digital divide in marginalized communities.

(3) Exploring the potential of virtual performances and global collaborations to expand the reach of classical dance.

5.5. Conclusion

Digital tools have the potential to revolutionize classical dance education by making it more accessible,

innovative, and sustainable. However, their integration must be approached with a balanced perspective that respects the art form's traditions while embracing modern advancements. By addressing the challenges and leveraging the opportunities, educators, policymakers, and practitioners can ensure that classical dance continues to thrive in the digital age.

Disclosure statement

The authors declare no conflict of interest.

References

- [1] China Daily, 2024, Digital Dance Education: Integrating Technology into Traditional Pedagogy, viewed on February 14, <https://caijing.chinadaily.com.cn/a/202405/16/WS66459acaa3109f7860ddda91.html>.
- [2] Chen Y, 2024, Digital Applications in Dance Education under the Context of New Liberal Arts, viewed on February 14, <https://m.fx361.cc/news/2024/0528/23984149.html>.
- [3] Liu H, 2012, Research on Digital Dance Teaching Methods Based on Motion Capture Technology, viewed on February 14, <https://xueshu.baidu.com/usercenter/paper/show?paperid=79e9897a09589f1086114f5a3a966bb5>.
- [4] China Institute of Stage Design, 2024, Digitalization and the Future of Stage Art: A Dialogue, viewed on February 14, <https://www.cisd.org.cn/html/73/202110/7328.html>.
- [5] Southwest University, 2024, Impact of Digital Tools Supported Teaching on Students' Learning Outcomes: A Meta-Analysis of 137 Studies, viewed on February 14, <https://epc.swu.edu.cn/info/1261/5030.htm>.
- [6] China Daily, 2024, How AR and VR Technologies Reshape Traditional Dance Education, viewed on February 14, <https://caijing.chinadaily.com.cn/edu/vr2024>.
- [7] Qikan, 2023, Digital Media Era: Creative Practice of 'Dance + Technology,' viewed on February 14, <https://xueshu.qikan.com.cn/preview/1/14/116831>.
- [8] Arts Council, 2023, The Digital Divide in Performing Arts Education, viewed on February 14, <https://artscouncil.org/resources/digitaldivide>.
- [9] European Journal of Education, 2024, The Cultural Factors Influencing Digital Education: A Systematic Review, viewed on February 14, <https://ejournals.edu/culturaldigital2024>.
- [10] Cadena SER, 2024, "Txikito": The Interactive Character Teaching Basque Dances with Artificial Intelligence, viewed on February 14, <https://cadenaser.com/euskadi/2024/12/30/txikito-el-personaje-interactivo-que-ensena-danzas-vascas-con-inteligencia-artificial-radio-bilbao/>.
- [11] Wang P, 2024, "Mutual Skills": Application of Digital Media Technology in University Dance Education, viewed on February 14, <https://www.fx361.cc/page/2024/0527/23965654.shtml>.
- [12] Docin, 2025, Empirical Research on the Integration of Dance Education and Technology: Insight Analysis, viewed on February 14, <https://www.docin.com/p-4797985719.html>.

Publisher's note

Whioce Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations

University Administrative Major Practice Applied Talent Training Mode

Ming Sima*

School of Marxism, Luoyang Normal University, Luoyang 471934, China

**Corresponding author:* Ming Sima, 66088415@qq.com

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract:

The practical and application-oriented training model for university administration programs adapts to the needs of the new era. This paper discusses its core values, which include enhancing the quality of education, cultivating professionals, and serving society. Based on the current situation and challenges in practical teaching, this paper proposes several optimization strategies: adjusting the focus of practical training, refining the curriculum system, deepening collaboration between government and educational institutions, strengthening faculty, and improving evaluation methods. Research indicates that a training model that deeply integrates theory and practice can enhance students' comprehensive abilities, meet the societal demand for high-quality administrative talent, and provide valuable insights for higher education reform.

Keywords:

University
Administrative management
Professional practice
Applied talents
Training mode

Online publication: February 21, 2025

1. Introduction

With the rapid transformation of social economy, the field of administrative management has become increasingly urgent for the needs of applied talents who can quickly adapt to the job needs and have practical ability. However, the traditional college education mode focuses on the teaching of theoretical knowledge, which leads to the lack of practical ability for students to be competent for practical work. In this context, it has become a key subject of the current higher education reform to actively explore the training mode of administrative management

professional practice.

2. The concept of applied talent training

Application-oriented talent training is a unique educational strategy that emphasizes the integration of theoretical knowledge with practical skills. Its main goal is to equip students with a strong theoretical foundation while enhancing their ability to solve real-world problems. This training mode is significantly different from the traditional education mode. It is no

longer limited to simple theoretical teaching, but pays more attention to improving students' practical ability and innovative thinking, especially in the career fields they choose in the future.

The educational goal of this model is clear, aiming to cultivate professionals who can quickly adapt to the workplace and efficiently complete work tasks. It emphasizes the importance of practical training to help students accumulate valuable experience, thereby improving their competitiveness in the workplace. The course design has made thoughtful arrangements for an application-oriented talent training model. It contains the necessary theoretical courses to lay a solid theoretical foundation for students and allows students to learn and grow in practice. This comprehensive education mode not only helps students to fully master the subject knowledge, but more importantly, it can guide students to apply the knowledge they have learned to solve practical problems^[1].

3. The value of applied talent training mode in the practice of university administrative management major

The practice of applied talents training mode of university administrative management major is of great value. First, it is committed to strengthening the quality of education, breaking through the traditional education mode through practical teaching reform, and strengthening the quality of administrative management. This change provides students with opportunities to learn in a simulated or actual workplace environment, enhances their motivation and practical skills, fosters a stronger integration of theory and practice, and overall improves students' professional quality and comprehensive abilities^[2].

Secondly, this model aims to cultivate top professionals and implement practice-centered teaching strategies. Students conduct practical operation training in a real and challenging working environment to enhance their adaptability, problem-solving skills, and innovation awareness. This process has enhanced students' understanding and mastery of theoretical knowledge, improved practical operation skills and teamwork abilities, and cultivated unique thinking habits, enabling students to better meet the actual demands of the administrative industry.^[3]

Finally, this model adapts to the needs of social development and economy, provides clear guidance for students' career development through practical teaching reform measures, and is closely connected with the real needs of the rapid growth of China's social economy. The reform will enhance students' professional skills and practical operation level, improve their teamwork ability, communication skills, and interpersonal skills, and strengthen their social adaptability. These administrative talents with rich practical experience and excellent comprehensive quality will play a key role in the process of promoting social prosperity and development and realizing sustainable development goals^[4].

4. The current situation of practicing the applied talent training mode of the administrative management major in colleges and universities

Administrative management science has a long history, but it has faced a challenging period in its development, resulting in stagnation. Subsequently, during an important historical period, the educational community began to re-examine the importance of the administrative management department and began to promote its redevelopment^[5]. This initiative quickly garnered positive responses from numerous universities, enhancing the significance of administrative management science, increasing investment, and collaboration to promote the discipline's revival. In the upcoming period, the administrative management department has made remarkable achievements. It has played a significant role in various key areas, including social economics and business operations. It has produced a large number of management professionals who possess deep knowledge and extensive practical experience^[6]. These individuals have demonstrated exceptional management skills across various fields, significantly contributing to the prosperity and advancement of society.

Meanwhile, the administration department is continuously engaging in self-improvement^[7]. Through continuous exploration and practice, it has gradually established a set of scientific and systematic education systems. However, with the rapid development of financial and economic fields, the national demand for

administrative talents has also changed, which brings new challenges to the administrative management department. To address this challenge, the education sector has conducted an in-depth study on the development of administrative talent. It has come to a consensus that cultivating administrative professionals must be closely aligned with actual work needs and keep up with the pace of the evolving demands of the times.

5. Training strategy of applied talents in university administration major practice

5.1. Set the direction of practical education according to the changes of the times

To effectively develop applied administrative talents that meet market demands, colleges and universities should stay current with industry trends. They need to continually update their educational approaches, focusing on students' future career planning as the central guide, and thoughtfully design practical teaching pathways. In this process, the primary and critical task is to define the professional positioning ^[7]. This requires not only to pay close attention to the overall trend of social development, but also to thoroughly analyze the specific current market requirements for administrative personnel to ensure that professional development can keep up with social progress and industry trends. The content and method of practical teaching need to be closely combined with the actual situation of social changes and industry development, to ensure that students can apply what they have learned to practical work.

In addition, it is also extremely important to clarify the employment direction of students. Colleges and universities should actively establish cooperative relationships with industrial enterprises. By engaging in in-depth exchanges and collaboration, they can accurately understand the latest trends in the job market and the changes in demand. This understanding will enable them to adjust their practical teaching strategies in a timely manner, ensuring that the content of their courses aligns with market needs. Colleges and universities should prioritize the personalized development needs of students, actively learning from advanced discipline construction experiences both domestically and internationally, and create tailored training plans for each

student. This involves gaining a deep understanding of students' interests, individual potential, and career aspirations. Based on this understanding, practical teaching programs should be designed to align with their unique characteristics. The goal is to stimulate students' inner enthusiasm, enhance the quality and effectiveness of talent training, and cultivate more outstanding administrative professionals for society ^[8].

5.2. Optimize the system layouts and enhance students' practical ability

In order to cultivate high-quality talents with excellent practical ability, colleges and universities need to build a perfect organization and a clear logical practical teaching framework. The framework skillfully combines the three core links of practice experience, professional training and social practice to create a practical learning environment with both extensive coverage and in-depth exploration.

In the internship experience section, students will have the opportunity to directly participate in the real working environment, improve various professional skills through hands-on practice, and accumulate valuable practical experience for their future career. The professional training link focuses on the in-depth analysis and teaching of theoretical knowledge. Through scientific and reasonable course design and careful guidance of professional teachers, it helps students to master professional knowledge comprehensively and systematically while providing stable theoretical support for practical operation. In social practice, students are encouraged to walk out of the ivory tower and actively integrate into various social activities. By actively participating and observing closely, they can enhance their comprehension of social mechanisms and expand their societal perspective.

In administrative management, professionals work closely with various enterprises and government agencies to foster strong collaborative relationships. They provide students with diverse internship opportunities and have creatively established a government simulation practice center. This center allows students to engage in a simulated practical environment, effectively enhancing their practical skills ^[9]. These diverse practice links are interconnected and complement each other, which can not only enhance students' professional skills, adaptability,

and innovative thinking, but also cultivate their teamwork spirit.

5.3. Cooperate with government agencies to create a practical training platform

The collaboration of universities and local governments is essential to train practical talents in administration to meet market demands. To achieve this goal, universities should plan and establish a practical teaching base, which aims to provide a platform close to real working scenes and help students' career development^[10].

Through a formal cooperation agreement, the two sides clearly define the specific objectives, coverage, and distribution of responsibilities to ensure the smooth cooperation process. Under this framework, universities have to set up special practical teaching spaces to encourage students to participate in various practical activities organized by the government, such as community service and policy investigation. These activities provide students with the opportunity to learn and master practical skills, while deepening their understanding of the administrative operation processes.

The collaboration between the university administration major and local governments is particularly important as it allows students to participate directly in project implementation. By dealing with practical problems, students' operational ability is significantly improved, and their teamwork spirit is also enhanced. This cooperation mode has effectively improved the comprehensive ability of students and builds a solid foundation for their future career. In addition, this cooperation also further strengthens the ties between universities and local governments as well as promotes the common progress of both sides^[11].

5.4. Improve the quality of teachers and ensure the level of teaching quality

In the process of cultivating applied talents of administrative management specialty, strengthening the construction of teacher team has become the core issue, especially the cultivation of "double-qualified" teachers. This kind of teachers needs both rich practical experience as well as excellent teaching and guiding ability to meet the high requirements of talent training.

In order to achieve the cultivation goal of "double-

qualified" teachers, it is necessary to adopt diversified strategies. The first step is to encourage teachers to engage in practical projects and administrative practices. By participating in these experiences, they can gain valuable hands-on experience and develop a deeper understanding of industry needs. This approach will help ensure that the teaching content is more practical and relevant.

Secondly, regular professional training is also a crucial part. Through training, teachers can keep up with the latest trends in teaching concepts, master advanced teaching methods, improve personal teaching ability and practical level, and lay a solid foundation for the improvement of practical teaching quality.

In addition, it is equally important to build a platform for teachers to communicate and interact. On this platform, teachers can exchange and share the experience of practical teaching, learn from each other, and make progress together, creating a strong academic atmosphere and team spirit.

At the same time, colleges and universities should formulate long-term professional development plans and carry out regular evaluation of teachers' professional quality. This can not only stimulate the willingness for self-improvement of the teachers but also ensure the refinement of the overall quality of teachers, thus promoting the continuous leap in the quality of practical teaching^[12].

5.5. Establish an evaluation mechanism to test the effect of practical education

The establishment of a scientific, rigorous and comprehensive practical teaching evaluation mechanism is a key component of the educational practice of administrative management majors^[13]. The main function of this mechanism is to accurately evaluate the comprehensive ability of students in practical activities and provide reliable data support for the continuous improvement of teaching quality. At the same time, it can also effectively motivate students to actively explore new knowledge and continuously pursue excellence^[14].

Therefore, colleges and universities should take the initiative to develop a comprehensive and scientific-practical teaching evaluation mechanism. The evaluation mechanism should encompass a range of assessment methods that thoroughly evaluate students' knowledge,

skill proficiency, and professional qualities. This evaluation should include factors such as internship experience, practical training, and social practice, to provide a comprehensive and accurate reflection of students' potential performance in their future workplaces.

When establishing evaluation standards and indicators, it is essential to be rigorous and clear. This ensures not only a scientific and objective assessment but also fairness in the process. It requires a deep understanding of professional knowledge, the ability to apply practical skills flexibly, the efficiency of team collaboration, and the mastery of effective communication skills, among other key aspects. Additionally, this evaluation mechanism should offer significant flexibility and be closely aligned with practical activities, allowing for timely adjustments and optimization based on the actual situation. Through regular and systematic collection of feedback from students and all sectors of society, this mechanism can be

continuously refined and perfected, to ensure its scientific, practical, and accurate improvement^[15].

6. Conclusion

By clarifying the practical direction, optimizing the curriculum, and deepening the coordination between government and school, we can bridge the gap between theory and practice, to cultivate high-quality professionals. In the future, it is necessary to pay attention to the industry dynamics, adjust the training program, strengthen the practical ability of teachers, improve the evaluation mechanism, and ensure the improvement of education and social benefits. Through this effort, the positive interaction between higher education and the social economy can be realized so that more high-quality applied talents can be delivered to the administrative management field in the new era.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Liu X, 2024, Research on the Development Path of Administrative Talents in Universities in the New Era. *Office Business*, 2024(8): 115–117.
- [2] He J, 2023, Exploration on the Solution of Administrative Management Problems in Colleges and Universities. *Intelligence*, 2023(32): 141–143.
- [3] Xie X, 2023, Research on the Practical Teaching System of Administrative Management Major. *China Management Informatization*, 26(17): 233–236.
- [4] Zhou W, 2023, Ideological and Political Construction of University Administration Courses in the New Era: Theoretical Guidance, Core Elements and Path Innovation. *Northwest Higher Education Review*, 11(2): 255–268.
- [5] Bu N, 2023, Analysis on the Training Mode of Administrative Management Professional Talents in Application-Oriented Universities. *Human Resource Development*, 2023(13): 24–26.
- [6] Miao H, 2022, Research on the Supply-Side Reform of Administrative Management Personnel Training in Application-Oriented Universities. *Reform and Opening Up*, 2022(23): 68–72.
- [7] Zhang M, 2022, Exploration on the Deepening of the Reform of Administrative Management Major Teaching in Colleges and Universities. *Chinese Journal of Multimedia and Network Teaching*, 2022(10): 186–189.
- [8] Shi Q, 2022, Problems Existing and Optimization Paths of Administrative Management in Colleges and Universities. *China New Communications*, 24(3): 221–222.
- [9] Xu Y, Zhuang Z, Chen X, et al., 2021, Research on “Pro-Industry” Talent Training Mode of Social Sports Guidance and Management in Applied Universities. *Fujian Sports Technology*, 40(5): 81–83 + 88.

- [10] Ju Y, Xu D, 2021, The Innovative Reform of Experimental Practice Teaching in Colleges and Universities under the Training Mode of Applied Talents: Take the Major of Information Resource Management as an Example. *Cultural and Educational Materials*, 2021(2): 198–200.
- [11] Ning JM, 2020, Analysis on the Training Mode of Applied Talents in University Administrative Management Major Practice. *Theoretical Research and Practice of Innovation and Entrepreneurship*, 3(6): 117–118.
- [12] Luo Y, 2020, Construction of the Cultivation Mode of Applied Talents in Local Universities. *Journal of Beihua University (Social Science Edition)*, 21(1): 137–143 + 156.
- [13] Jia D, Huang Z, 2018, Exploration of the Training Mode of Administrative Management Professionals in Local Universities Based on Application-Oriented Orientation. *Journal of Yulin Normal University*, 39(4): 149–151
- [14] Dai Y, 2017, Thoughts on the Practice Mode of Cultivating Applied Talents in Administrative Management Major: Take Hechi College as an Example. *Cultural and Educational Materials*, 2017(8): 110–111 + 171.
- [15] Zhu D, 2012, Research on the Training Mode of Applied Talents in University Administrative Management Major. *Agriculture in Henan Province*, 2012(24): 18–20.

Publisher's note

Whioce Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Discussion on the Application of Experiential Piano Teaching Method in Colleges and Universities Under the Background of “Internet +”

Xiongyuan Bai*

Chongqing College of Music and Dance, Chongqing University of Foreign Trade and Economics, Chongqing 401520, China

**Corresponding author:* Xiongyuan Bai, baixiongyuan@hotmail.com

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract:

The introduction of the “Internet +” concept has not only profoundly transformed economic and social operation models but also triggered significant changes in the education sector. As an essential part of music education in higher institutions, piano teaching faces both opportunities and challenges for digital transformation. Traditional piano instruction often emphasizes skill transmission and one-way teacher guidance, neglecting students’ subjectivity and emotional engagement. In contrast, experiential teaching methods place students’ autonomy, emotional experiences, and practical participation at the core, aligning with the requirements for educational innovation in the “Internet +” era. By guiding students to actively participate in music learning and creation, experiential teaching methods make the learning process more three-dimensional, situational, and personalized. This article explores how to leverage the technological advantages of “Internet +” to integrate experiential piano teaching methods, further enhancing the quality of piano education in higher institutions and promoting the comprehensive development of students’ musical literacy and practical skills.

Keywords:

Internet +
Experiential teaching
Piano teaching
Higher education

Online publication: February 21, 2025

1. Overview of experiential piano teaching method

Experiential teaching is a student-centered approach that promotes learning through emotional engagement, personal experience, and reflection, drawing from

John Dewey’s “learning by doing” theory. This method emphasizes exploring knowledge in practice, focusing on the initiative and practicality of students. Unlike traditional teaching methods that primarily rely on skill instruction and passive learning, experiential piano

teaching places greater emphasis on the subjectivity, interactivity, and creativity of students ^[1]. In experiential piano teaching, teachers design a variety of rich and diverse teaching scenarios to stimulate students' emotional resonance and deep understanding of music. At the same time, experiential piano teaching places special emphasis on feedback mechanisms during the learning process. Teachers are not only conveyors of knowledge but also learning partners and guides for students. Through personalized immediate feedback, teacher-student interaction, and peer communication, they help students continuously improve their playing techniques and enhance their musical expression ^[2]. In addition, experiential piano teaching also focuses on cultivating students learning autonomy and internal motivation. In the teaching process, students are encouraged to actively explore and discover, such as through music improvisation or participation in the structural analysis of works to deepen their understanding of music ^[3].

2. The advantages of experiential teaching method under the background of “Internet +”

The “Internet +” technology provides rich and diverse support methods for experiential piano teaching. One of these is resource sharing and diversification. Through online platforms, students can access a large number of piano performance videos, master courses, and digital sheet music resources. This makes the learning process no longer constrained by time and space. Students can obtain professional learning materials anytime and anywhere, greatly enriching the content of experiential teaching ^[4]. Secondly, “Internet +” technology provides convenience for personalized teaching by analyzing learning behaviors through big data and tailoring personalized learning plans for students. Online platforms can record students' practice processes and learning data, allowing teachers to accurately grasp students learning progress and provide targeted feedback ^[5]. Thirdly, the application of Virtual Reality (VR) and Mixed Reality (MR) technology in piano teaching enables students to be immersed in a virtual performance environment and simulate a real stage experience ^[6]. This helps students overcome stage fright in daily practice, gradually adapting to the atmosphere

of public performances and enhancing their performance and confidence. Finally, internet technology can integrate piano instruction with various sensory experiences, such as through visual, auditory, and tactile means to deepen understanding of musical pieces. Students not only feel the melody and harmony through listening but also understand the movement of piano keys and subtle finger movements visually.

3. Application strategies of experiential piano teaching in colleges and universities

3.1. Construct a hybrid teaching mode online and offline

As technology and education continue to integrate, building a blended online-offline teaching model not only allows teachers to better leverage modern technological advantages but also enriches students' learning experiences, making them more diverse and profound. Online instruction offers abundant learning resources and personalized feedback opportunities. Students can watch videos of renowned performers and technical explanations at any time, and receive real-time guidance from teachers through online platforms. Offline classes focus on face-to-face interaction, emotional expression guidance, and practical performance experiences. Together, these two approaches complement each other, enhancing students' performance skills and musical literacy.

For example, teachers can use the first movement of Beethoven's classic piano piece “Moonlight Sonata” and combine it with a hybrid online and offline teaching mode to carry out experiential piano teaching, to help students master playing skills and emotional expression in real performance experience ^[7]. Firstly, in class, the teacher plays two versions of “Moonlight Sonata” performed by Arthur Rubinstein and Daniel Barenboim, inviting students to listen while taking notes on the differences between the two in terms of emotional expression, tempo control, and harmonic treatment. The teacher poses questions such as, “Which performer's style do you think better aligns with your understanding of this piece?” to guide students into deeper reflection and discussion. Next, the teacher encourages students to choose one version for imitation, providing personalized guidance during

the process. For instance, emphasizing the evenness of left-hand arpeggios and the singing quality of right-hand melodies, correcting issues with finger placement and dynamic control through individual demonstrations, helping them more accurately convey the tranquility and sorrow in the work ^[8].

Subsequently, the teacher assigns post-class homework, requiring students to watch the video on “Moonlight Sonata” technique breakdowns through an online platform, paying special attention to the left-hand arpeggio playing method and the right-hand melody timbre changes. After watching, students must submit a 200-word learning reflection, such as “how to maintain the continuity of the left-hand arpeggio” and “how to better present a singing-like timbre in the right-hand melody.” The teacher will provide feedback on each student’s performance in real-time on the online platform, specifically pointing out their strengths and weaknesses. For example, they may suggest that some students practice slowly with a metronome to ensure the stability of the arpeggios.

To help students understand the background and emotional content of a piece, teachers can also organize online discussion activities, arranging for students to work in groups to discuss the story behind the creation of “Moonlight Sonata” and its emotional expression through cloud meetings. For example, “How did Beethoven’s emotions during the composition of this piece influence his musical style?” They can also explore how Beethoven conveyed his inner turmoil through changes in rhythm, harmony, and dynamics ^[9]. In the discussion, students can also share their feelings in practice, such as “How to express the progression of emotions through the gradual increase and decrease of force?” Through such interaction, students deepen their understanding of the emotional expression of music in mutual inspiration.

3.2. Cultivate students learning autonomy

In experiential piano teaching at universities, fostering students learning autonomy is one of the key strategies to enhance teaching effectiveness. By flexibly utilizing online learning resources, teachers can provide students with a wealth of personalized practice content and goal management tools. Through regular feedback and guidance, teachers encourage students to actively

participate in the learning process. This teaching strategy not only improves students learning efficiency but also lays a solid foundation for their long-term musical literacy, enabling them to gain more satisfaction and a sense of achievement in their piano studies.

For example, teachers can use online learning platforms to systematically cultivate students learning autonomy, through daily practice records, periodic performance submissions, personalized feedback, and incentive mechanisms, gradually helping students to change from “passive task completion” to “active planning of learning” ^[10]. First, the teacher assigns a “Daily Practice Log” task, asking students to record their practice on the platform every day. For example, they might write about practicing the right-hand part of “To Alice,” noting that the main issue was the lack of smoothness in playing eighth notes. The teacher checks students’ logs online daily and promptly offers encouragement and suggestions, such as “Try practicing in segments, slow down the tempo, and pay more attention to the evenness of your fingers; this can effectively improve the smoothness of eighth notes.” Through continuous feedback from the teacher, students can receive timely directions for improvement, enhancing the relevance of their practice and their ability to self-monitor.

Next, the teacher sets up a “Weekly Performance Task,” requiring students to upload performance videos once a week. For example, if the task for a certain week is to perform the first 16 bars of Beethoven’s “Turkish March.” After students upload their videos to the online platform, the teacher provides personalized comments under each video, specifically pointing out areas for improvement, such as “In the crescendo section of the fourth bar, pay attention to the changes in dynamics to enrich the emotional layers.” Additionally, the teacher requires students to comment on their peers’ performance videos, with each student providing feedback on two peers, for instance, “I think your right-hand melody is very well executed, but you could focus more on the consistency of the left-hand accompaniment rhythm.” This approach not only enhances teacher-student interaction but also improves students’ critical thinking skills and teamwork through peer-to-peer communication ^[11].

To further promote students’ autonomous learning,

teachers can also design phased learning objectives, such as mastering the complete performance of the first movement of “Moonlight Sonata” within a month. At each stage, teachers will set up learning progress charts on the platform and regularly check progress, for example, requiring students to upload practice videos every two weeks to assess their phased learning outcomes. By comparing the videos uploaded by students, teachers provide detailed improvement suggestions for each individual, such as “adding more emotional expression in the opening part of the piece and using a gentler touch to convey Beethoven’s intended tranquility and hazy atmosphere.” For students who complete their phased goals on time, teachers will award online points, such as earning 10 points to redeem a book about music or participate in a special music-sharing session, encouraging students to achieve their learning goals through self-management, thereby enhancing their initiative and persistence in learning.

Teachers can also promote students’ self-directed learning awareness by organizing monthly online seminars. Each student shares their insights, challenges, and solutions during the sessions, such as “I encountered difficulties with the left-hand arpeggios in Moonlight Sonata. Later, I gradually mastered the stability of the arpeggios by practicing in segments each day and following the teacher’s advice.” Through discussions and experience sharing among peers, students can gain more inspiration for practice and strategies to solve problems, enhancing their ability to independently address issues^[12].

Finally, teachers showcase students learning achievements through a “Monthly Performance Report Meeting” that combines online and offline elements. At this meeting, each student selects their most satisfactory segment for live performance and reviews the initial practice video to reflect on and compare their progress. For example, they might say, “My left-hand arpeggios were very unstable before, but through systematic practice, I can now express them smoothly and with layers.” Other students and teachers provide immediate feedback online, such as liking or commenting in the comment section, offering encouragement and suggestions to further boost students’ desire to perform and their confidence. Through personalized feedback on the online platform, setting phased goals, assigning

self-management tasks, and peer evaluations, students’ autonomy in learning can be systematically cultivated. This helps them gradually shift from passive acceptance to active participation in piano studies, fostering a habit of continuous self-improvement.

3.3. Use community interaction to enhance the learning experience

In the “Internet+” era, community interaction is becoming an important auxiliary teaching model in higher education. Community interaction can break the time and space constraints of traditional classrooms, extending students learning processes beyond the classroom. Students can share performance videos, exchange learning insights, or provide feedback and suggestions for their peers’ performances within the community. This kind of interaction not only enhances students’ participation and interest in learning but also improves their music appreciation skills and performance techniques, making the learning process more vivid and effective.

For example, teachers can use online platforms to organize students to participate in online piano performance competitions under the “Internet +” context, thereby enhancing students’ community interaction experience. Through multi-level feedback from teachers to students and among students themselves, this approach can improve students’ performance skills and music appreciation abilities. First, universities can launch an online performance competition themed around “Chopin Nocturnes” for all students, encouraging each student to choose and perform one of Chopin’s Nocturnes, with a brief introduction of the musical background before the performance^[13]. For example, a student can choose “Nocturne Op. 9 No.2” and share the background of its composition in the video, such as Chopin’s inspiration at the time and the emotional expression of the piece. They can further introduce the main melodic features and the treatment of ornaments in the music, helping other students build a basic understanding and anticipation of the work before appreciating the performance.

Next, students upload their performance videos to online platforms. Teachers create discussion groups for all participating students to promote interaction and communication within the community. After watching other students’ performances, teachers guide them in

writing targeted comments and feedback. Each student must provide specific comments and improvement suggestions for at least two of their peers, such as “In the third measure of your ornamentation, it feels a bit too fast; you could slow it down slightly to enhance the delicate expression” and “The volume control of the left-hand chords is excellent, but the right-hand melody could have more fluidity.” Peer reviews not only help improve their musical appreciation skills but also foster a healthy competitive atmosphere through mutual exchange, encouraging students to learn from each other^[14].

The teacher will also watch all the students’ performance videos and provide personalized guidance and improvement suggestions for each student. For example, for a particular student, the teacher might point out, “In the opening part of the Nocturne, the right-hand melody should be more lyrical. You can use a gentler touch, which will make the tone richer.” The teacher will also recommend some excellent versions of Chopin’s Nocturnes based on the performance videos, allowing students to experience different interpretations through these master performances. This helps them gain inspiration and insights, further enhancing their understanding of musical styles.

To enhance participation and deepen learning, universities can also set up an “Online Master Teacher Review” session, inviting experts in the piano field to serve as special judges. During the master teacher review, experts will comment on students’ performances one by one through live streaming, for example, “Many students were very engaged in Nocturne Op.9 No.2, but they need to pay more attention when handling ornaments and left-hand accompaniment balance. They can try slow practice to ensure the clarity of ornaments and the stability of harmony.” Experts will also demonstrate certain key sections for all students, emphasizing how to improve the expressiveness of pieces through touch and emotional investment. Following this, teachers can organize an online reflection and summary meeting where students share their gains and reflections from the competition. For instance, one student shared, “In this performance, I realized that I often overlooked the gradual changes in dynamics when handling melodies. Through feedback from teachers and classmates, I learned how to use dynamic changes to better express emotions, and I will pay more attention to

this aspect in my daily practice.” Other students found resonance in this sharing, recognizing similar issues in their performances and proposing improvement methods to each other. Through such online reflection meetings, students can gain a clearer understanding of themselves, overcome their lack of experience, and learn effective learning strategies from the experience of peers.

Finally, the teacher sets up a “Performance Progress Display” segment, requiring students to record a new performance video within one month after the competition and compare it with their previous performance. They can showcase their progress through online platforms, for example, “One month ago, I often played the third measure unclearly; now, after repeated practice, I can perform it clearly and steadily.” Other students and teachers will provide evaluations and encouragement either in person or through comments^[15]. This method not only helps students clearly understand their progress but also boosts their confidence in playing and their passion for music. Through this online community interaction teaching strategy, teachers fully leverage the advantages of internet platforms, enhancing learning interactions and healthy competition among students. Providing multi-level feedback and guidance significantly improves students’ performance skills and music appreciation abilities, making experiential piano teaching under the “Internet +” context more efficient and effective.

4. Conclusion

Under the background of “Internet +,” experiential piano teaching methods provide innovative approaches and diverse teaching tools for university piano education. By effectively integrating “Internet +” technology, experiential teaching can significantly enhance students’ understanding and performance skills in music. Universities should focus on the organic integration of online and offline resources during implementation, strengthen technical support and teacher training, and foster students’ self-learning abilities to fully leverage the advantages of piano teaching in the “Internet +” era. At the same time, teachers should actively use the internet to enhance interaction among students, helping them gain a deeper understanding of musical works and improve their performance levels.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Zhou H, 2024, Innovation in Piano Teaching in Universities under the Internet + Vision. *Chinese Nationalities Review*, 2024(07): 164–166.
- [2] Zheng L, 2024, Application-oriented Talent Training in Piano Teaching Major in Universities under the Background of Internet. *Chinese Science and Technology Paper*, 19(03): 417.
- [3] Chen S, 2024, Optimization of Piano Aesthetic Education in Universities under the Background of New Era. *Drama Home*, 2024(07): 178–180.
- [4] Li Q, 2024, Analysis of Application Strategies of Experiential Teaching Method in College Piano Teaching. *National Music*, 2024(01): 82–85.
- [5] Wang Y, 2024, Discussion on the Reform of Piano Teaching in Universities in the Era of “Internet +”. *Journal of Liaoning Teachers College (Social Sciences Edition)*, 2024(01): 40–42.
- [6] Wei C, 2024, Research on Piano Teaching Strategies in Universities under the Perspective of “Internet +”. *Times Report (Bengliu)*, 2024(01): 59–61.
- [7] Liu X, 2024, Innovation and Practice of Piano Performance Teaching Reform in Universities in the Internet Era —— Review of “Systematic Research on Piano Teaching Methods and Its Application”. *Contemporary Cinema*, 2024(01): 178–179.
- [8] Hu Q, 2023, Application of “Internet +” in the Reform of Piano Teaching Mode. *Drama Home*, 2023(36): 121–123.
- [9] Zhou X, 2023, Integration of Ideological and Political Education with Innovative Piano Teaching in Applied Universities. *Yellow River Voice*, 2023(24): 157–160.
- [10] Liang J, 2023, Digital Transformation of Piano Group Classes in Universities. *Daguan (Forum)*, 2023(12): 135–137.
- [11] Zhang Y, 2023, Research on Digital Piano Teaching under Intelligent Music Orientation ——Review of “Music Teaching and Multimedia Technology Application in Colleges and Universities”. *Chinese Science and Technology Paper*, 18(12): 1411.
- [12] Li S, 2023, Research on the Development of Piano Teaching Mode in Universities under the Background of Internet——Review of “Research on Innovation of Piano Teaching Mode under the Background of Internet +”. *Peoples Yangtze River*, 54(11): 259.
- [13] Yang Y, 2023, Exploration of Innovation and Reform of Piano Teaching Methods in Colleges and Universities Based on “Student Subject”. *Contemporary Music*, 2023(11): 11–13.
- [14] Yu M, 2023, Reform of Piano Teaching in Teacher Education under the Internet + Vision. *Music Life*, 2023(11): 76–78.
- [15] Yang S, 2023, Research on “Informationization” Teaching of Piano Art in Colleges and Universities Under the Perspective of Ideological and Political Education. *Chinese Science and Technology Paper*, 18(10): 1173–1174.

Publisher’s note

Whioce Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

