EnPress Publisher, LLC
Add: 9650 Telstar Avenue, Unit A, Suit 121, El Monte, CA 91731
Tel: +1 (949) 299 0192
Email: contact@enpress-publisher.com
Web: https://enpress-publisher.com

EnPress Publisher

International Journal of Mathematics and Systems Science

— Educational Systematics

9

2024 Volume 7 Issue 9
ISSN: 2578-1839

ISSN 2578-1839
09
9 772578 183072

Editorial Board

Editor-in-Chief

Editorial Board Member

Volume 7 Issue 9·2024
EISSN: 2578-1839

International Journal of Mathematics and Systems Science

Editor-in-Chief

Prof. Maria Alessandra Ragusa

Università degli Studi di Catania,

Italy

EnPress Publisher

EnPress Publisher

2024 | Volume 7 | Issue 9

International Journal of Mathematics and Systems Science

https://systems.enpress-publisher.com/index.php/IJMSS

Contents

Original Articles

Translation Strategies for Public Documents from the Perspective of Eco-Translatology:a Case Study of the 2023 Government Work Report in English

Yian Wang, Qinpeng Wang

Jiaxing Nanhu University, Jiaxing 314001, China

Abstract: Eco-Translatology provides a new perspective for translation through the combination of translatology and ecology. This article takes the 2023 Government Work Report as an example to explore how translators, guided by this theory, can coordinate linguistic, cultural, and communicative dimensions in the process of selective adaptation and adaptive selection to translate public documents.

Keywords: The Government Work Report; Eco-Translatology; Selective Adaptation; Adaptive Selection

1.Introduction

As an official public document, the government work report is an important medium for the dissemination of China's values and ideas as well as its future development direction. In the translation process of the report, requirements such as maintaining the objectivity of the text, localizing expression, coordinating and sharing cultural backgrounds, and preserving the original characteristics as much as possible highly fit with the core of "Eco-Translatology" proposed by Professor Hu Gengshen at Tsinghua University. This paper plans to conduct an analysis and comparative study on the translation of government work reports in 2023 from the perspective of Eco-Translatology, summarizing translation strategies that are conducive to the translation of official texts.

2.The guiding significance of Eco-Translatology on the translation of the Government Work Reports

Eco-Translatology is a translation theory proposed by Hu Gengshen, a professor at Tsinghua University, and its sustainability and practicality has been proved by many domestic scholars. The theory regards the original text, the translated text, certain readers, and the translators, even the publishing house as a whole translation system. The translator constantly carries out selective adaptation and adaptive selection, by using all kinds of translation strategies and techniques (literal translation, paraphrasing, naturalization, alienation and so on) and focusing on the linguistic dimension (using accurate vocabulary and sentence structure), cultural dimension(retaining the characteristics of the original expression and to achieve interoperability and mutual understanding) and the communicative dimension(conveying the underlying meaning or certain persuasion with purposes) in the translation process. The "conversion in three dimensions" is an important translation method in Eco-Translatology(Hu, 2011)[3]. Therefore, translation under the guidance of the Eco-Translatology will enable the translator to accurately, completely and comprehensively grasp the content and central idea of the source language text to convey it to the target readers in a more appropriate expression.

In order to strengthen the tone and highlight the emphasis, a large number of words with Chinese characteristics, such as four-word phrases, as well as proverbial proverbs are widely used in the Government Work Report, which are inevitably deviated when exporting cultural values.

Compared with the traditional translation theory, Eco-Translatology especially emphasizes the holism of translation and is based on the dynamic environment of translation activities, which is mixed with the considerations of life (author, translator, reader, etc.), ecology (balance in translation activities) and survival (spread and acceptance of translated texts), and in the meantime, it is mixed with the characteristics of "the golden means". Therefore, the translation becomes faithful to the original text in terms of overall dynamics. Also, the theory of Eco-Translatology holds that it is not a certain translation strategy that plays a decisive role in the translation process, but "the cumulative result of the translator's multi-dimensional adaptation to the translation ecosystem and adaptive choices" (Hu, 2004)[2].

Therefore, under the guidance of the Eco-Translatology, the translation of the Government Work Report can ensure that it can effec-

tively convey the original meaning, which is of stronger practical value and more in line with the requirements for political external publicity.

3.Analysis of English translation strategy of the 2023 Government Work Report based on Eco-Translatology

Under the influence of "Adaptation and Selection" in Darwin's theory of biological evolution, Professor Hu Gengshen put forward the "Translation Adaptation and Selection Theory" in 2004. It stresses the role of translators in translation activities, and the translator-centred view of translation is the core idea and important content of the theory of translation adaptation and selection (Hu, 2004)[2]. This theory is also one of the core concepts of Eco-Translatology.

4.Selective adaptation of two dimensions

According to the theory of Eco-Translatology and its "Translation Adaptation Selection Theory", before translating, the translator first needs to identify the differences between the source language and the target language and at the same time, needs to take into account other factors besides the language itself, such as history, economy, culture, ideology and so on. Therefore, translators need to adapt to the two languages and also let the two languages adapt to each other naturally before choosing translation methods and techniques. And this step includes both linguistic and non-linguistic adaptation and selection.

4.0.1 Linguistic adaptation and selection

There is a great difference between the word formation patterns of Chinese and English. There are quite a lot of four-character words in the Government's work report, which are well-structured, rich in meaning, making the expression of the sentence condensed and rich in deep meaning.

Example 1."We deepened reform and opening up across the board in an effort to create a new pattern of development."

Since Chinese is an ideographic language, the translator needs to adapt to the grammatical structure of English and add the missing subject and other parts to form a complete sentence in order to translate the real meaning clearly in the target language.

4.0.2 Non-linguistic adaptation and selection

As Hu Gengshen said, "The subject here is broadly defined, i.e., all the living beings involved in translation activities, including the author of the original text, translators, readers, translation initiators, sponsors, publishers, marketers, editors, and so on, i.e., the 'translation community'. The external environment may include the natural economic environment, linguistic and cultural environment, socio-political environment and so on related to the translation environment. The translation ecological environment is interwoven by various elements and is the sum of various natural and humanistic factors for the occurrence, existence and development of translation activities." (Hu, 2003)[1]. Due to the dynamic nature of both the subject and external environment of the translation ecosystem, translators need to adapt dynamically while considering various parts of the ecosystem, in order to present real-time and even time resistant translation.

Example 2. "an open world economy"

As a result of China's deepening openness to the world economy, the expression changed from "export-oriented economy" to "global-market-oriented economy" and "global economy" to the current expression. Taking into account the context of the passage in which the term is used and the evolution of the expression, the translator chose a more modern version to adapt to the economic, social and popular changes.

5. Adaptive selection of three dimensions

Selective adaptation is more detailed, mainly focusing on the practical level of translation, such as the selection of specific translation methods and techniques. The process mainly focuses on the three levels of linguistic, communication and culture, contributing to the realization of the harmony of the whole translation ecology.

5.0.3 Linguistic dimension

The conversion of translation between source language and target language inevitably requires translation methods such as direct translation, transliteration and paraphrasing to ensure the adaption in individual writing habits.

Example3. "...to strengthen themselves through reform, scientific and technological advances."

Chinese expressions have more repetitive structures compared to English(Lian, 2010)[6]. Repetitive structures form parallel sentences in Chinese, creating a stronger momentum, but if the translator directly translates them, they will be very cumbersome in the eyes of the target language readers. Therefore, the translator adopts the combination to "strengthen themselves through...advances", which is simple and concise and fits with the concise and succinct character of the government work report.

Example 4. "The Party successfully convened its 20th National Congress, during which it drew up an inspiring blueprint for building China into a modern socialist country in all respects."

In this translation, the subject of the original text is "the 20th Party Congress" can not make the action of "depicting", so there are two ways of adaptive selection: firstly, making the subject passive dynamic treatment, change to "The blueprint was drawn in the Congress...". This kind of expression adapts to the English expression habit and maintains the style of the source language as much as possible; Secondly, adopting the anthropomorphism technique, using more vivid and lively language to translate without changing the sentence structure of the source and target languages as shown above. It retains the overall structural framework of the original language, adds a different atmosphere to the translation, and facilitates the understanding of the target readers at the same time, thus realizing the optimal adaptive transformation.

Example 5. "Over the past five years, tax cuts and fee reductions respectively totaled 5.4 trillion yuan and 2.8 trillion yuan. This policy not only helped enterprises overcome difficulties and stay afloat, but also nurtured business growth and cultivated sources of tax revenue. "

In order to maintain semantic equivalence, the translated text of "cultivated sources of tax revenue..." presents the flexible expression in the source language with the most direct and essential connotation in front of the target readers, which is not only close to the original text, but also suitable for external dissemination.

These typical translations of the 2023 Government Work Report are faithful to the original ideas while adapting to the language, thinking and cultural habits of foreign readers, and achieve a balance between the ecology of the source language and that of the translated language.

Example 6. "Confronted with new downward pressure on the economy, we acted decisively and made timely adjustments. We made use of the policy tools kept in reserve over recent years, front-loaded the implementation of adopted policies, and remained firm in advancing supply-side structural reform. We unveiled and implemented a full range of policies and follow-up measures to stabilize the economy."

The lack of a subject in the sentence structure of the original sentence is a common phenomenon in Chinese expressions. According to the context and the understanding of the main idea, the absence of the subject does not affect the understanding of Chinese readers. In the first step of the translation process, the translator divided the original paragraph into three independent and complete English sentences. After adding the subject "we", the paragraph is first summarized by the sentence "We acted decisively and made timely adjustments", and then the measures mentioned in the source language are put into separate sentences, preserving the subject-verb structure of the original text. Finally, the sentence "We unveiled and implemented a full range of policies and follow-up measures to stabilize the economy." works as the conclusion of the whole paragraph. This approach achieves a balance between the ecology of the source language and the ecology of the translated language, and achieves ecological equivalence at the level of the "linguistic dimension".

5.0.4 Cultural dimension

There are big differences between Chinese and English culture, which are mainly reflected in the way of thinking, values and ideology. The translation of the Government Work Report needs to face readers with different cultural backgrounds, and its translation, as a role of bridge, should also refer to the political environment, cultural connotations of the appropriate conversion, taking into account the accuracy and acceptance of the target readers and, at the same time, avoiding misinterpretation as well as transmitting the cultural information contained in political terms to target readers.

Example 7. "Some local governments have used one-size-fits-all approaches or taken excessive measures when implementing policies."

"One-size-fits-all approaches" is a phrase from the first chapter of Liu Xinwu's The Bell and Drum Tower, which was originally intended to be a metaphor for the generalization, uniformity and absolutization of people, i.e., the mechanical singularity (in terms of concepts or ways of doing things) and the inability to do specific analysis of specific problems. In the 2023 government work report, it indicates inflex-

ible policies. The translator adopts the method of direct translation, which not only realizes the reasonable and accurate communication of the original text, but also avoids the ambiguity caused by cultural barriers, and realizes the conversion of the source language and the target language in the cultural dimension.

Example 8. " With these efforts, we have fully secured the food supply of more than 1.4 billion people."

The translator directly discarded the rhetorical device of reference and chose to directly translate the word as "food supply", breaking the cultural gap between Chinese and English, and changing the sentence style, which not only takes into account the expression of the target language readers' habits, but also ensures the output of the original language and culture.

5.0.5 Communicative dimension

Translation is a communicative act between different cultures through language. With the help of "the adaptive selection of communicative intent conversion in the translation process, the pursuit is that the communicative ecology of the original text and the translated text can be optimally maintained and preserved" (Hu, 2013: 238)[4]. "The Eco-Translatology focuses on grasping textual information in a macro and dynamic way, adopting an adaptive selection of conversion strategies, focusing on whether the communicative intent in the original text is reflected in the translated language system, and in particular, focusing on the equivalence of the translation of certain political terms with the political meaning of the original text, in order to achieve the purpose of interpretation, publicity and effective communication" (Lan, 2018: 53)[5]. Chinese political discourse system is nurtured in the profound traditional culture and rooted in the practice of socialist construction with Chinese characteristics. Therefore, adopting the strategy of "turning Chinese characteristics into world expression", translating contemporary Chinese political concepts in a language that meets international norms, presenting the world with a real, three-dimensional and comprehensive China are kernels of the Eco-Translatology.

Example 9. "Staying true to the idea that lucid waters and lush mountains are invaluable assets..."

The Government Work Report uses the rhetorical technique of metaphor, comparing "green water and green mountains" to "gold and silver mountains" to convey China's concept of environmental protection. The translation uses the technique of metaphor, retaining the syntax of the original sentence but erasing the metaphorical and referential significance of "gold and silver mountains" and directly translating it into "intangible wealth", which accurately conveys the original meaning and China's environmental protection philosophy.

6. Conclusion

Due to the simplicity and conciseness of the government work report, literal translation is commonly used for the 2023 government work report. In addition, the treatment of long sentences also involves splitting and merging, literal translation and omission. In the process of the embodiment of these translation methods, the difference of translation under the guidance of Eco-Translatology theory lies in "selection and adaptation", which means translators select expressions and techniques for target language readers' better understanding.

In conclusion, translating public documents like government work reports requires translators to fully consider the linguistic and cultural context of the original text and choose appropriate translation methods to handle related concepts and terms in order to adapt to the ever-changing ecological environment for translation.

References

[1]Hu, G.S. (2003). Translation as Adaptation and Selection. Perspectives: Studies in Translatology, 4, 283-291.

[2]Hu, G.S. (2004). An Approach to Translation as Adaptation and Selection. Wuhan: Hubei Education Press.

[3]Hu, G.S. (2011). The Research Focus and Theoretical Perspective of Eco-Translatology. Chinese Translators Journal(02),5-9+95.

[4]Hu, G.S. (2013). Eco-Translatology: Construction & Interpretation. Beijing: The Commercial Press.

[5]Lan, D.X. (2018). A Study on the Translation of Political Terms from the Perspective of Eco-Translatology. Journal of Zhoukou Normal Unversity(04),51-56. doi:10.13450/j.cnki.jzknu.2018.04.11.

[6]Lian, S.N. (2010). Contrastive Studies of English and Chinese. Beijing: Higher Education Press.

EnPress

Opportunities and challenges of advanced mathematics teaching based on the integration of online channel and offline channel

Yanan Li

Department of Basic Courses, Guangdong Technology College, Zhaoqing 526100, China

Abstract: This article explores thechallenges faced by educators, differences in challenges across demographics, relationships between integration and tools usage, and the study's contribution to innovative teaching methods discourse. Using a quantitative approach, the study collected data through structured questionnaires, ensuring ethical considerations. Findings suggest a strong consensus favoring a blended approach, highlighting the value of diverse tech tools and consistent integration. The study underscores challenges in adaptability, student engagement, and technology access. Recommendations emphasize diverse research samples, flexible teaching methods, and collaborative workshops, offering practical insights for educators navigating the integration of online and offline channels in advanced mathematics.

Keywords: Opportunities and Challenges; Online and Offline Integration; Technology Tools

Introduction

China, renowned for its prowess in mathematics education, faces the dual challenge of maintaining its academic excellence and adapting to the demands of the 21st century. The advent of online technologies provides an opportunity to reimagine the teaching and learning processes, fostering an environment that caters to the diverse needs and learning styles of students. This study seeks to unravel the potential benefits, challenges, and implications of integrating online and offline channels in advanced mathematics classrooms across China.

As the study navigate through this exploration, it aspire not only to identify effective models of integration but also to propose a comprehensive framework that can serve as a blueprint for advancing advanced mathematics teaching in the digital era. The implications of this study extend beyond the immediate context, resonating with educators, policymakers, and researchers who share a common goal of preparing students for the challenges and opportunities of the future.

1. Background of the Study

The rise of digital technologies and the ubiquity of the internet have transformed the way information is accessed and knowledge is disseminated. In the realm of education, this transformation presents a unique opportunity to enhance the learning experience, providing students with dynamic and interactive resources that extend beyond the confines of traditional textbooks. The integration of online platforms, virtual tools, and collaborative spaces into mathematics education holds the potential to not only augment understanding but also cultivate critical thinking, problem-solving skills, and digital literacy.

China, with its vast and diverse educational landscape, faces the dual challenge of sustaining its historical excellence in mathematics education while embracing the benefits of technological integration. The imperative to prepare students for a future where adaptability, creativity, and technological proficiency are paramount underscores the need for a comprehensive examination of the current state of advanced mathematics teaching.

2.Population and Sampling

The population in this study consisted of 126 teachers and faculty members from selected university and colleges, encompassing individuals who could provide valuable academic perspectives on research and reference of the quality assurance system in selected university and colleges. The use of a stratified random sampling technique was crucial for ensuring a representative and diverse sample from this population.

Stratified random sampling involved dividing the population into distinct strata or subgroups based on certain characteristics that were

relevant to the research objectives. In this case, strata focused on age, sex, educational background, and years in teaching service. By doing so, the researchers could ensure that each subgroup was adequately represented in the sample, allowing for a comprehensive understanding of the technological tools and platforms suitable for facilitating this integration.

The selection of participants from each stratum was then done using stratified random sampling techniques within those strata. This approach ensured that the sample reflected the heterogeneity present in the larger population.

The use of stratified random sampling enhanced the external validity of the study, as findings from the sample could be more confidently generalized to the entire population of teachers and faculty members from selected university and colleges. It also allowed for meaningful subgroup analyses, enabling researchers to explore potential variations in perspectives based on different characteristics such as age, sex, educational background, and years in teaching service.

3.The Challenges That Educators Face In Aligning Their Pedagogical Strategies With The Integration Of Online And Offline Channels In Advanced Mathematics Education

This study presents the challenges that educators face in aligning their pedagogical strategies with the integration of online and offline channels in advanced mathematics education in terms of obstacle identification, strategy effectiveness, and time constraints

3.1 Obstacle Identification. The results presented in Table 1 demonstrate a robust consensus among educators on the challenges they face in aligning pedagogical strategies with the integration of online and offline channels in advanced mathematics education.

The highest mean, at 3.33, indicates a strong agreement that adapting to a mix of face-to-face and online interactions in hybrid learning environments requires adjustments. This recognition underscores educators' acknowledgment of the complexities inherent in hybrid learning models, emphasizing the necessity for flexibility in navigating the intricacies of both online and offline teaching modalities.

Table 1 The Challenges That Educators Face In Aligning Their Pedagogical Strategies With The Integration Of Online And Offline Channels In Advanced Mathematics Education In Terms Of Obstacle Identification

Statements	Mean	Interpretation
1. Teachers face issues with technology when using online and offline methods for advanced math education.	3.30	Strongly Agree
2. Not all students have the same access to technology, creating challenges for teachers in combining online and offline approaches.	3.32	Strongly Agree
3. Adapting traditional teaching to online formats is a hurdle for educators in advanced math education.	3.33	Strongly Agree
4. The online learning environment brings challenges like varying engagement levels, making pedagogical alignment harder.	3.29	Strongly Agree
5. Educators struggle with students having different digital skills when integrating online and offline methods.	3.31	Strongly Agree
6. Limited time for planning and delivering both synchronous and asynchronous content poses challenges in blended learning.	3.29	Strongly Agree
7. Managing administrative duties related to technology integration adds complexity for educators.	3.31	Strongly Agree
8. Dealing with differences in student engagement across online and offline methods is a challenge.	3.33	Strongly Agree
9. Adapting to a mix of face-to-face and online interactions in hybrid learning environments requires adjustments.	3.33	Strongly Agree
10. Overcoming resistance to new methods among students or colleagues is a hurdle for educators in advanced math education.	3.30	Strongly Agree
Composite Mean	3.31	Strongly Agree

Legend: 3.25-4.00 = Strongly Agree; 2.50-3.24 = Agree; 1.75-2.49 = Disagree; 1.00-1.74 = Strongly Disagree

Closely following, with a mean of 3.33, educators strongly agree that dealing with differences in student engagement across online and offline methods poses a significant challenge. This emphasizes the importance of addressing variations in student interaction and participa-

tion levels in different learning environments, highlighting the need for targeted strategies to maintain consistent engagement. Pereira, E. A., Bryce, J., Quek, E., & Daud's (2022) exploration of online learning challenges during the pandemic enriches this understanding, emphasizing the concept of obstacle identification in recognizing and addressing hurdles in maintaining engagement across diverse channels.

The means of 3.32 for statements 2 and 8 highlight critical challenges for educators. Firstly, not all students having the same access to technology creates hurdles for teachers in combining online and offline approaches. This underscores the digital divide and emphasizes the need for inclusive strategies to ensure equitable access to educational resources. Secondly, dealing with differences in student engagement across online and offline methods is acknowledged as a challenge. This reinforces the importance of developing approaches that cater to diverse learning preferences and maintain engagement across various instructional modes.

The means of 3.31 for statements 5 and 7 indicate additional challenges. Educators acknowledge struggling with students having different digital skills when integrating online and offline methods, emphasizing the importance of digital literacy support. Furthermore, managing administrative duties related to technology integration is seen as a complex task, highlighting the multifaceted nature of educators' responsibilities in the digital age. Khoruzha, L. L.'s (2020) exploration of modern strategies for transforming pedagogical education provides additional insights into the concept of obstacle identification, enriching our understanding of the challenges educators face in navigating the complexities of technology integration.

The means of 3.30 for statements 1 and 10 underscore challenges related to technology use and resistance to new methods. Teachers recognize issues with technology when using online and offline methods, signaling potential barriers in the seamless integration of technological tools. Overcoming resistance to new methods among students or colleagues is identified as a hurdle, emphasizing the importance of fostering a positive and adaptive mindset toward evolving teaching approaches.

The mean of 3.29 for statements 4 and 6 highlights challenges associated with the online learning environment and limited time for planning and delivering content. Educators acknowledge varying engagement levels in online learning and the constraints posed by time limitations in preparing both synchronous and asynchronous content for blended learning. Pereira, E. A., Bryce, J., Quek, E., & Daud's (2022) exploration, along with Khoruzha, L. L.'s (2020) study, further emphasizes the multifaceted challenges through the concept of obstacle identification, offering valuable insights into the complexities educators encounter in the integration of online and offline channels.

The composite mean of 3.31 reinforces the overall strong agreement on the challenges faced by educators in aligning their pedagogical strategies with the integration of online and offline channels in advanced mathematics education. The multifaceted nature of these challenges, encompassing technological issues, disparities in student access and engagement, time constraints, and the need for adapting to hybrid learning environments, is evident. Insights from the related studies, emphasizing the concept of obstacle identification, contribute to ongoing efforts to understand and address these obstacles. This perspective fosters a learning environment where educators can effectively integrate diverse channels while overcoming the challenges presented by the dynamic landscape of advanced mathematics education.

3.2 Strategy Effectiveness. The results from Table 2 highlight a unanimous consensus among educators, shedding light on the challenges they face when aligning pedagogical strategies with the integration of online and offline channels in advanced mathematics education, with a particular emphasis on strategy effectiveness.

The educators strongly agree, with the highest mean of 3.33, that integrating student feedback into pedagogical strategies requires a strategic and responsive approach, underscoring the significance of considering student input to enhance instructional methodologies. Additionally, the challenge of selecting strategies suitable for both online and offline channels is identified as particularly formidable, with a mean of 3.33, pointing to the intricate nature of adapting pedagogical approaches to diverse learning environments. Balancing engagement levels across online and offline methods is recognized as a significant challenge, with a mean of 3.31, emphasizing the need for strategies that accommodate varied learning preferences.

Table 2 The Challenges That Educators Face In Aligning Their Pedagogical Strategies With The Integration Of Online And Offline Channels In Advanced Mathematics Education In Terms Of Strategy Effectiveness

Statements	Mean	Interpretation

1. Educators find it challenging to select strategies that work well for both online and offline channels in advanced mathematics.	3.33	Strongly Agree
2. Teachers encounter difficulties in effectively implementing chosen pedagogical strategies within blended learning environments.	3.30	Strongly Agree
3. Balancing engagement levels across online and offline methods poses a challenge for educators.	3.31	Strongly Agree
4. Making prompt adjustments to strategies based on real-time feedback becomes challenging in the dynamic blended learning environment.	3.25	Strongly Agree
5. Adopting evidence-based practices for effective strategy implementation requires careful consideration.	3.28	Strongly Agree
6. Implementing interventions to enhance strategy effectiveness demands a targeted approach from educators.	3.30	Strongly Agree
7. Teachers face challenges in refining their approaches based on the systematic evaluation of strategy effectiveness.	3.25	Strongly Agree
8. Proactively adapting strategies to align with changing online and offline dynamics is a continual challenge.	3.28	Strongly Agree
9. Effectively integrating student feedback into pedagogical strategies requires a strategic and responsive approach.	3.33	Strongly Agree
10. Achieving a cohesive and effective learning experience for students through the integration of diverse channels demands strategic alignment of pedagogical approaches.	3.25	Strongly Agree
Composite Mean	3.29	Strongly Agree

Legend: 3.25-4.00 = Strongly Agree; 2.50-3.24 = Agree; 1.75-2.49 = Disagree; 1.00-1.74 = Strongly Disagree

Moreover, educators face difficulties in practically implementing chosen pedagogical strategies within blended learning environments, as indicated by a mean of 3.30. This suggests that challenges extend beyond the selection of strategies to the execution phase, requiring a seamless integration process. The identified challenges also encompass implementing interventions to enhance strategy effectiveness, adopting evidence-based practices, proactively adapting strategies to changing dynamics, refining approaches based on systematic evaluation, making prompt adjustments based on real-time feedback, and achieving a cohesive and effective learning experience for students through the strategic alignment of pedagogical approaches, each with means ranging from 3.25 to 3.30.

Studies contribute valuable insights into these challenges. In Muchlis, E. E., Priatna, N., & Maizora's (2023) review of "technology-enabled mathematics education: optimizing student engagement," the concept of strategy effectiveness enriches our understanding of the challenges faced by educators. The study provides nuanced insights into the complexities educators face, focusing on the selection and implementation of strategies that leverage both online and offline channels. The systematic evaluation of strategy effectiveness offers valuable guidance for educators in refining their approaches, adopting evidence-based practices, and implementing interventions to optimize the impact of their teaching methods.

In Azevedo, B. F., Pereira, A. I., Fernandes, F. P., & Pacheco's (2022) case study on mathematics learning and assessment using the MathE platform, the concept of strategy effectiveness enriches our understanding of challenges within technology-enhanced platforms. The study emphasizes systematically evaluating strategy effectiveness within these platforms, offering insights into how educators can refine their approaches, adopt evidence-based practices, and implement targeted interventions to enhance the effectiveness of their teaching methods within the MathE platform. These perspectives contribute to ongoing efforts to understand and enhance the effectiveness of strategies, particularly within technology-enhanced platforms, creating an environment where educators can integrate diverse channels while optimizing the impact of their pedagogical approaches.

3.3 Time Constraints. The findings in Table 3 elucidate a compelling consensus among educators regarding the challenges they confront when aligning pedagogical strategies with the integration of online and offline channels in advanced mathematics education, with a specific focus on time constraints.

A pivotal concern, underscored by the highest mean of 3.34, is the judicious allocation of time for various interactions to optimize the learning experience. This highlights educators' acknowledgment of the central role that time management plays in facilitating effective inter-

actions, both online and offline, to enhance the overall learning journey.

Table 3 The Challenges That Educators Face In Aligning Their Pedagogical Strategies With The Integration Of Online And Offline Channels In Advanced Mathematics Education In Terms Of Time Constraints

Statements	Mean	Interpretation
1. Educators face challenges due to the limited time available for planning and preparing materials for both online and offline components.	3.29	Strongly Agree
2. Striking a balance between synchronous and asynchronous content delivery within time constraints poses a challenge for teachers.	3.25	Strongly Agree
3. Providing timely and meaningful feedback to students becomes challenging within the constraints of the blended learning environment.	3.31	Strongly Agree
4. Adapting to different pacing needs of students while managing time efficiently is a significant challenge for educators.	3.27	Strongly Agree
5. Managing administrative tasks associated with technology integration consumes valuable instructional time.	3.25	Agree
6. Educators must judiciously allocate time for various interactions to optimize the learning experience.	3.34	Strongly Agree
7. Balancing interactions across online and offline modalities within limited time frames is a key challenge.	3.30	Strongly Agree
8. Adapting pedagogical approaches to the dynamic landscape of online and offline integration requires strategic time management.	3.32	Strongly Agree
9. Proactively managing time to prioritize tasks and explore innovative approaches is crucial for educators.	3.29	Strongly Agree
10. Maintaining the quality of advanced mathematics education within the constraints of limited instructional time is an ongoing challenge.	3.30	Strongly Agree
Composite Mean	3.29	Strongly Agree

Legend: 3.25-4.00 = Strongly Agree; 2.50-3.24 = Agree; 1.75-2.49 = Disagree; 1.00-1.74 = Strongly Disagree

Closely following, with a mean of 3.32, educators strongly agree that adapting pedagogical approaches to the dynamic landscape of online and offline integration necessitates strategic time management. This underscores the imperative for educators to adeptly navigate the evolving educational landscape while efficiently managing their time resources to ensure the seamless integration of pedagogical strategies.

Furthermore, the challenge of providing timely and meaningful feedback to students within the constraints of the blended learning environment is evident, with a mean of 3.31. This emphasizes the intricate nature of offering constructive feedback in a timely manner, considering the diverse modes of instruction and the need for personalized feedback to support student learning effectively.

Additional challenges, reflected in the means of 3.30 for statements 7 and 10, highlight the significance of equitable distribution of interaction opportunities and the continuous effort required to deliver high-quality education despite time limitations. Balancing interactions across online and offline modalities within limited time frames is recognized as a key challenge, emphasizing the importance of ensuring fair and effective engagement for all students. Additionally, maintaining the quality of advanced mathematics education within the constraints of limited instructional time is acknowledged as an ongoing challenge, emphasizing the perpetual commitment needed to uphold educational standards.

The means of 3.29 for statements 1 and 9 accentuate the challenges educators face in time management. Limited time available for planning and preparing materials for both online and offline components poses a substantial challenge, emphasizing the need for efficient workflows. Proactively managing time to prioritize tasks and explore innovative approaches is considered crucial, reinforcing the proactive role educators must play in optimizing their time resources.

Moreover, the mean of 3.27 for statement 4 indicates that adapting to different pacing needs of students while managing time efficiently is a significant challenge. This emphasizes the importance of personalized learning approaches to accommodate the diverse learning speeds of students while efficiently utilizing instructional time.

Studies support and enrich these findings. In Wu and Cai's (2021) exploration of supporting secondary mathematics teacher educators

in China, the integration of the concept of time constraints provides valuable insights into the challenges educators face, particularly in planning, implementing, and managing instructional activities within the blended learning environment. Similarly, Hunter et al.'s (2020) exploration of innovative pedagogical practices in mathematics education reinforces the critical influence of time constraints on educators' ability to align pedagogical strategies with online and offline integration. These studies collectively underscore the multifaceted challenges posed by time constraints and offer insights that can guide educators in developing time-efficient strategies, fostering a learning environment where diverse channels can be effectively integrated while navigating the constraints of limited instructional time.

3.4 To explain the challenges that educators face in aligning their pedagogical strategies with the integration of online and offline channels in advanced mathematics education, the hypothesis was tested through Two-Independent Samples t-test and Analysis of Variance (ANOVA). The null hypothesis stated that, there is no significant difference in the challenges that educators face in aligning their pedagogical strategies with the integration of online and offline channels in advanced mathematics education when they group according to profile. This study used 0.05 level of significance in making decision on null hypothesis (H0).

Table 4

Significant Difference In The Challenges That Educators Face In Aligning Their Pedagogical Strategies With The Integration Of Online And Offline Channels In Advanced Mathematics Education When the Respondents Are Grouped According To Age

Challenges	F-value	p-value	Decision on Ho	Interpretation
Obstacle Identification	0.155	0.961	Failed to Reject	Not Significant
Strategy Effectiveness	0.257	0.905	Failed to Reject	Not Significant
Time Constraints	0.334	0.855	Failed to Reject	Not Significant

Table 4 presents the analysis of significant differences in the challenges faced by educators in aligning pedagogical strategies with the integration of online and offline channels in advanced mathematics education based on respondents' age groups. The F-values and p-values indicate whether there are statistically significant differences among age groups for each challenge category.

For "Obstacle Identification," the F-value is 0.155, and the p-value is 0.961. The decision not to reject the null hypothesis (Ho) suggests that there is no significant difference in obstacle identification challenges based on age. This implies that educators, regardless of age, encounter similar obstacles when identifying challenges in integrating online and offline channels in advanced mathematics education.

Similarly, for "Strategy Effectiveness," the F-value is 0.257, and the p-value is 0.905. The decision not to reject the null hypothesis indicates that there is no significant difference in challenges related to strategy effectiveness based on age. Educators across different age groups face similar challenges when it comes to the effectiveness of pedagogical strategies in the integration of online and offline channels.

Regarding "Time Constraints," the F-value is 0.334, and the p-value is 0.855. Once again, the decision not to reject the null hypothesis suggests that there is no significant difference in challenges related to time constraints based on the age of educators. Time-related challenges appear to be consistent across different age groups.

Conclusion

The results highlight substantial challenges for educators in aligning pedagogical strategies with online and offline channels in advanced mathematics education. The highest mean emphasizes the necessity for adaptability in hybrid learning environments, indicating a demand for flexible teaching methods. Educators express strong agreement regarding challenges in managing divergent student engagement across methods, necessitating focused strategies. Challenges related to technology access, digital skills, and administrative tasks are evident, with insights from related studies enriching our understanding and contributing to optimizing pedagogical approaches. Time constraints pose significant challenges, emphasizing the importance of judiciously allocating time and strategic time management. Both the table findings and

related studies underscore the intricate nature of these challenges, providing valuable insights to inform the development of effective pedagogical strategies and support mechanisms for enhanced teaching and learning outcomes in the dynamic educational landscape.

The analysis of challenges faced by educators in aligning pedagogical strategies with online and offline channels in advanced mathematics education reveals consistent findings across different demographic groups. The study focusing on age groups, suggests that educators of varying ages encounter similar challenges in obstacle identification, strategy effectiveness, and time constraints. No statistically significant differences were found among different age groups. Similarly, the study, which considers gender, indicates no significant variations in challenges related to obstacle identification, strategy effectiveness, and time constraints based on educators' gender. The challenges appear consistent regardless of gender. The study examining the level of education, reinforces the pattern of uniform challenges. Educators with different education levels face comparable difficulties in obstacle identification, strategy effectiveness, and time constraints. Lastly, the study based on years of teaching experience, demonstrates that challenges do not significantly differ among educators with varying levels of experience. Obstacle identification, strategy effectiveness, and time constraints remain consistent across different experience groups.

References

[1]Khoruzha, L. L. (2020). MODERN STRATEGIES FOR TRANSFORMING THE CONTENT OF PEDAGOGICAL EDUCATION. Pedagogical education: theory and practice. Psychology. Pedagogy, 33. http://dx.doi.org/10.28925/2311-2409.2020.33.1

[2]Kouser, S., & Majid, I. (2021). TECHNOLOGICAL TOOLS FOR ENHANCING TEACHING AND LEARNING PROCESS. Towards Excellence, 366(373). http://dx.doi.org/10.37867/te130133

[3]Lin, L. (2021). Student Learning and Engagement in a Blended Environment. In Research Anthology on Developing Effective Online Learning Courses (pp. 1371-1385). IGI Global. DOI: 10.4018/978-1-7998-8047-9.ch068.

[4]Lin, W. (2020). Teacher-Student Interaction and Chinese Students' Mathematics Learning Outcomes: The Mediation of Mathematics Achievement Emotions. Proceedings of the 2020 AERA Annual Meeting. doi:10.3102/1570544

[5]Loots, S., Strydom, F., & Posthumus, H. (2023). Learning from students: Factors that support student engagement in blended learning environments within and beyond classrooms. Journal of Student Affairs in Africa, 11(2). http://dx.doi.org/10.24085/jsaa.v11i2.4897

[6]Muchlis, E. E., Priatna, N., & Maizora, S. (2023). Developing mathematical thinking skills through technology-based learning: a review of "technology-enabled mathematics education: optimizing student engagement". Journal of Mathematics Teacher Education, 26(4), 425–432. https://doi.org/10.1007/s10857-022-09561-4

[7]Nortvedt, G. A., & Buchholtz, N. (2018). Assessment in mathematics education: responding to issues regarding methodology, policy, and equity. ZDM Mathematics Education, 50, 555–570. https://doi.org/10.1007/s11858-018-0963-z

[8]Nurbavliyev, O., Kaymak, S., & Sydykov, B. (2022). The Effect Of Active Learning Method On Students' Academic Success, Motivation And Attitude Towards Mathematics. Journal of Language and Linguistic Studies, 18(2), 701-713. https://files.eric.ed.gov/fulltext/EJ1347347.pdf

[9]Pereira, E. A., Bryce, J., Quek, E., & Daud, N. (2022). Online Learning Challenges Faced by Academicians During the Pandemic. International Journal of Advanced Research in Education and Society, 4(3), 166-172. ISSN 2682-8138. Retrieved from https://myjms.mohe.gov.my/index.php/ijares/article/view/20243

Acknowledgments

This work is supported by the Top-notch offline courses Advanced Mathematics 1 of Guangdong Technology College (YLKC202110).

An Innovative Exploration on Teaching and Learning Management in Secondary School Mathematics Classrooms

Yongshu Li

Chongqing Changshou Experiment Middle School, Chongqing 404500, China

Abstract: In the new era of secondary education, higher demands have been placed on the management of mathematics education. Mathematics education is a major national discipline program, and its benefits and value are obvious. In the management of mathematics classroom teaching, the curriculum and teaching content need to be improved. At the same time, the status and role of teachers in mathematics teaching have attracted more and more attention. On this basis, this paper analyzes in depth the deficiencies in secondary school mathematics teaching management in the new era, and explores how to better carry out secondary school mathematics teaching management.

Keywords: Secondary School Mathematics; Classroom Teaching Management; Innovative Strategies

Introduction

With the deepening of educational reform, the innovation of secondary school mathematics classroom teaching management is particularly important. The traditional teaching mode has been difficult to meet the needs of modern education, especially in the cultivation of students' innovative thinking and practical ability there are many deficiencies. Therefore, this paper aims to explore the innovative methods of secondary school mathematics classroom teaching management, in order to provide educators with some useful references.

1. Deficiencies in secondary school mathematics classroom teaching management

In the process of secondary school mathematics classroom teaching management, it is not difficult to find some existing problems, which may have a negative impact on the learning effect of students as well as the quality of teachers' teaching.

Firstly, classroom discipline is not maintained strictly enough, which leads to some students being easily distracted in the classroom or engaging in some activities not related to learning, thus affecting the learning atmosphere of the whole classroom. Secondly, teachers' interaction and guidance in the classroom are relatively single and lack of diversified teaching methods, which makes it difficult for some students to maintain sustained interest and attention. In addition, the allocation of classroom time is not reasonable enough, teachers spend too much time on some parts of the class, while other important parts are rushed, which leads to students' lack of in-depth understanding of the knowledge points. Finally, there are problems with the arrangement of homework and tutoring after class, and some students do not get timely feedback and help after class, which affects their consolidation and mastery of knowledge.

Specifically, the laxity of classroom discipline may cause some students to engage in some irrelevant activities in class, such as chatting privately and playing with cell phones, etc. These behaviors not only distract their own attention, but also interfere with the surrounding classmates, thus affecting the learning atmosphere of the whole classroom. If the teacher's interaction and guidance in the classroom is too single, such as always adopting the traditional lecture-style teaching and lacking interaction and discussion, students may feel boring and find it difficult to stay focused for a long time. If the allocation of class time is not reasonable, for example, spending too much time on one knowledge point while rushing through another important knowledge point, this may lead to students not having a deep enough understanding of certain knowledge points, or even creating knowledge gaps. If the arrangement of homework and tutoring after class is unreasonable, such as the amount of homework is too large or too difficult, and the tutoring is not timely and effective, this will lead to some students not getting timely feedback and help after class, thus affecting their consolidation and mastery of knowledge.

In order to improve these deficiencies, teachers can take the following measures: first, strengthen the management of classroom discipline to ensure that every student can stay focused in class and create a favorable learning environment. Secondly, teachers can adopt a variety of teaching methods to increase students' participation and interest. In addition, class time should be reasonably arranged to ensure that each knowledge point can be fully explained and practiced. Finally, after-class homework and tutoring should be more personalized and

timely, and appropriate help and support should be provided for the different needs of students to ensure that every student can be effectively consolidated and improved after class. Through these measures, the quality of secondary school mathematics classroom teaching management can be effectively improved to promote the overall development of students.

2.Innovative Strategies for Improving Teaching Management in Secondary School Mathematics Classrooms

2.1.Constructing a student-centered teaching management mode

Building a student-centered teaching management model requires a radical change in the traditional classroom teaching management. In traditional classroom teaching, the teacher often plays the main role, while students are in a passive state of accepting knowledge. This model often limits the development of students' initiative and creativity. In order to break this situation, teachers must change their roles from mere knowledge transmitters to guides and facilitators to help students better master knowledge and develop their independent learning ability. Specifically, the following measures can be taken to realize the student-centered teaching management model:

One is to design student-centered classroom activities, such as cooperative group learning and project-based learning. Through these activities, students can take the initiative to acquire knowledge in the process of cooperation and communication. In cooperative group learning, students can discuss in groups and solve problems together, thus developing their teamwork and communication skills. And in project-based learning, students can apply theoretical knowledge to specific situations through actual operation and practice, so as to deepen their understanding and mastery of knowledge, so that students can not only better understand abstract concepts, but also improve their hands-on ability and problem-solving skills.

Secondly, encourage students to actively raise questions and guide them to find answers through independent exploration. Teachers can design some open-ended questions to stimulate students' curiosity and desire to explore. For example, by setting some challenging questions, teachers can prompt students to think and take the initiative to find ways to solve problems. This can not only develop students' independent thinking ability, but also enhance their interest and initiative in learning. Teachers can encourage students to speak up in class and share their ideas and insights, thus creating a positive and interactive learning atmosphere. In this way, students can not only acquire knowledge, but also learn how to solve problems independently, laying a solid foundation for their future studies and life.

Third, use positive evaluation skillfully. In the secondary school mathematics classroom, it is very important to help students build up their confidence in learning mathematics. Cultivating students' self-confidence can prompt students to take the initiative to cooperate with the teacher, broaden their knowledge base and ensure their own future development in mathematics. For this reason, it is important to emphasize the diversity of evaluation methods in the teaching process, to make good use of affirmative evaluation, and to explore and affirm students' potentials from different angles. When students feel that they have been recognized by the teacher, they will be more conscious of classroom discipline and self-improvement in a good classroom atmosphere. At present, evaluation methods mainly include online comprehensive assessment and student self-assessment. For example, during class, many teachers give students a wrong answer. However, the scientific approach should be to point out the most outstanding aspects of the students' answers, for example, their courage in answering the question or the correct guidance of the problem-solving method. Positive evaluation can motivate students to explore actively. Therefore, teachers should use positive evaluation methods wisely in the teaching and learning process.

2.2. Optimize classroom teaching management by using information technology

With the rapid progress of information technology, the field of classroom teaching management has ushered in unprecedented opportunities. Teachers can significantly improve the efficiency and management of teaching with the help of various information technology means. The following are some specific measures:

Teachers can make full use of multimedia technology and rich network resources to make classroom teaching content more colorful and lively. Through these advanced technological means, mathematical concepts that are originally abstract and difficult to understand can be visualized and displayed in a visual way, thus greatly enhancing students' interest and enthusiasm in learning. For example, complex mathe-

matical formulas and theorems can be made vivid and easy to understand with the use of animation and video, while interactive online exercises and simulation experiments can enable students to master knowledge in practice and further stimulate their enthusiasm for learning. In addition, teachers can also interact with students in real time through the online platform to answer their questions and provide personalized tutoring, thus further enhancing the teaching effect. Secondly, in order to meet the needs of modern education, it is particularly important to establish a well-functioning online learning platform. The platform will realize the integrated management of pre-course pre-study, in-class interaction and post-course review, enabling students to complete all learning tasks in a unified system. Through such a platform, students can study anytime and anywhere, no longer restricted by time and place, and can flexibly arrange their study plans according to their own learning progress and time schedule, thus improving their learning efficiency. For the pre-class pre-study part, the platform can provide rich learning resources, such as video lectures, e-textbooks and online tests, to help students master the necessary basic knowledge before the formal class. In the interactive part of the class, teachers can interact with students and answer their questions through real-time videos, discussion forums and online Q&A to enhance the interactivity and fun of the class. For the revision part after class, the platform can provide homework, quiz and mock exams to help students consolidate what they have learned, and identify and make up for deficiencies in their learning in a timely manner. In addition, the platform can also record students' learning situation and form detailed teaching reports, so that teachers and parents can keep abreast of their academic status and provide targeted counseling. Through this integrated learning management approach, students can better grasp the learning initiative, improve learning results, and ultimately achieve better learning outcomes. Finally, big data analysis can be used to realize online monitoring and in-depth analysis of students. Through the statistical analysis of the experimental results, it can enable teachers to better understand the learning situation of students and find out the problems and deficiencies in their learning. In this way, teachers can quickly adjust their teaching strategies to fit the needs of their students. In this way, more personalized teaching can be achieved, and a more appropriate teaching plan can be formulated for the unique needs and characteristics of each student, thus significantly improving the teaching effect.

2.3. Create a positive classroom atmosphere

Classroom atmosphere has an extremely important influence on students' psychological state and learning effect. A positive, relaxed and happy classroom atmosphere can greatly promote students' learning enthusiasm and efficiency. Therefore, teachers should strive to create such a classroom environment, the specific measures can include the following points: First, in the education process, it is crucial to establish an equal and respectful teacher-student relationship. Teachers should fully respect the opinions and views of each student and encourage them to speak out and express their ideas. This practice not only enhances students' self-confidence, but also enables them to participate more actively in discussions and learning in class. When students feel the teacher's respect, they will be more willing to share their insights, thus forming a positive and interactive classroom atmosphere. Teachers' encouragement and support are the source of motivation for students' continuous improvement, which helps to cultivate their critical thinking and independent thinking ability. Secondly, students' interest in learning can be effectively stimulated by designing various interesting games and competitions. These activities not only enable students to learn in a relaxed and pleasant atmosphere, but also enhance their sense of teamwork. Through teamwork to complete tasks, students can learn how to communicate and collaborate with others, which is important for the development of students' comprehensive quality. In teamwork, students can learn from each other, complement each other's strengths and solve problems together. This kind of interaction not only helps to improve learning efficiency, but also develops students' social skills and leadership, laying a solid foundation for their future development. Thirdly, students should be recognized and praised for the progress they have made in a timely manner. Teachers should pay attention to each student's learning situation, point out students' strengths and progress in a timely manner, and give praise and incentives. This can not only enhance students' self-confidence, but also stimulate their learning motivation, so that students will work harder and more actively in their future learning. When students feel recognized by their teachers, they will be more confident and motivated to meet new challenges.

3. Conclusion

In summary, the innovation of secondary school mathematics classroom teaching management is a systematic project, which needs teachers to explore and practice constantly. By constructing a student-centered teaching management model, optimizing classroom teaching

management by using information technology and creating a positive classroom atmosphere, the teaching effect can be effectively improved and students' comprehensive quality can be cultivated. In the future, educators should continue to pay attention to the latest developments in education reform, constantly explore more scientific and efficient classroom teaching management methods, and contribute to the cultivation of innovative talents in the new era.

References

[1] Feng Jiaojiao. Research on Classroom Teaching Management of Newly Appointed Middle School Teachers [D]. YiLi Normal University,2021.

[2] Ruan Xinxing. Analysis of Optimization Strategies for Junior High School Teaching Management [J]. Elite Teachers Online,2020,(21):92-93.

[3] Hou Shengrong, Ren Lanqing. A Brief Discussion on the Scientific and Artistic Management of Junior High School Classroom Teaching [J]. China New Telecommunications,2019,21(18):47.

Author Introduction:

Yongshu Li (1980.11-), male, Han nationality, from Yunyang, Chongqing, undergraduate, senior teacher, research direction: middle school mathematics.

Study on supply chain resilience and resilience under the impact of COVID-19

Li Huang

School of Finance and Economics of Hainan Vocational University of Science and Technology, Hainan Haikou 571199, China

Abstract: The COVID-19 pandemic has had a severe impact on global supply chains, exposing many deficiencies in supply chain risk management. Based on the analysis of the impact of the epidemic on the supply chain, especially the supply chain of small and medium-sized enterprises, this paper discusses the path to improve the supply chain resilience, constructs the key influencing factors model of supply chain resilience by using the analytic hierarchy process, and puts forward countermeasures and suggestions to strengthen the supply chain resilience and resilience, in order to provide a reference for enterprises to build a supply chain system with high resilience.

Keywords: COVID-19; Supply Chain Resilience; Small and Medium-Sized Enterprises; Risk Management

Introduction:

The sudden outbreak of COVID-19 in 2020 has had a huge impact on the economic and social development of all countries. In the context of globalization, the supply chain disruption caused by the epidemic is particularly prominent. From the perspective of the global industrial chain, the contraction of upstream raw material supply and downstream demand has led to supply chain disruption; From a regional perspective, major industrial countries have been "shut down" one after another, with shortages of key parts and components and slow recovery of production capacity. Uncertainties such as repeated outbreaks and the spread of mutated viruses persist, and supply chain risks are intensifying. In the face of complex and changeable external environment, how to improve the resilience of enterprise supply chain and enhance the ability to resist risk impact has become an urgent key issue for enterprise supply chain management.

1. Impact of epidemic impact on supply chain

1.1 Global supply chain disruptions

Since the outbreak of the novel coronavirus, governments around the world have taken strict prevention and control measures to contain the spread of the epidemic. Factory shutdowns, restricted movement of people and disrupted transport channels have crippled global supply chains. Many multinational companies' supply chains are at a standstill. Take the automobile industry as an example, China is the world's largest automobile market and an important auto parts manufacturing base, and Wuhan is the key town of the automobile industry. During the epidemic, Wuhan auto parts enterprises have stopped production in a large area, which has greatly affected the production and operation of global vehicle manufacturers. After the global spread of the epidemic, Germany, Japan, the United States and other major auto production countries have been paralyzed, slow recovery of production capacity, causing a catastrophic blow to the global auto industry chain.

1.2 Impact on the supply chain of smes

For the majority of small and medium-sized enterprises, due to their weak anti-risk ability, the supply chain is particularly affected by the epidemic. On the one hand, small and medium-sized enterprises are located in the downstream of the supply chain network of large enterprises, with poor bargaining power and low substitutability of suppliers. Once the suppliers fail to deliver on time, the procurement process will face the risk of interruption. On the other hand, small and medium-sized enterprises orders are unstable, limited financial strength, it is difficult to achieve large-scale inventory, once the downstream customer demand shrinks, their own inventory backlog risk increases. At the same time, small and medium-sized enterprises have a low level of digitalization and intelligence, lack a global perspective of the supply chain, and lack of perception and response ability to supply chain sudden risks, which is easy to suffer heavy losses in the crisis.

2. Path analysis for improving supply chain resilience

2.1 Connotation of supply chain resilience

Supply chain resilience refers to the ability of the supply chain system to respond to unexpected shocks and quickly recover to the original or higher level without damage to the structure and function. A highly resilient supply chain system should have the ability to continuously perceive changes in the external environment, quickly identify potential risks, flexibly adjust response strategies, and quickly return to normal operation. This ability is not only reflected in the prior prediction and prevention, but also includes the response and adaptation in the event, and the recovery and improvement after the event. Therefore, the construction of supply chain resilience is a process of continuous improvement and dynamic optimization.

2.2 Key factors affecting supply chain resilience

Through literature research, it is found that the key factors affecting supply chain resilience can be summarized into four aspects: first, risk prediction and evaluation ability, including information acquisition and analysis, supply chain visualization; Second, rapid response and coordination ability, including production flexibility, resource integration, etc.; Third, supply chain redundancy and flexibility, such as key material safety inventory, spare capacity, etc. Fourth, organizational resilience, such as corporate culture, leadership, and employee skills. It can be seen that the formation of supply chain resilience requires the full cooperation of upstream and downstream members of the supply chain, and it is difficult for individual enterprises to deal with systemic risks.

2.3 Model selection of supply chain resilience based on analytic Hierarchy process

This paper uses analytic Hierarchy Process (AHP) to compare and analyze two supply chain resilience models, “behavior-oriented” and “behavior-cooperative”, from four criterion levels of supply chain prediction ability, response ability, adaptation ability and recovery ability. Through the questionnaire survey of six small and medium-sized electronic manufacturing enterprises, the judgment matrix was constructed and consistency test was carried out. Finally, the conclusion was drawn: under the impact of the epidemic, the construction of supply chain resilience of small and medium-sized enterprises is more suitable for the “behavior-oriented” model. This model emphasizes that enterprises rely on their own flexible organizational behavior, actively take various countermeasures, and constantly adapt to environmental changes, and the requirements for systematic risk prediction and resource integration capabilities are relatively low, which is more in line with the “short and fast” supply chain characteristics of smes.

3. Suggestions on measures to strengthen supply chain resilience and resilience

3.1 Improve demand forecasting capabilities

Under the impact of the epidemic, market demand has fluctuated greatly, which has brought great challenges to supply chain management. In order to cope with the uncertainty of demand, enterprises should enhance the foresight and flexibility of demand forecast. On the one hand, it is necessary to make full use of advanced technological means such as big data analysis and artificial intelligence, combined with factors such as industry development trends and consumer behavior changes, to carry out hierarchical and rolling forecasts for market demand, and improve the accuracy of forecasts. On the other hand, it is necessary to establish and improve the multi-department collaborative mechanism of demand forecasting, break the information barriers between departments, and realize the full sharing and effective use of data in all links of the supply chain. At the same time, for the possible demand gap, supply shortage and other situations, we should take measures in advance, such as production and marketing coordination, supplier development, and channel expansion. In particular, it is necessary to pay close attention to market changes caused by epidemic prevention and control, incorporate epidemic factors into the scope of demand forecasting, formulate multi-scenario emergency plans in response to demand fluctuations, and minimize supply chain operational risks.

3.2 Strengthen supply chain collaboration

The foundation of the stable and efficient operation of the supply chain lies in the close cooperation between each link and each sub-

ject. Limited by their own resources and capabilities, small and medium-sized enterprises are often in a weak position in the supply chain. To overcome the impact of the epidemic, we must break through our own limitations and actively seek the support of upstream and downstream partners in the industrial chain. On the supply side, it is necessary to strengthen strategic coordination with key raw material suppliers and establish a solid partnership; At the same time, the diversification of supply channels is developed, the multi-level backup system of suppliers is formed, the necessary safety inventory is stored, and the risk of supply interruption is reduced. On the demand side, it is necessary to establish long-term and stable cooperative relations with downstream customers by signing flexible contracts, improve customer stickiness, and alleviate the pressure of demand fluctuations. In the logistics distribution link, it is necessary to actively expand new logistics modes such as multimodal transport, sling transport, and warehouse distribution integration, and improve transportation timeliness and distribution elasticity. At the capital level, it is necessary to take the initiative to connect with financial institutions such as banks, strive for financial support such as supply chain finance, and alleviate the pressure on capital turnover.

3.3 Enhance the stability of capital flow

Small and medium-sized enterprises generally have the problem of shortage of funds, and the ability to resist risks is weak. During the epidemic, we should make full use of various government relief policies and actively strive for various preferential measures such as tax relief and low-interest loans. We will appropriately reduce non-rigid expenditures, optimize the cost structure, and increase the efficiency of the use of funds. Innovate marketing models, increase online channel development efforts, and strive for diversified cash flow sources. Pay attention to the management of accounts receivable, accelerate the withdrawal of funds, and use financial tools such as commercial factoring to revitalize accounts receivable stock when necessary to ease the pressure on funds. For small and medium-sized enterprises in strategic emerging industries and key areas, the government and financial institutions should also provide targeted financial support to help them tide over difficulties and resume development.

3.4 Accelerate digital transformation and flexible transformation

Digital technology is a key support to enhance enterprise agility and resilience. Smes should adapt to the development trend of the digital era and accelerate the process of digital transformation. It is necessary to strengthen the construction of digital infrastructure, use cloud computing, big data, the Internet of Things and other next-generation information technologies to build a digital management platform integrating business management, data analysis, and risk early warning, so as to achieve data connectivity, business coordination, and agile response in all links of the supply chain. It is necessary to speed up the digital transformation of the supply chain, use the industrial Internet, blockchain and other technologies to achieve the digital integration of the upstream and downstream information flow, capital flow, and logistics of the supply chain, build a transparent and visual supply chain panorama, and improve the overall coordination level of the supply chain. At the same time, we must pay attention to the innovation of manufacturing and service models, enhance flexible production and personalized customization capabilities, and improve the ability to respond quickly and meet diversified market demands.

Conclusion:

The COVID-19 pandemic has sounded the alarm for the industrial development of all countries and the security of global supply chains. In the future, with the intensification of uncertainty risks and the frequent occurrence of “black swan” events, supply chain resilience has become an important part of the core competitiveness of enterprises. Small and medium-sized enterprises should start from the overall perspective of the supply chain, enhance risk awareness, improve forecasting and early warning capabilities, strengthen the coordination of all links of the supply chain, and constantly improve the resilience of the supply chain to cope with shocks and restore operation. Only in this way can we be invincible in the volatile market environment and achieve dynamic balance and sustainable development of supply chain operations.

References

[1] Chen Yujie, Jiang Yifei, Xie Zilu, Xing Guangjun. Study on supply chain resilience of smes under the impact of COVID-19 [J].

China Collective Economy,2023(27):95-98. (in Chinese)

[2] Zhang Zhanfu, Geng Liyan. Study on coping mechanism of supply chain disruption risk of lean manufacturing enterprises under COVID-19 [J]. Value Engineering,2023,42(9):47-51.

About the author:

Li Huang, 1979.06, female, Li nationality, Hainan Wanning, undergraduate, teaching assistant, director of practical training center, agricultural and forestry economic management, logistics and supply chain.

EnPress

Exploring the dilemma of human nature under the logic of capital in the digital survival era

Yating Zhou

ANHUI UNIVERSITY OF FINANCE & ECONOMICS, Bengbu 233000, China

Abstract: The arrival of the digital survival era has brought great changes to the human society. The logic of capital can operate in a broader scope. Through data analysis, artificial intelligence and other technical means, it can realize the accurate grasp of the market and the optimal allocation of resources. However, the abuse and alienation of digital technology by capital logic also produces a series of problems, such as information overload, social isolation, privacy leakage, etc., which make people ignore the essential needs and values of human beings in the process of pursuing profit maximization, leading to the loss and distortion of human nature. Therefore, it is necessary to deeply reflect on and criticize the relationship between digital technology and the logic of capital, not only to make full use of the convenience and benefits brought by digital technology, but also to be alert to the negative impact of digital technology under the logic of capital.

Keywords: Digital Survival; Alienation; Capital Logic; Human Nature Dilemma

Introduction:

In his speech at the conference commemorating the 200th anniversary of Marx's birth, General Secretary Xi pointed out: " Marxism is extensive and profound, in the final analysis, is a word of liberation for mankind."[1] Marx established the lofty ideal of "working for human happiness"[2] in his youth, and later, his exposition of "people", "people" and "human nature" are reflected in a series of works. In Das Kapital, Marx not only analyzed the problems of commodities and the logic of capital, but also through the analysis of "commodity fetishism". The digital information revolution represented by artificial intelligence and other technologies is accelerating the generation of a digital and intelligent world. Digital survival has become an important phenomenon in the modern life world, dominating the survival trend of the whole era.[3]

1.The performance of the human nature dilemma in the digital survival age

1.1. Man are further alienated into labor and commodities

First, people are alienated into the labor force. Under the traditional capitalist mode of production, the capitalists obtained the control of the production process and the possession of the surplus value by occupying the labor force of the workers. But the workers lost the right to control their labor force, and became the vassal and tool of the capitalists. This alienation makes the labor process lose its autonomy and creativity, and become a monotonous, mechanical and repetitive activity. In the era of digital existence, the phenomenon of human alienation has also undergone new changes. Secondly, people are alienated into commodities. In the traditional capitalist market, the value and meaning of people are simplified to the value and price of goods. Human abilities, skills, knowledge, etc., are all transformed into goods that can be bought and sold, while human dignity and value are ignored and trampled on.[3] The phenomenon of people being alienated into labor force and commodities is one of the difficulties in the survival and development of people in the capitalist society. It leads to the one-sided, materialization and instrumentalization of people, which makes people lose the possibility of freedom and comprehensive development. With the development of digital technology, a large amount of data generated is accurately analyzed, used and pushed to merchants

1.2. The materialization and money of interpersonal relations in the age of digital survival

The first is the materialization of interpersonal relations. Interpersonal relations are regarded as a kind of resource that can be exchanged and used under capitalism. People get what they need by establishing and using relations. In this process, interpersonal relationships are objectified into objects with exchange value and use value, losing their own human nature and emotion. The second is the money of inter-

personal relationship. With the development of the market economy, money has become the standard to measure everything. Money is also given overstatus in relationships. Some use money as a means of building and exploiting relationships, and even see it as the only measure of the intimacy and quality of relationships. This phenomenon of money is particularly prominent in some commercial transactions and power rent-seeking. Money has become a necessary condition for the establishment and utilization of relationships. In order to obtain more money and interests, people do not hesitate to damage the interests and emotions of others.

In the social background of capitalism, due to the scarcity of the working class in material and real life, they inevitably face the shortage of spiritual wealth.[4] At the same time, although the bourgeoisie has rich material wealth, their spiritual world is developing in distortion, and their ideas are dominated by capital and the desire for profit. This fact reveals that the development of people in the capitalist society has its own defects, only when human entered the communist society, realize the everyone free and comprehensive development, private ownership under the capitalist mode of production has been completely replaced by public ownership, in highly harmonious social relations and people life and spiritual state greatly improved under the premise of the capitalist production system and division of labor system, and production activities and human alienation will gradually disappear, under the capital logic of the plight of human nature can be solved.[5]

2.The reasons of the human dilemma in the age of digital existence are slightly explored

2.1. The internal connection between capital accumulation and human nature dilemma

First of all, in the process of capital accumulation, some people accumulate a large amount of wealth through investment and entrepreneurship, while others fall into poverty due to the lack of opportunities, education and other resources. Secondly, competition is inevitable, under capitalism. With the continuous accumulation of capital, the competition is becoming more and more fierce. In order to survive and develop, people have to work hard and struggle, which not only affects people's physical and mental health, but also may lead some people to take improper means to obtain wealth and status, thus falling into the dilemma of human nature. Thirdly, capital accumulation distorts interpersonal relationship. In the process of capital accumulation, money and interests have become important factors in people's communication. In order to pursue economic interests, some people do not hesitate to damage the interests and feelings of others, which leads to the alienation and indifference of interpersonal relationship, which makes it difficult for people to establish a sincere and trusting relationship, thus falling into a lonely and confused situation.

2.2.The shaping of human nature dilemma by the capitalist mode of production

The capitalist mode of production has shaped the human dilemma through the alienation of labor, the concept of "commodity fetishism" and class differentiation, which may lead to the destruction of people's spiritual world and aggravate the social contradictions and instability. First of all, among the many forms of alienation, Das Kapital emphasizes the alienation of human labor. Under the capitalist mode of production, workers lose the control and autonomy of their labor in the production process, and their labor is alienated into a simple, mechanical and repetitive activity.[6] Secondly, in Das Kapital, there is an interpretation of "commodity fetishism". In the capitalist society, goods have become a mysterious object, and people's worship and pursuit of goods exceed their respect and concern for people. This commodity fetishism leads to the relationship between people being determined by money and goods, and human dignity and value being ignored and trampled on. Thirdly, in the capitalist mode of production, in order to pursue economic interests, people often only pay attention to the development of their professional skills and professional knowledge, while ignoring the growth and promotion of other aspects. This one-sided development leads people to feel empty and confused in spirit, and it is difficult to find the true self and value.[7]

3.The possible path to solve the human nature dilemma under the capital logic

In the construction of people-oriented economic development model, we should first establish the concept of people-oriented development, which means that people's needs, interests and all-round development should be regarded as the core goal of economic and social development, and the all-round people's development should be regarded as the highest value of economic development. When formulating economic policies and planning projects, we should always pay attention to the needs and interests of people to ensure that the overall de-

velopment of people is fully guaranteed and supported.[8] Second, we should promote economic transformation and upgrading, improve the quality and efficiency of economic development, including strengthening innovation-driven development, promoting industrial upgrading, developing green economy, improving the quality of workers and other measures. Through economic transformation and upgrading, more job opportunities can be created, improve people's income level, and provide a better material basis for people's all-round development. Thirdly, we should promote cultural prosperity and social harmony, including strengthening cultural innovation, promoting the development of cultural industry, carrying forward excellent traditional culture, cultivating good social customs and other measures to create a positive, harmonious and inclusive social atmosphere, and provide a good spiritual home for the all-round development of people. Advocating core socialist values can promote the values of patriotism, collectivism, integrity and law-abiding, foster good social customs and moral standards, and promote social harmony and stability. At the same time, the publicity and education of such core values can also guide people to establish a correct world outlook, outlook on life and values, and get rid of human difficulties and psychological pressure.

References

[1]Speech by Xi Jinping at the Commemoration of the 200th Anniversary of Marx's Birth [N]. People's Daily, May 5,2018 (002)

[2]Marx, and Engels. Collected Works of Marx and Engels (Vol. 5) [M]. Beijing: People's Publishing House, 2009.

[3][US] Nicholas groponte. The digital survival [M]. Hu Yong, Fan Haiyan, in translation. Beijing: Electronic Industry Press, 2017.

[4]Peng Lan. Digitization and digitization: two sides of survival in the digital age [J]. People's Forum, 2023, (17): 42-47.

[5][Beauty] Bell. Capitalist cultural contradiction [M]. Yan Beiwen, translated. Beijing: People's Publishing House, 2007:9.

[6]Xiao Xiang. The theoretical purport of Marxist ethics in Das Kapital [J]. Studies of Marxism, 2020, (02): 54-62.

[7]Kang Zhai. The dual logic of digital survival and its limits [J]. Academic Forum, 2024,47 (01): 110-117.

[8]Qiu Cheng, Peng Qifu. Practical strategies for the discourse communication of ideological and political education in the era of digital survival [J]. Theoretical Guide, 2023, (09): 109-115.

About the author:

Zhou Yating, 1989.12, female, Anhui Province, Bengbu, graduate student of Anhui University of Finance and Economics, School of Marxism, Research Direction: basic principles of Marxism.

Blended University English Learning Motivation Based on the Framework of Self-determination Theory

Kunyan Song, Xiaohui Yu

College of Foreign Languages, Qingdao City University, Qingdao 266106, China

Abstract: Presently, there is a flourishing demand for transnational communicative talents from all walks of life, which poses higher expectations for university English teaching. Following the innovation of university English education and the high-speed growth of technology, the conventional university English class has been transitioned from a solitary face-to-face, teacher-oriented treatment to a blended pattern (Muhammadin & Herda, 2024). Along with this shift, it is imperative to find out whether and how students' motivation to learn English gets elevated. Hence, to addressing this issue, this paper presents the basic theoretical framework of self-determinism and analyses whether and how the basic psychological needs of learners are better met to elevate their learning motivation in blended university English instruction. Despite its limitations, this study provides a referential basis for the researchers who are interested in this theory while at the same time providing a practical guide to the practice of blended university English language teaching and learning.

Keywords: Motivation; Self-Determination Theory; Blended Learning

Introduction

Motivation, as an important non-intellectual factor, is of undeniable importance in education as it influences learning outcomes and the level of commitment to learning (Bower, 1979). Most existing research on motivation has used a dichotomous approach to classify motivation as internal or external. It was not until the 1980s that the American psychologists Deci and Ryan developed their self-determination theory (SDT). They broke away from the limitations of the previous view and saw human motivation as a continuum from unmotivated, externally motivated to internally motivated (Deci & Ryan, 1980). They also suggest that there are three basic psychological needs for every individual, the need to be competent, the need to belong, and the need for autonomy. When these needs are met, the individual will fully engage in learning activities and self-regulate, internalizing external motivation into more enduring intrinsic motivation (Muñoz & Ramirez, 2015). This theoretical finding has has shed considerable light on the enhancement of student motivation in traditional university English language teaching, and there has been a great deal of empirical and theoretical research by scholars on how it can be applied to boost educational effectiveness in university English classes (Wang & Wang, 2024). It is worth noting, however, that contemporary education has progressively embraced blended learning settings, which involve a combination of offline and online delivery methods in which instruction and assessment are provided to students in a physical environment, such as a classroom or a workplace, in tandem with online environments (online quizzes, online instructor-led lectures, or online assessments) (Marcellis et al., 2023). At present, there are relatively few studies concerned with employing self-determinism to raise university students' motivation to learn English within such blended learning environments (Wang & Wang, 2024). Therefore, aiming at bridging this gap, this paper analyses the effects of these three psychological needs on English learning motivation individually on the basis of the SDT theory as the basic framework and elaborates on whether and how the exploitation of the SDT theory in blended teaching of university English stimulate students' motivation and promote the quality of instruction so as to bring new inspirations to practitioners.

1. Three Psychological Needs

1.1. Competence

Competence in SDT is analogous to Bandura's notion of self-efficacy, a subjective determination of a given one's ability to undertake a learning task. When learners have a high level of competence, their engagement in and motivation for learning is higher (Deci & Ryan, 1980). And the most crucial aspect of competent satisfaction is the tasks given to students are moderately difficult and in the best areas chal-

lenging. When tasks are in the realm of optimal challenge, competence needs are well met and intrinsic motivation is increased. Accordingly, In blended teaching, the way in which instruction is delivered both offline and online can be better adapted to the ability level of the student to allow them to be challenged to the maximum extent possible. For instance, online intelligent tutoring systems enable support to be tailored to students' proficiency levels. Instructors would even be able to visualize students' real-time proficiency growth throughout the English language learning process through graphs automatically generated by the online system including spiderweb graphs or line graphs, and deliver guidance that is best suited to the student's ability (Kabudi, 2021). Furthermore, according to cognitive appraisal theory, informational reward can increase an individual's intrinsic motivation by making them feel competent in the activity they are performing, or by knowing how to be more competent in that activity. In educational activities, positive feedback and formative assessment are common forms of informational rewards, which increase students' self-esteem, their sense of competence, and their internal motivation to learn ((Muñoz & Ramirez, 2015). University students are in the key stage of self-identification, they are eager to be recognized and respected by outsiders, especially the teachers (Tran & Ma, 2021). It is thus of paramount value to provide them with positive and formative responses in teaching so that they are aware of their competence and progress, which is a powerful approach to raise their learning motivation. And the periodic testing, instant and timely feedback, and growth records in blended teaching all make it easier for learners to track their learning gains and advances, boosting their self-confidence and intrinsic motivation.

1.2. Relatedness

According to SDT, the satisfaction of the need for relatedness could also lead externally motivated or demotivated learners to a more intrinsic motivation. When individuals are in an environment where they feel secure, warm, and belong, exploratory behaviors governed by intrinsic motivation will increase (Comanaru & Noels, 2009). It is wise to utilize the role of relatedness adequately to strengthen students' motivation to learn English. And blended teaching is precisely a perfect stimulus for university students to build rapport with their teachers and instructors. On the one hand, teachers could create a form to summarize and record students' basic profiles and personal traits, and use different caring techniques for different types of students to meet their needs for being related. Or hold regular question-and-answer hours, and leave the instructor's contact channels accessible so that students have the channel to connect directly with teachers. On the other hand, it is useful to use online tools such as videoconferencing or virtual reality platforms to organize social activities to build rapport among students and satisfying their sense of relatedness.

1.3. Autonomy

In SDT, autonomy is the heart of the three basic psychological needs. It refers to the individual's perception that the actions carried out are of their own volition and are self-directed. When learners develop a high degree of autonomy over their learning tasks, they will tend to regulate their own behavior, make fuller use of their talents (Black & Deci, 2000). In the past, many instructors have always taught according to the official syllabus issued by the educational department, treating students as passive learners, resulting in students' learning interest declining year by year and a utilitarian attitude towards learning. Whereas in blended teaching, this phenomenon can be modified. Teachers provide open learning resources, such as e-books, podcasts, online courses, etc., to empower students to autonomously choose learning materials according to their interests and learning goals. Besides, students are provided with a wider range of self-directed learning tools, such as grammar and vocabulary practice software, pronunciation correction tools, language learning apps, etc., enables students to self-evaluate and upgrade their language skills. Teaching that honors students' independence and autonomy by giving them the scope to choose their learning materials and learning strategies, enables learners to be accountable for their conduct and to internalize their learning motivation, thus heightening the effectiveness of education (Mohamed & Al-Jadaan, 2024).

Conclusion

In a word, in blended university English teaching, students' psychological needs are all catered for better, and their learning motivation are aroused in a greater way. The new mode can be better tailored to the proficiency level of university students and supply positive and formative feedback to satisfy their competence demands; offer abundant pathways of linkage to foster student-to-student, and student-to-teacher

connections; and enable students to make their own choices among the open learning resources and self-directed learning tools. This finding has both theoretical and practical implications. Theoretically, it expands and perfects the English teaching in universities, and offers additional references and grounds for researchers who are keen on this theory to explore university students' motivation in blended English language teaching based on the SDT theory. Practically speaking, it is a useful approach to promote motivation in the practice of university blended English teaching. However, the mechanics of motivation are immensely complicated. The universality of the basic psychological needs is still in doubt. And perhaps there are also cultural and individual differences in terms of the concept of self and personal psychological needs (Muhammadin & Herda, 2024). Hence, hereafter, a more targeted and represented research design could be taken into account, depending on the characteristics of the research participants. And English educators shall continue to explore and check how SDT theory functions more effectively in motivating learners in the context of blended education in university English, in light of their practical teaching experiences.

References

[1] Bower, G. H. (1979). Psychology of learning and motivation. Academic Press.

[2] Black, A. E., & Deci, E. L. (2000). The effects of instructors' autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective. Science Education, 84(6), 740-756.

[3] Comanaru, R., & Noels, K. A. (2009). Self-determination, motivation, and the learning of Chinese as a heritage language. Canadian Modern Language Review, 66(1), 131-158.

[4] Deci, E. L., & Ryan, R. M. (1980). Self-determination theory: When mind mediates behavior. The Journal of mind and Behavior, 33-43.

[5] Kabudi, T. (2023). Towards Designing AI-Enabled Adaptive Learning Systems.

[6] Muhammadin, I. N., & Herda, R. K. (2024). Exploring Motivation among EFL Undergraduate Students: A Self-Determination Theory Perspective. Balangkas: An International Multidisciplinary Research Journal, 1(1), 1-9.

[7] Muñoz, A., & Ramirez, M. (2015). Teachers' conceptions of motivation and motivating practices in second-language learning: A self-determination theory perspective. Theory and Research in Education, 13(2), 198-220.

[8] Tran, T. T. T., & Ma, Q. (2021). Using formative assessment in a blended EFL listening course: Student perceptions of effectiveness and challenges. International Journal of Computer-Assisted Language Learning and Teaching (IJCALLT), 11(3), 17-38.

[9] Wang, X., & Wang, S. (2024). Exploring Chinese EFL learners' engagement with large language models: A self-determination theory perspective. Learning and Motivation, 87, 102014.

EnPress

Parameter estimation of multivariate normal distribution in Bayesian framework

Zihao Ye

Lomonosov Moscow State University, Moscow 119234, Russia

Abstract: This paper discusses the parameter estimation of the multivariate normal distribution using Bayesian statistical methods. Traditionally, frequency statistical methods are used to estimate the parameters of the multivariate normal distribution, but this method may face sampling limitations and model complexity. In contrast, the Bayesian method can more effectively explain the uncertainty of parameter estimation by introducing prior information and subsequent reasoning, and show better robustness to data limitations or model complexity. Through literature review and empirical analysis, this paper demonstrates the benefits and potential of using Bayesian methods to estimate the parameters of the multivariate normal distribution, and proposes new ideas for parameter estimation of the multivariate normal distribution in various fields, such as providing new ideas and methods for portfolio management.

Keywords: Multivariate Normal Distribution; Frequency Statistical Methods; Bayesian Statistical Methods

1 Introduction

1.1 Project Overview

The classical multivariate normal distribution is based on the use of frequency statistics to estimate model parameters. This may lead to some limitations, especially when the sample is limited or the modeling is complex. In other words, the classical method may underestimate the actual uncertainty and risk associated with the investment.

In recent years, Bayesian statistical methods have received increasing attention in data analysis and parameter estimation. The Bayesian method allows us to consider prior knowledge of parameters and update them based on observed data, which makes it more flexible and robust for different market scenarios. However, parameter estimation under the Bayesian statistical method also faces more complex difficulties, such as: the choice of parameter prior distribution and likelihood function, and the difficulty in obtaining analytical solutions for the posterior distribution and posterior predictive distribution. This article will use Jeffrey's prior ideas to calculate and derive the parameter estimation of the multivariate normal distribution step by step.

1.2 Methodology

Within the framework of Bayesian statistical methods, the following definition theorems will be used: Bayes' theorem, likelihood function, inverse Wishart distribution, multivariate Student's T distribution, Jeffrey prior, prior distribution, posterior distribution and posterior predictive distribution, etc.

1.3 Project Outcome

Although the multivariate normal distribution is widely defined in various models, such as in economics, where it is often defined as the distribution of excess returns of assets, it may face limitations in estimating parameters, especially in periods of financial instability or limited data availability.

In this context, Bayesian statistical methods represent a promising approach to estimating the parameters of the multivariate normal distribution. By integrating prior knowledge and data, they can improve the accuracy of estimates and manage uncertainty more effectively.

Although the use of Bayesian methods in parameter estimation is still relatively new, there have been many studies that have confirmed the effectiveness and applicability of Bayesian methods in estimating the parameters of the multivariate normal distribution. The following is a detailed review of these studies and an analysis of their results.

2 Research and solution of the problem

2.1 Multivariate Normal Distribution

The initial preparation for the definition of the multivariate normal distribution begins by assuming that there are N different random variables. Let X denote an N-dimensional vector of random variables consisting of N random variables. In this case, the multivariate normal distribution is defined as a distribution with mathematical expectation μ and covariance Σ, where μ is a vector of size N×1 and Σ is a matrix of size N timesN.

$$P(X;\mu,\Sigma)=\frac{1}{(2\pi)^{N/2}|\Sigma|^{1/2}}e^{-\frac{1}{2}(X-\mu)'\Sigma^{-1}(X-\mu)}\Leftrightarrow X\sim N_N(\mu,\Sigma)$$

where |Σ| is the determinant of the covariance matrix.

Assume that there are N random variable vectors as samples of parameter estimation. Let X_t denote the th random vector variable sample.

$$X_t=\left(X_{1,t},R_{X,t},\ldots,X_{N,t}\right)'$$

$$P(X_t;\mu,\Sigma)=\frac{1}{(2\pi)^{N/2}|\Sigma|^{1/2}}e^{-\frac{1}{2}(X_t-\mu)'\Sigma^{-1}(X_t-\mu)}\Leftrightarrow X_t\sim N_N(\mu,\Sigma)$$

The estimation of parameters μ and Σ can be divided into two types: frequency statistics methods and Bayesian statistics methods. Next, we will describe how these two methods achieve parameter estimation. The theorems used and their proofs will also be given.

2.2 Frequency statistics methods

frequency statistics methods assumes that the parameters and have certain values. The parameters are estimated using the maximum likelihood estimation method:

$$L(\mu,\Sigma|X_1,\ldots,X_T)=(2\pi)^{-\frac{TN}{2}}|\Sigma|^{-\frac{T}{2}}e^{-\frac{1}{2}\sum_{t=1}^{T}(X_t-\mu)'\Sigma^{-1}(X_t-\mu)}$$

$$Ln(L(\mu,\Sigma|X_1,\ldots,X_T)=-\frac{TN}{2}\ln(2\pi)-\frac{T}{2}\ln|\Sigma|-\frac{1}{2}\sum_{t=1}^{T}(X_t-\mu)'\,\Sigma^{-1}(X_t-\mu)$$

$$\frac{\partial Ln\left(L(\mu,\Sigma|X_1,\ldots,X_T)\right)}{\partial\mu}=0\Rightarrow\hat{\mu}=\frac{1}{T}\sum_{t=1}^{T}X_t$$

$$\frac{\partial Ln\left(L(\mu,\Sigma|X_1,\ldots,X_T)\right)}{\partial\Sigma}=0\Rightarrow\hat{\Sigma}=\frac{1}{T}\sum_{t=1}^{T}(X_t-\hat{\mu})\,(X_t-\hat{\mu})'$$

Unbiasedness of parameter estimates:

Testing the unbiasedness of $\hat{\mu}$:

$$E[\hat{\mu}]=\frac{1}{T}\sum_{t=1}^{T}E\,[R_t]=\frac{1}{T}(T\mu)=\mu$$

Theorem 2.2.1 [8]

Property of orthogonal matrices: All column vectors Y_j are unit orthogonal vectors. Therefore:

$$\left(Y_j,Y_k\right)=\begin{cases}1\ ,\ j\ =\ k\\0\ ,\ j\ \neq\ k\end{cases}$$

Theorem 2.2.2 [10]

Let $X_1,X_2,\ldots,X_n$ be samples from the population X, $X\sim N_p(\mu,\Sigma)$.

$\overline{X}=\frac{1}{n}\sum_{i=1}^{n}X_i,S=\sum_{k=1}^{n}(X_k-\overline{X})\,(X_k-\overline{X})'$ There exist independent P-dimensional vectors $Y_1,Y_2,\ldots,Y_{n-1}$, $Y_i\sim N_p(0,\Sigma),i=1,2,\ldots,n-1$ therefore:

$$S=\sum_{i=1}^{n-1}Y_i\,Y_i'$$

Proof:

$$S=\sum_{k=1}^{n}\left(X_k-\overline{X}\right)\left(X_k-\overline{X}\right)'=\sum_{k=1}^{n}\left[(X_k-\mu)-\left(\overline{X}-\mu\right)\right]\left[(X_k-\mu)-\left(\overline{X}-\mu\right)\right]'=$$

$$=\sum_{k=1}^{n}\left[(X_k-\mu)(X_k-\mu)'-\left(\overline{X}-\mu\right)(X_k-\mu)'-(X_k-\mu)\left(\overline{X}-\mu\right)'+\left(\overline{X}-\mu\right)\left(\overline{X}-\mu\right)'\right]=$$

$$=\sum_{k=1}^{n}(X_k-\mu)\,(X_k-\mu)'-\left(\overline{X}-\mu\right)\left(\sum_{k=1}^{n}X_k-n\mu\right)'-\left(\sum_{k=1}^{n}X_k-n\mu\right)\left(\overline{X}-\mu\right)'+n\left(\overline{X}-\mu\right)\left(\overline{X}-\mu\right)'=$$

$$=\sum_{k=1}^{n}(X_k-\mu)\,(X_k-\mu)'-n\left(\overline{X}-\mu\right)\left(\overline{X}-\mu\right)'-n\left(\overline{X}-\mu\right)\left(\overline{X}-\mu\right)'+n\left(\overline{X}-\mu\right)\left(\overline{X}-\mu\right)'=$$

$$=\sum_{k=1}^{n}(X_k-\mu)\,(X_k-\mu)'-n\left(\overline{X}-\mu\right)\left(\overline{X}-\mu\right)'$$

Let $Y=(Y_1,Y_2,...,Y_{n-1},Y_n)=(X_1-\mu,X_2-\mu,...,X_{n-1}-\mu,X_n-\mu)U$, where U- is an orthogonal matrix of the form:

$$U=\begin{pmatrix}u_{1,1} & \cdots & u_{1,n-1} & \frac{1}{\sqrt{n}}\\ u_{2,1} & \cdots & u_{2,n-1} & \frac{1}{\sqrt{n}}\\ \vdots & \ddots & \vdots & \vdots\\ u_{n,1} & \cdots & u_{n,n-1} & \frac{1}{\sqrt{n}}\end{pmatrix}$$

Therefore, Y_j is a linear combination of $X_i-\mu,...,X_{n-1}-\mu,X_n-\mu$. Its expectation vector and covariance matrix are:

$$E\left[Y_j\right]=E\left[\sum_{i=1}^{n}u_{i,j}\,(X_i-\mu)\right]=0$$

$$COV\left(Y_j,Y_k\right)=COV\left(\sum_{i=1}^{n}u_{i,j}\,(X_i-\mu),\sum_{l=1}^{n}u_{l,k}\,(X_l-\mu)\right)=$$

$$=COV\left(\sum_{i=1}^{n}u_{i,j}\,X_i,\sum_{l=1}^{n}u_{l,k}\,X_l\right)=\sum_{i=1}^{n}u_{i,j}\,u_{i,k}COV(X_i,X_i)=$$

$$=\sum_{i=1}^{n}u_{i,j}\,u_{i,k}\Sigma=\delta_{j,k}\Sigma$$

By the orthogonal matrix theorem (2.2.1) it follows:

$$COV\left(Y_j,Y_k\right)=\sum_{i=1}^{n}u_{i,j}\,u_{i,k}\Sigma=\delta_{j,k}\Sigma$$

where,

$$\delta_{j,k}=\begin{cases}1\ ,\ j=k\\ 0\ ,\ j\neq k\end{cases}$$

Therefore:$Y_1,...,Y_{n-1},Y_n$ are independent of each other and $Y_i\sim N_p\,(0,\Sigma)$, i=1,2,...,n.

Since:

$$\sum_{k=1}^{n}(X_k-\mu)\,(X_k-\mu)'=YU^{-1}(YU^{-1})'=YU^{-1}(U^{-1})'Y'=YY'$$

$$Y_n=\frac{1}{\sqrt{n}}\sum_{k=1}^{n}(X_k-\mu)=\frac{n}{\sqrt{n}}\left(\overline{X}-\mu\right)=\sqrt{n}\left(\overline{X}-\mu\right)$$

Therefore:

$$Y_n Y_n' = n\left(\overline{X} - \mu\right)\left(\overline{X} - \mu\right)'$$

$$S = \sum_{k=1}^{n} (X_k - \mu)\,(X_k - \mu)' - n\left(\overline{X} - \mu\right)\left(\overline{X} - \mu\right)' = YY' - Y_n Y_n' =$$

$$= \sum_{i=1}^{n} Y_i\, Y_i' - Y_n Y_n' = \sum_{i=1}^{n-1} Y_i\, Y_i'$$

Testing the unbiasedness of $\hat{\Sigma}$:

According to Theorem 2.2.2

$S = \sum_{t=1}^{T}(R_t - \hat{\mu})\,(R_t - \hat{\mu})', \hat{\Sigma} = \frac{S}{T} \Rightarrow S = \sum_{i=1}^{T-1} Y_i\, Y_i'\ , Y_i \sim N_N(0, \Sigma)$

Therefore:

$$E\left[\hat{\Sigma}\right] = E\left[\frac{S}{T}\right] = E\left[\frac{\sum_{i=1}^{T-1} Y_i\, Y_i'}{T}\right] = \frac{1}{T}\sum_{i=1}^{T-1} E\left[(Y_i - 0)(Y_i - 0)^T\right]$$

$$= \frac{1}{T}\sum_{i=1}^{T-1} E\left[(Y_i - E[Y_i])(Y_i - E[Y_i])^T\right] = \frac{1}{T}\sum_{i=1}^{T-1} D\,(Y_i) = \frac{T-1}{T}\Sigma$$

Therefore, the estimator $\hat{\mu}$ is unbiased, and the estimator $\hat{\Sigma}$ is not unbiased. But it follows that $\frac{n}{n-1}\Sigma$ is unbiased.

Consequently, the estimators of the parameters μ and Σ have the following forms:

$$\hat{\mu} = \frac{1}{T}\sum_{t=1}^{T} R_t$$

$$\hat{\Sigma} = \frac{1}{T-1}\sum_{t=1}^{T}(R_t - \hat{\mu})\,(R_t - \hat{\mu})'$$

The above is the whole process of estimating the parameters of the multivariate normal distribution using the frequency statistics methods. The following is the parameter estimation process using the Bayesian statistics methods. Before that, let us first add two important probability distributions.

2.3 Inverse - Wishart Distribution

An N×N matrix Σ~ Inverse - Wishart_N (Σ|Ψ,υ) with degrees of freedom υ if its probability density function has the following form:

$$W^{-1}(\Sigma|\Psi,\upsilon) = \frac{|\Psi|^{\frac{\upsilon}{2}}}{2^{\frac{\upsilon N}{2}}\Gamma_N\left(\frac{\upsilon}{2}\right)}|\Sigma|^{-\frac{\upsilon+N+1}{2}} e^{-\frac{1}{2}tr(\Psi\Sigma^{-1})}$$

where,Γ_N is the multivariate gamma distribution.

2.4 Multivariate Student's t-distribution with degrees of freedom

An N-dimensional vector y~t_υ (μ,Σ) with degrees of freedom υ if its probability density function has the following form:

$$f(y) = (\pi\upsilon)^{-\frac{N}{2}}\frac{\Gamma\left(\frac{\upsilon+N}{2}\right)}{\Gamma\left(\frac{\upsilon}{2}\right)}|\Sigma|^{-\frac{1}{2}}\left(1 + \frac{1}{\upsilon}(y-\mu)'\Sigma^{-1}(y-\mu)\right)^{-\frac{\upsilon+N}{2}}$$

Then the mathematical expectation E(y)=μ and the covariance matrix $COV(y) = \frac{\upsilon}{\upsilon-2}\Sigma$ for υ>2.

2.5 Bayesian statistics methods

The Bayesian statistics methods assumes that the parameters μ and Σ are random variables, and their joint distribution is P(μ,Σ). Estimating the parameters will produce the distribution of the parameters.

Then the probability density function of the random variable vector sample X_t (N-dimensional multivariate normal distribution) becomes the conditional probability distribution $p(X_t|\mu,\Sigma)$

$$P(R_t|\mu,\Sigma)=\frac{1}{(2\pi)^{N/2}|\Sigma|^{1/2}}e^{-\frac{1}{2}(R_t-\mu)'\Sigma^{-1}(R_t-\mu)} \Leftrightarrow R_t|\mu,\Sigma \sim N_N(\mu,\Sigma)$$

Theorem 2.5.1 (Bayes' Theorem) [10]

Let A and B be continuous random variables with joint distribution P(A,B).

Then:

$$P(A|B)=\frac{P(A,B)}{P'(B)}=\frac{P(B|A)P'(A)}{P'(B)}=\frac{P(B|A)P'(A)}{\int P(B|A)P'(A)dA}$$

where

P' (A) - marginal distribution of A(prior distribution)

P(A|B) - posterior probability;

P(B|A) - conditional distribution;

P^' (B) - marginal distribution of B.

Theorem 2.5.2 (N-dimensional Gauss integral) [3]

Let A be an N-dimensional symmetric matrix

$$\int e^{-\frac{1}{2}x'Ax}dx=\sqrt{\frac{(2\pi)^N}{|A|}}$$

where, |A| is the determinant of the symmetric matrix A.

Theorem 2.5.3 [2]

Let $X_1,X_2,...,X_n$ be samples from the population X,$X\sim N_p(\mu,\Sigma)$.

$\overline{X}=\frac{1}{n}\sum_{i=1}^{n}X_i, S=\sum_{k=1}^{n}\left(X_k-\overline{X}\right)\left(X_k-\overline{X}\right)'$, therefore: $\overline{X}\sim N_p\left(\mu,\frac{1}{n}\Sigma\right)$

Proof:

$$E[\overline{X}]=\frac{1}{n}\sum_{i=1}^{n}E[X_i]=\mu$$

$$D[\overline{X}]=E\left[\left(\frac{1}{n}\sum_{i=1}^{n}X_i-\mu\right)\frac{1}{n}\sum_{i=1}^{n}X_i-\mu)'\right]=\frac{1}{n^2}\sum_{i=1}^{n}E[(X_i-\mu)(X_i-\mu)']=\frac{1}{n}\Sigma$$

Theorem 2.5.4 [10]

Let $X\sim N(\mu_X,\sigma_X^2)$ and $Y\sim N(\mu_Y,\sigma_Y^2)$. The probability density functions are f_X and f_Y. If Z=X+Y, then its probability density function $f_Z=\int f_X(x)\text{-}f_Y(z\text{-}x)dx \Rightarrow Z\sim N(\mu_X+\mu_Y,\sigma_X^2+\sigma_Y^2)$.

Then, according to Bayes' theorem (2.5.1), the posterior distribution of asset returns is as follows:

$$P(\mu,\Sigma|R_1,\ldots,R_T)=\frac{P(R_1,\ldots,R_T|\mu,\Sigma)P'(\mu,\Sigma)}{\int\int P(R_1,\ldots,R_T|\mu,\Sigma)P'(\mu,\Sigma)d\mu d\Sigma}$$

Since the double integral $\iint P(R_1,...,R_T|\mu,\Sigma)\,P'(\mu,\Sigma)d\mu d\Sigma$ is one constant. Therefore:

$$P(\mu,\Sigma|R_1,\ldots,R_T)=\frac{P(R_1,\ldots,R_T|\mu,\Sigma)P'(\mu,\Sigma)}{\int\int P(R_1,\ldots,R_T|\mu,\Sigma)P'(\mu,\Sigma)d\mu d\Sigma}\propto P(R_1,\ldots,R_T|\mu,\Sigma)P'(\mu,\Sigma)$$

The posterior distribution of the parameters μ and Σ here is the Bayesian estimate of the parameters μ and Σ.

Assuming that there is no prior information about the parameters μ and Σ, then the parameters μ and Σ follow an uninformative prior distribution, that is, the Jeffrey distribution.

$$P'(\mu,\Sigma) \propto |\Sigma|^{-\frac{(N+1)}{2}}$$

At the same time, the likelihood function of the N-dimensional multivariate normal distribution $P(X_1,...,X_T|\mu,\Sigma)$ is equal to:

$$P(X_1,\dots,X_T|\mu,\Sigma) \propto |\Sigma|^{-\frac{T}{2}} e^{-\frac{1}{2}\sum_{t=1}^{T}(X_t-\mu)'\Sigma^{-1}(X_t-\mu)}$$

Then the posterior distribution of the parameters μ and Σ:

$$P(\mu,\Sigma|X_1,\dots,X_T) \propto |\Sigma|^{-\frac{T+N+1}{2}} e^{-\frac{1}{2}\sum_{t=1}^{T}(X_t-\mu)'\Sigma^{-1}(X_t-\mu)}$$

Based on the posterior distribution, the distribution of predicted asset returns is defined as:

$$P(X_{T+1}|X_1,\dots,X_T) = \int\int P(X = X_{T+1}|\mu,\Sigma,X_1,\dots,X_T)P(\mu,\Sigma)d\mu d\Sigma$$

where, P(μ,Σ) is an estimate of the parameters μ and Σ, i.e., the posterior distribution of the parameters μ and Σ. Therefore:

$$P(X_{T+1}|X_1,\dots,X_T) = \int\int P(X = X_{T+1}|\mu,\Sigma)P(\mu,\Sigma|X_1,\dots,X_T)d\mu d\Sigma =$$

$$= \int\int P(X = X_{T+1}|\mu,\Sigma)P(\mu|\Sigma,X_1,\dots,X_T)d\mu P(\Sigma|X_1,\dots,X_T)d\Sigma$$

Marginal posterior distribution of the parameter Σ:

$$P(\Sigma|X_1,\dots,X_T) = \int P(\mu,\Sigma|X_1,\dots,X_T)d\mu \propto |\Sigma|^{-\frac{T+N+1}{2}} \int e^{-\frac{1}{2}\sum_{t=1}^{T}(X_t-\mu)'\Sigma^{-1}(X_t-\mu)}d\mu$$

For $-\frac{1}{2}\sum_{t=1}^{T}(X_t-\mu)'\,\Sigma^{-1}(X_t-\mu)$:

$$-\frac{1}{2}\sum_{t=1}^{T}(X_t-\mu)'\,\Sigma^{-1}(X_t-\mu) = -\frac{1}{2}\sum_{t=1}^{T}(X_t'\Sigma^{-1}X_t - 2\mu'\Sigma^{-1}X_t + \mu'\Sigma^{-1}\mu) =$$

$$= -\frac{1}{2}\left(\sum_{t=1}^{T}X_t'\,\Sigma^{-1}X_t - 2\mu'\Sigma^{-1}\sum_{t=1}^{T}X_t + T\mu'\Sigma^{-1}\mu\right) =$$

Since $\hat{\mu} = \frac{1}{T}\sum_{t=1}^{T}X_t$:

$$= -\frac{1}{2}\left(\sum_{t=1}^{T}X_t'\,\Sigma^{-1}X_t - 2T\mu'\Sigma^{-1}\hat{\mu} + T\mu'\Sigma^{-1}\mu\right) =$$

$$= -\frac{1}{2}\left(\sum_{t=1}^{T}X_t'\,\Sigma^{-1}X_t + T(\mu-\hat{\mu})'\Sigma^{-1}(\mu-\hat{\mu}) - T\hat{\mu}'\Sigma^{-1}\hat{\mu}\right) =$$

We can find out that $\sum_{t=1}^{T}X_t'\,\Sigma^{-1}X_t = \sum_{t=1}^{T}(X_t-\hat{\mu})'\,\Sigma^{-1}(X_t-\hat{\mu}) + T\hat{\mu}'\Sigma^{-1}\hat{\mu}$:

$$= -\frac{1}{2}\left(\sum_{t=1}^{T}(X_t-\hat{\mu})'\,\Sigma^{-1}(X_t-\hat{\mu}) + T(\mu-\hat{\mu})'\Sigma^{-1}(\mu-\hat{\mu})\right)$$

Only $-\frac{T}{2}(\mu-\hat{\mu})'\Sigma^{-1}(\mu-\hat{\mu})$ has μ. Therefore:

$$\int e^{-\frac{T}{2}(\mu-\hat{\mu})'\Sigma^{-1}(\mu-\hat{\mu})}d\mu = \int e^{-\frac{1}{2}(\mu-\hat{\mu})'T\Sigma^{-1}(\mu-\hat{\mu})}d\mu = (2\pi)^{\frac{N}{2}}T^{-\frac{N}{2}}|\Sigma|^{\frac{1}{2}}$$

It is clear that the upper integral is an N-dimensional Gauss integral (Theorem 2.5.2):

So, the result of the integral is:

$$P(\Sigma|X_1,\dots,X_T) = \int P(\mu,\Sigma|X_1,\dots,X_T)d\mu \propto |\Sigma|^{-\frac{T+N}{2}} e^{-\frac{1}{2}\sum_{t=1}^{T}(X_t-\hat{\mu})'\Sigma^{-1}(X_t-\hat{\mu})} =$$

$$= |\Sigma|^{-\frac{T+N}{2}} e^{-\frac{1}{2}tr(\Sigma^{-1}\sum_{t=1}^{T}(X_t-\hat{\mu})(X_t-\hat{\mu})')}$$

$$\Rightarrow \Sigma|X_1,\dots,X_T \sim \text{Inverse - Wishart}_N\left(\sum_{t=1}^{T}(X_i-\hat{\mu})\,(X_i-\hat{\mu})', T-1\right)$$

A posteriori conditional distribution of the parameter μ:

By Theorem 2.5.3 we can follow:

$$\Rightarrow \mu|\Sigma, X_1, \ldots, X_T \sim N_N\left(\hat{\mu}, \frac{\Sigma}{T}\right)$$

Since the random variable vector sample follows an N-dimensional multivariate normal distribution:

$$\Rightarrow X_{T+1}|\mu, \Sigma \sim N_N(\mu, \Sigma)$$

Therefore:

$$P(X_{T+1}|\Sigma, X_1, \ldots, X_T) = \int P(X = X_{T+1}|\mu, \Sigma) P(\mu|\Sigma, X_1, \ldots, X_T) d\mu$$
$$= \int N_N(\mu, \Sigma) N_N\left(\hat{\mu}, \frac{\Sigma}{T}\right) d\mu$$

According to Theorem 2.5.4 we can follow:

$$\Rightarrow X_{T+1}|\Sigma, X_1, \ldots, X_T \sim N_N\left(\hat{\mu}, \frac{\Sigma}{T} + \Sigma\right)$$

$$P(R_{T+1}|R_1, \ldots, R_T) = \int P(R_{T+1}|\Sigma, R_1, \ldots, R_T) P(\Sigma|R_1, \ldots, R_T) d\Sigma =$$

where, $X_{T+1}|\Sigma, X_1, \ldots, X_T \sim N_N\left(\hat{\mu}, \frac{\Sigma}{T} + \Sigma\right)$ and $\Sigma|X_1, \ldots, X_T \sim$ Inverse - Wishart$_N(S, T-1)$, $S = \sum_{t=1}^{T}(X_i - \hat{\mu})(X_i - \hat{\mu})'$

$$= \frac{\frac{|S|^{T-1}}{2}}{(2\pi)^{\frac{N}{2}}\left(\frac{T+1}{T}\right)^{\frac{N}{2}} 2^{\frac{N(T-1)}{2}} \Gamma_N\left(\frac{T-1}{2}\right)} \int |\Sigma|^{-\frac{T+N+1}{2}} e^{-\frac{1}{2}\left[tr(S\Sigma^{-1}) + \frac{T}{T+1}(X_{T+1}-\hat{\mu})'\Sigma^{-1}(X_{T+1}-\hat{\mu})\right]} d\Sigma$$

$=$

Let $A = S + \frac{T}{T+1}(X_{T+1} - \hat{\mu})(X_{T+1} - \hat{\mu})'$, the internal has the form:

$$\int |\Sigma|^{-\frac{T+N+1}{2}} e^{-\frac{1}{2}tr(A\Sigma^{-1})} d\Sigma$$

It can be seen that the form of this integral is part of the integral of the distribution Inverse - Wishart(Σ|A,T) Since the integral of the probability density function is 1, the result of this integral is the reciprocal of the constant term of the distribution Inv - Whisart(Σ|A,T)

$$\int |\Sigma|^{-\frac{T+N+1}{2}} e^{-\frac{1}{2}tr(A\Sigma^{-1})} d\Sigma = \frac{2^{\frac{TN}{2}} \Gamma_N\left(\frac{T}{2}\right)}{|A|^{\frac{T}{2}}}$$

Therefore:

$$P(X_{T+1}|X_1, \ldots, X_T) = \int P(X_{T+1}|\Sigma, X_1, \ldots, X_T) P(\Sigma|X_1, \ldots, X_T) d\Sigma =$$
$$= \frac{\frac{|S|^{T-1}}{2}}{(2\pi)^{\frac{N}{2}}\left(\frac{T+1}{T}\right)^{\frac{N}{2}} 2^{\frac{N(T-1)}{2}} \Gamma_N\left(\frac{T-1}{2}\right)} \frac{2^{\frac{TN}{2}} \Gamma_N\left(\frac{T}{2}\right)}{|A|^{\frac{T}{2}}} \propto \frac{\Gamma_N\left(\frac{T}{2}\right)|S|^{\frac{T-1}{2}}}{\Gamma_N\left(\frac{T-N}{2}\right)|A|^{\frac{T}{2}}}$$

By processing the coefficients, we can obtain:

$$\Rightarrow \frac{\Gamma_N\left(\frac{T}{2}\right)}{\Gamma_N\left(\frac{T-N}{2}\right)} \left|\frac{\left(1+\frac{1}{T}\right)S}{T-N}\right|^{-\frac{1}{2}} \left(1 + \frac{1}{T-N}(X_{T+1} - \hat{\mu})' \left(\frac{\left(1+\frac{1}{T}\right)S}{T-N}\right)^{-1} (X_{T+1} - \hat{\mu})\right)^{-\frac{T}{2}}$$

$$\Rightarrow X = X_{T+1}|X_1, \ldots, X_T \sim T_v\left(\hat{\mu}, \frac{\left(1+\frac{1}{T}\right)}{v} S\right), v = T - N$$

That is, the distribution of predicted asset returns is a multivariate Student's t-distribution with degrees of freedom T-N.

Therefore, the estimates of the parameters μ and Σ are:

$$\tilde{\mu} = \hat{\mu}$$

$$\tilde{\Sigma} = \frac{\upsilon}{\upsilon - 2} \frac{\left(1 + \frac{1}{T}\right)}{\upsilon} S = \frac{\left(1 + \frac{1}{T}\right)(T-1)}{T - N - 2} \hat{\Sigma}$$

where, $\hat{\mu}$ and Σ can be seen 2.2.

3 Conclusion and Future Directions

3.1 Conclusion

In this paper, we have discussed in depth the problem of parameter estimation for multivariate normal distributions, and given a concrete procedure for parameter estimation by traditional frequency statistics methods and Bayesian statistics methods. Traditional frequency methods are based on maximum likelihood estimation, which, despite its good properties with large samples, may show limitations when dealing with complex high-dimensional data and finite sample situations. In contrast, Bayesian methods, by introducing prior information, are able to deal with data uncertainty more effectively, especially in the case of small samples or complex models.

Through the research and analysis in this paper, we find that Bayesian methods have great potential for application in financial and statistical modelling, especially when data is limited or the model needs to capture more uncertainty. Bayesian inference can clearly portray parameter uncertainty through posterior distributions, a property that provides a more robust means for risk management and forecasting in financial markets. For example, in this paper we use the uninformative treatment of the covariance matrix by Jeffrey's prior to demonstrate that Bayesian methods can exhibit good fit in high-dimensional data and avoid parameter estimation bias in frequency methods.

3.2 Future Directions

Although Bayesian methods show a wide range of applications in parameter estimation, there are still many issues that deserve further exploration. The research in this paper provides the following potential ideas for future directions:

Numerical Optimisation in High-Dimensional Problems: Although Bayesian methods have significant advantages in dealing with uncertainty and small-sample data, the problem of computational complexity in high-dimensional spaces remains severe. Future research can further explore how to accelerate the computation of posterior distributions through more efficient numerical methods, such as variational inference and Hamiltonian Monte Carlo (HMC) algorithms, especially for parameter estimation in high-dimensional financial data, which will greatly improve the efficiency of the practical application of Bayesian methods.

Integration of Bayesian and Machine Learning: With the development of machine learning techniques, combining Bayesian inference with deep learning can bring greater flexibility to data-driven models. For example, using Bayesian neural networks or probabilistic graphical models, potential uncertainties in financial data can be modelled and predicted in greater depth. Future research could explore how Bayesian uncertainty inference can be applied to deep learning frameworks to improve model robustness and generalisation.

Applications of Dynamic Bayesian Models: In dynamic environments such as financial markets, the statistical properties of data may change over time. Dynamic Bayesian models (e.g., state-space models or time-series Bayesian models) are uniquely suited to cope with time-varying parameters and non-stationary data. Future research could explore how dynamic Bayesian methods can be applied to problems such as asset price forecasting, risk management and option pricing in financial markets.

References

[1] Theodore W. Anderson. 2003. An introduction to multivariate statistical analysis (3rd ed.). Wiley.

[2] Theodore Wilbur Anderson and Ingram Olkin. 1985. Maximum-likelihood estimation of the parameters of a multivariate normal distribution. Linear algebra and its applications 70, (1985), 147–171.

[3] Jose M Bernardo. 1979. Reference posterior distributions for bayesian inference. Journal of the Royal Statistical Society Series B: Statistical Methodology 41, 2 (1979), 113–128.

[4] José M. Bernardo and Adrian FM Smith. 2000. Bayesian theory. Wiley.

[5] Christopher M. Bishop. 2006. Pattern recognition and machine learning. Springer.

[6] Carlos M. Carvalho, Nicholas G. Polson, and James G. Scott. 2010. The horseshoe estimator for sparse signals. Biometrika 97, 2 (2010), 465–480.

[7] Andrew Gelman, John B. Carlin, Hal S. Stern, David B. Dunson, Aki Vehtari, and Donald B. Rubin. 2013. Bayesian data analysis (3rd ed.). CRC Press.

[8] Werner H Greub. 2012. Linear algebra. Springer Science & Business Media.

[9] Marzieh Hasannasab, Johannes Hertrich, Friederike Laus, and Gabriele Steidl. 2021. Alternatives to the EM algorithm for ML estimation of location, scatter matrix, and degree of freedom of the student t distribution. Numerical Algorithms 87, 1 (2021), 77–118.

[10] Richard Arnold Johnson, Dean W Wichern, and others. 2002. Applied multivariate statistical analysis. (2002).

[11] Dennis V. Lindley. 1972. Bayesian statistics: A review. SIAM.

[12] Kevin P. Murphy. 2012. Machine learning: A probabilistic perspective. MIT Press.

[13] Anthony O'Hagan. 1994. Kendall's advanced theory of statistics, volume 2B: Bayesian inference. Wiley.

[14] Svetlozar T Rachev, John SJ Hsu, Biliana S Bagasheva, and Frank J Fabozzi. 2008. Bayesian methods in finance. John Wiley & Sons.

[15] Christian P. Robert. 2007. The bayesian choice: From decision-theoretic foundations to computational implementation (2nd ed.). Springer.

[16] Mike West and Jeff Harrison. 1997. Bayesian forecasting and dynamic models. Springer.

[17] Де Гроот. 1974. Оптимальные статистические решения. (1974).

About the author:

Zihao Ye（2001.05.10）,Male,Han,Heyuan City,Guangdong Province,Master,

research area :Market risks (securities portfolio management, evaluation of derivative financial instruments, stochastic programming methods).

An Analysis of the educational value of Chinese folk music

—— Take the Guizhou Gelao nationality folk song as an example

Bo Yao

Liupanshui Kindergarten Normal College, Liupanshui 553000, China

Abstract: After the revolutionary era and the establishment of new China, all social strata attach great importance to the social role of folk songs, and carry out all kinds of practical activities by means of folk songs. On this basis, there are more and more research on the educational thought, educational function and educational value of folk songs, more and more in-depth and more and more large-scale. However, the educational value of folk songs has not been demonstrated enough, and they are in a weak position in Chinese modern education, especially basic education. For this reason, Zhang Zhongxiao, a folk musician in Guizhou province, published the article *Local music should be the backbone of music education*, advocating a revolution in the three fields of music education thought, teaching materials and cultural ecological environment, so as to improve the status of local music in modern education. This paper intends to take the Guizhou Gelao nationality folk song as an example to explain its rich educational value.

Keywords: Folk Music; Gelao Folk Song; Educational Value

In the thousands of years of ancient Chinese history since the Shang and Zhou Dynasties, folk culture, as the basic social and cultural form, has always been valued by the ruling class and cultural groups.References The Book of *Rites · Wang system* recorded the son of Heaven five years a tour …… ordered the master Chen Shi to view the folk customs." [1]The Book of *Han · Literature and Art* also has the ancient there of the official of poetry, the king so view the customs, know the gains and losses, from the examination is also."The account of. Since the Western Zhou Dynasty, the collection of "rural slang songs" has become a means to collect the people's conditions, check the public opinion and gather the people's wisdom of the people, and then reverse the public through the transformation of folk songs, to realize the role of social education and stable rule, that is, the so-called " change customs, never be good at music.References To the Republic of China, the theory of aesthetic education made the value of music art education gained a new understanding. Music art education has become an indispensable part of the cultivation of perfect personality, which expands the understanding of perfect personality in aesthetic education.[2] Of course, the music here also includes the folk songs.

1. Its educational value as a "living fossil of history"

Folk songs are the art that comes from life and serves life. They are also the product of history. They are gradually formed and developed through people's long and extensive individual and mass impromptu compilation and oral singing. Therefore, folk songs carry the historical memory of various ethnic groups, including myths and legends, clans, religions, customs, clothing, shelter and transportation, and become the "living historical fossils" of a nation.References In the five categories (refers to folk songs, songs and dances, rap, opera and instrumental music.—— Author's note), a folk song composed of the combination of lyrics (literature) and tunes (music), has the longest history. From ancient times to modern times, folk songs have experienced every historical stage of human society, and Marx called it the "chronicle" of various ethnic groups."[3]

Because the Gelao nationality does not have its own characters, the myths and legends, historical narratives, religious beliefs and customs of the Gelao nationality are all passed down by mouth and inherited from generation to generation. The inheritance process of folk songs truly shows the historical development of the Gelao nationality. The ancient songs of the *Gelao nationality* depict The Song of the people in ancient times, leaving only Ah Fu and Ah Xi brother and sister. Finally, the brother and sister became married, continuing the human beings. The history of the *third Book of March and the book* of the ancestors of the Gelao nationality established Zangke and the country of Yelang. In addition, the ancient song also describes the understanding of the Gelao people's natural phenomena, astronomy and geography, farming and animal husbandry. These rich historical information, scientific knowledge and life and production experience contained in the

folk songs not only make it possible to inherit the history of the Gelao nationality, but also remember the achievements of the ancestors through the singing of the folk songs, so that the later generations can "understand the forewords and practice their virtues".

From the myths and legends to the rise of Yelang, from the invasion to the escape, from the brilliant heyday to the decline, to the rebirth after the birth of new China, the rise and fall of the Gelao nationality have been extended among the generations of the Gelao population. For example, the ancient song of the Gelao nationality The Book of March 3 Use sings:

Zangke was built in the Spring and Autumn Period before Yelang State in the Warring States Period. Zangke was built first, and Yelang was built ten years later. They were all built in the southwest, which were built by the people themselves.

References: When King Xiang of the State of Chu fought against Qin, he sent great troops into the southwest. When the army passed the Yuanshui area, they destroyed Yelang. Hongwu came to ascend the throne, and was transferred to the north army to march to the south. The southwest Gelao was swept away, and the people from the north were transferred to fill the south.[4]

Due to several wars and the central feudal centralized rule, in the early years of the Republic of China, the Gelao nationality was almost extinct, and the culture of the Gelao nationality was also fragmented, which had a tendency to be hidden by history. After the founding of the People's Republic of China, the people of the Gelao nationality welcomed new vitality. They not only established their national identity, but also protected their excellent traditional customs and national culture by the state. The population of the Gelao nationality also increased to more than 600,000 at present, becoming a member of the 56 ethnic groups in China. Now, the happy Gelao nationality sings to:

The Communist Party led us to turn over,

Food and clothes,

Happy live a happy life.

Zhenning County folk song *Song of Happiness*

This song *Happy Song* belongs to the wine song category and is sung in the language of the Gelao nationality. The lyrics are simple and concise, but they can fully reflect the great changes in the life of the Gelao people. Through the Song of Happiness, we can imagine the vivid picture of the Gelao ethnic group people sitting together and holding a wine glass to praise the Communist Party and praise the new life.

It is precisely because of the precious national memories contained in the Gelao folk songs that it has become a valuable treasure to teach generation after generation to not forget the national history, identify with the national identity, adhere to the national unity, and adhere to the national culture and national spirit. The educational value of Gelao folk songs based on historical resources, belief resources and cultural and artistic resources is worth extensive and in-depth study.

2. As an educational value of enhancing national identity

Folk songs contain the national genes, Is the cultural element that continuously maintains a national cohesion and identity, In 1994, Martin Stokes (Martin Stokes), professor of Music Anthropology and Social anthropology at King's College, University of London, edited by *Ethnic identity identity and Musical Construction of Music*,discusses in depth the importance of music in building identity and ethnic identity, Analyzing how the boundaries of region and self are gathered and constructed through the music of a specific community, or say, Individuals, communities, how to use music to identify or even change views of other social groups and regions.

The key to the development and continuation of a national culture lies in enhancing its national identity. In the process of globalization all nationalities will to modern civilization, modern way of life, and a kinds of cultural form will constantly through the market economy, media and population flow continued to change everyone, as kelao people how to maintain ethnic identity and ethnic cultural identity, is the kelao traditional culture can continue to inheritance and the development of the key factors.

Yelang State was the first country established in southwest China by the ancestors of the ethnic minorities in Guizhou province. It was also the heyday of the ancestors of the Gelao nationality, and then it gradually declined. In the next 1,000 years, the Gelao people scattered around the country have always had this honor spiritually. In many ancient songs, the praise, praise and remembrance of the ancestors of generations of Gelao people flow.

The creation of a song

Since ancient times, my ancestral site, full mountain trees I planted.

Datian dam I ancestral built, my ancestral wealth.

Dead burial land does not buy, mountain farming happy laugh.

Dam house my ancestral, generations to happiness.

The Gelao people trace their history with a long ancient song, describe the glory created by the ancestors, and strengthen their national identity through this narration and singing. A large number of ancient songs with similar themes handed down from various regions also reflect that References the Gelao nationality is the indigenous people of Guizhou, and the other people also agree on this.[5] This point of view.

We are the Ancient Gelao

We are the ancient Gelao, the ancient Gelao, we are the ancient Gelao, and the ancient liao people are our ancestors. The first people came here, came here, cut down trees, change land, change land; men plow and women weave six livestock prosperous, grain harvest deng Qingfeng year.

In the seventh half of the lunar calendar, pound new rice to make tribute rice, make tribute rice; the ancient Gelao family slaughter pigs and sheep, slaughter pigs and sheep, kill chickens and ducks to worship the ancestors first, pray for ancestors to bless, the next year is a big harvest year.

(Shuicheng District Gelao Nationality Folk Song)

This kind of sacrifice (sacrificial song) to worship the ancestors reflects the strong national emotional sustenance and spiritual return of the Gelao people, as well as the protection of the ancestors to the descendants. The value of this pursuit of ancestors and a strong sense of national identity for national identity education is self-evident.

In addition, this function can also be reflected in the Le Hazuami (ritual song) of the Gelao nationality. The Annals of Guizhou compiled during the Jiajing period of the Ming Dynasty recorded the scene of the funeral ceremony of Shiqian Gelao people: " beating drums and singing, men and women jumping around their bodies and scattered in sorrow.References Even today, singing still runs through the whole process of the funeral, it not only calms the soul of the dead and expresses the emotions of the living, but more importantly, it conveys the ethics and moral norms of the Gelao society and emphasizes the sense of belonging of the social members to inherit the integrity of the national culture."[6]

3. As the educational value of the village about the good customs

Folk songs in essence belongs to the folk culture, its folklore, social, group characteristics is generated under the specific historical and cultural background, it also gives the folk songs as township about good carrier of natural basic social value, always play in the rural governance structure the correct folkway, weathering enlightenment and guide the people to the good, the people into custom, promote social stability and maintain the national rule of traditional social regulation. Therefore, References modern ballads play an important position in China's social transformation and cultural construction. In the late Qing Dynasty, the original folk and popular ballads were transformed into the spiritual power of the society in many organized and preset movements.[7]

Gelao folk song culture moistens the kelao people of glorious history, recorded the kelao people in the forest survival tenacity, is formed in the long-term historical evolution and social change of the "cultural memory", and gradually precipitation for the metaphysical ethics in the rain, moistens everything silent education form regulation society. In addition, there are some more functional folk songs, such as letter song, which is a special way for the Gelao people to convey information.

In the folk songs of the Gelao nationality, the excellent people of the Gelao nationality, the elderly and the young, as well as the fighting spirit and national feelings. The folk songs of the ritual and custom songs of the Gelao nationality about praising the kindness of parents and family harmony are very rich, which subtly influence generations of Gelao people. In the description of "Persuade Children", the funeral song "filial piety" in Daguochang Village, Pingba, Anshun District, " When parents are alive, those as children have a good attitude towards their parents. Parents wrong place, can not be angry, to laugh to explain. To honor their parents, go out to do things, to let their parents know.

Take care of your parents wholeheartedly."There is also this wine song spread in Liupanshui Liuzhi Special Zone:

no sweet without sweat

Two more than young (ah) parents bitter, not food day difficulty (ah);

When the children grow up (yao), the family is lively to enjoy (ah).

Gelao region after ancient and modern wars and revolutionary movement, after 40 years of market economy, is still in the state of rural China grassroots and remote kelao village its social structure, social rules, cultural form, mental condition is fragmented, the reconstruction of modern economy, social and culture is still in its infancy. Therefore, under the background of the new era, to play a good kelao folk songs in shaping message between, the old, poor, form a "custom" social ethos beautify the role of customs, important is in the concept of References cultural integration [8] led, the folk songs into kelao overall culture, fully excavate the historical value of kelao folk songs, cultural value, aesthetic value and era value, restore the development of kelao folk culture vitality.

4. As the educational value of continuing family ethics

Gelao folk song education value can be analyzed from the history, nation state and social family three levels, in the first three points from the perspective of history and nation state expounds the education value of kelao folk songs, here through the analysis of "cry married song" discusses the kelao folk songs of social and family ethics of education value.

"Crying marriage song" is a kind of folk song genre contained in many provinces and cities and many ethnic groups in China.Crying marriage song" has a long history, the Qing Dynasty poet Peng Yongxing made a very vivid description in a bamboo poem: " pressure nong, miserable love, crying all the way. Report lang family today in sight, quietly just live call niang voice."To the married bride as the main singer, parents brother and sister-in-law and others to sing. From parents to brothers and sister-in-law, from family members to outsiders of the family, the order of crying and the content of urging them to follow the moral norms show the ethics of the traditional Gelao family. In the singing and closing (singing and answering) of the crowd participating in the "crying marriage", the inheritance and moral education of the family ethics of the married brides is also objectively realized.

References Getting married is a great turning point in the life of the Gelao girl. Before getting married, his identity is around the daughter is the family familiar relatives: parents, brother, sister-in-law, sisters, brother. In the care and protection of their parents. Life and behavior can be more casual and free. After getting married, his identity is the daughter-in-law facing the father-in-law, mother-in-law, husband and a strange environment. And to face social life independently. In your in-laws, be careful to avoid blame or the situation will be very difficult. Adjusting to this major shift is crucial for the bride itself."[9] Cry marriage song for the bride to vent parting, sadness to provide a channel, parents, brother and sister-in-sister, sisters, brother and neighborhood friends in the "cry marriage " exhortation also for the bride to correctly treat marriage, into the in-off life to provide a reference, alleviate the bride's anxiety. At the same time, although the song is accompanied by the bride, there are other participants, such as "niang sing", "sister-in-law sing", "sister advised to sing", "mother sing", "cousin" sister-in-law sing ," sister-in-law sing ", etc. This two-way interaction can play a role in self-education for all participants.

The following part is an excerpt from the title of One of the ancient Books of the *Gelao nationality of Guizhou Province: Cry Marriage Song* compiled by Wang Qizhen.

Open a song: the world to the female good ruthless.

A cry niang: the world only my mother good; niang accompany sing: all blame your mother can not get.

A cry father: for the female marriage worry broken heart. Cry brother: brother and sister leave very sad.

Cry sister-in-law: you are my good sister-in-law; sister-in-law to sing: sister rest assured on the sedan chair.

Cry sister: sister fell in the phoenix home; sister advised sing: send bed cover sister cover foot.

Cry brother: hope you quickly grow up; cry sister: good sister good sister to break up.

Cry to like: better than father and mother; better to sing: go out as a good man.

Cry my uncle: didn't help my uncle to make a pair of shoes; cry aunt: aunt painstakingly is for me.

Cry uncle: mother uncle send love way; cry cousin uncle: only hope cousin uncle live 100 years.

Cry cousin: cousin with a gift; cry watch sister-in-law: cousin eight characters born well.

Cousin-in-law sing: cousin leave home I embarrassed; cry cousin: cousin play day slowly walk.

Cry cousin: cousin is a good talent; cry hall sister-in-law: sister-in-law than guanyin is very beautiful.

Tang sister-in-law sing: slowly go ah my sister; cry little sister: sister is the rock on the peony flower.

Conclusion: Historically, Chinese folk music and traditional society are all integrated. After thousands of years, its educational value is boundless. Under the new era of the education value of folk music, one is to face up to the development of folk music and people especially youth art aesthetic demand, the it is to speed up the national music innovation, further refining folk music art quality, at the same time with the socialist core values and contemporary aesthetic demand, the Chinese folk music social regulations, ethics and vivid rhetoric art, artistic conception, interest in modern education.

References

[1] In ancient times, people referred to folk songs as "Feng"(风).

[2] Feng Wenci. A History of Musical Exchanges between China and Foreign Countries [M]. Beijing: People's Music Publishing House, 2013. Pages 308-309.

[3] Zhong Jingwen, Editor-in-Chief. Introduction to Folklore [M]. Shanghai: Shanghai Literary and Artistic Publishing House, 2009. Page 319.

[4] The *Ancient Songs of the Gelao* Ethnic Group, compiled by the Ethnic Affairs Committee of Anshun Prefecture, Guizhou Province; Guizhou Ethnic Publishing House, 1991 edition. Page 28.

[5] [De] Bao Klan, translated by Wang Wenhua and Fang Fengjun. The history and status quo of Guizhou Gelao [J]. Research on Slavery in Liangshan, 1978.

[6] LiuYuai. A Brief Analysis of the Cultural Connotations and Social Functions of the Ancient Songs of the Gelao Nationality's Funeral Rites [J]. Guizhou Social Sciences, Issue 5, 2006.

[7] Qiu Jian. Enlightenment and Revolution: An Event-based Interpretation of the Four Ballad Movements [J]. Chinese Modern Literature Series, Issue 2, 2020.

[8] Professor peng-cheng li and NiZhiJuan thinks, the so-called cultural integration, is relative to the situation, it is not only refers to a culture of internal cultural characteristics and various cultural level according to a certain order and the process of mutual coordination, also refers to a variety of culture in contact, communication, conflict, through adjustment, adaptation, innovation, integration and other cultural practice in the material level, system level and spirit, psychological and other deep gradually form a new cultural public body process.

[9] Tian Xiaoxiu. A Brief Analysis of the Ethnic Socio-Ethical and Moral Education Function of the "Crying Wedding" Custom of the Gelao Ethnic Group in Daozhen [J]. Guizhou Ethnic Studies, Issue 2, 2002.

Exploration into the role of rhythmic movement in the development of self-value and self-confidence

Qiang Zhang

Taihu Road Primary School, Hefei 230000, China

Abstract: This study focuses on the role of rhythmic movement in a primary school on the development of self-worth and self-confidence. As a kind of activity integrating sports, art and music, rhythmic movement has a positive impact on the physical and mental health of primary school students. Through literature review and field observation, this study aims to analyze the role of prosodic movements in enhancing the sense of self-worth and self-confidence and to explore the challenges encountered during the implementation and their solutions. The results showed that the prosodic movement significantly improved the sense of self-worth and self-confidence of the participating students, and also revealed the need for the joint efforts and support of educators and parents in the concrete implementation.

Keywords: Rhythmic Movement; Sense of Self-Worth; Self-Confidence; Pupils; Physical and Mental Development

1.Introduction

rhythmic movement, as an activity integrating sports and art, can not only exercise the physical quality of primary school students, but also have a positive impact on them on the psychological level. In primary school, the children are in the period of self consciousness gradually awakening, by participating in rhythm movement, they can find a sense of belonging in collective activities, so as to enhance the sense of self worth, the cultivation of self-confidence is the key to students psychological development, rhythm movement provides a platform to show themselves and accept others. In the process of rhythm, the children through constant practice and performance, can feel their progress and growth, the successful experience can effectively improve their self-confidence, the collective nature of rhythm movement requires children to learn to cooperate and communication, this not only can exercise their social skills, also can enhance identity in the interaction with peers. Every child is integral to teamwork, and this sense of need and attention helps them build a positive self-image[1]. This study observed the implementation of prosodic movements in a primary school to investigate the specific effects on the development of pupil self-worth and self-confidence.

2.First, the implementation status of rhythmic movement in primary schools

In this primary school, rhythmic movement has become an indispensable part of physical education. It not only enriches students' after-school life, but also plays a positive role in promoting the all-round development of students. By incorporating the rhythmic movement into the formal curriculum system, the school ensures that every student has the opportunity to participate in this activity. The rhythm course aims to improve students 'physical quality through physical movement, and also focuses on cultivating students' artistic accomplishment and aesthetic ability[2].. Through regular rhythm presentation activities, students get a platform to show themselves and learn from each other. These activities not only give students the opportunity to show their talents in front of their peers, but also to learn and improve by watching others' performances. In the process of rhythm learning and performance, the students experience the importance of team cooperation, every successful cooperation and wonderful performance let them feel a sense of accomplishment and sense of belonging, it is crucial for the establishment of their self worth, the collective characteristics of rhythm movement, makes the students in mutual cooperation and collaboration, learned how to communicate and coordinate with others.

3. The problem of rhythmic movement existing in elementary school

As an activity integrating sports and art, rhythmic movement has a positive impact on the physical and mental health development of primary school students. However, in the actual promotion process, the primary education system faces many challenges and problems, which hinder the overall development and benefit maximization of the rhythmic movement to some extent.

The organization and implementation of prosodic activities depends heavily on the ability and enthusiasm of individual teachers. This

dependence leads to the instability in the teaching quality. Some teachers may have strong rhythm skills and teaching enthusiasm, and they are able to design creative and attractive rhythm courses that can effectively stimulate students' interest and participation. These teachers are usually able to use a variety of teaching methods to enable students to learn rhythm in a relaxed and happy atmosphere, so as to improve students' physical quality and artistic accomplishment, while other teachers may be difficult to effectively organize and guide rhythmic activities due to the lack of relevant professional training and experience. This imbalance of teaching quality not only affects the promotion effect of rhythmic movement in primary schools, but also may have adverse effects on the development of students' physical and mental health.

The uneven distribution of resources in prosodic activity is also an problem. Some schools may not be able to provide adequate rhythmic learning opportunities for all students due to funding, facilities and other resources. This unequal allocation of resources may exacerbate the differences between students, influencing the popularity and development of prosodic movements in elementary schools. The uneven allocation of resources may leave some students without access to high-quality prosody education, thus losing the opportunity to enhance their sense of self-worth and self-confidence through prosody. This situation not only affects the fairness of prosody movement, but also limits the popularization and promotion of prosody education.

The problems existing in the promotion process of rhythmic movement in primary schools are multifaceted, involving teaching quality, teaching plan, psychological pressure and resource allocation. The existence of these problems seriously affects the promotion effect and educational value of prosodic movement in primary schools. In order to better play the role of rhythmic movement in the development of pupils' self-worth and self-confidence, it is necessary to conduct in-depth analysis and research on these problems to find effective solutions.

4. Solving strategies

In order to give full play to the positive role of rhythmic movement in promoting the development of pupils' self-worth and self-confidence, schools and teachers can take a series of measures to solve the existing problems, so as to create a more conducive rhythmic learning environment for students.

The school should develop a systematic teaching plan. This plan should include clear teaching objectives, clear teaching progress, and specific evaluation criteria. The teaching objectives should be matched with the physical and mental development stage of students, which can not only stimulate students' interest, but also promote their all-round development. The teaching schedule should take into account the learning speed and ability of different students to ensure that every student can keep up with the course schedule and will not feel frustrated by not keeping up. The evaluation criteria should be fair and objective, not only evaluate students' operational skills, but also pay attention to their participation attitude and progress. Through such a plan, teachers can teach in a more organized way, and students can also clarify their learning goals and expectations[3].. A systematic teaching plan helps to ensure that prosodic activities are conducted in an orderly manner and that each student has a balanced development opportunity in prosodic learning.

Focusing on the needs of all students is an important measure to ensure that every student benefits from prosodic activities. Schools should encourage all students to participate in rhythmic movements, regardless of their level. For beginners, basic prosody courses can be provided to help them build confidence and interest through simple movements and rhythms. For students who already have a certain foundation, more advanced courses can be provided to challenge and improve their skills through complex arrangement and skill training. The school can also provide personalized guidance and support for students with special needs to ensure that each student can find a suitable place in rhythmic activities[4].. By providing appropriate guidance and support to students at different levels, each student can feel their growth and progress in rhythmic activities, thus enhancing their self-confidence and sense of self-worth.

By making systematic teaching plans, providing professional training, paying attention to all students, and strengthening home-school cooperation, schools can effectively solve the problems of rhythmic sports in primary schools, so that they can better serve the physical and mental development of students. The implementation of these measures requires the joint efforts of schools, teachers, parents and students. Only by making concerted efforts can the rhythmic movement play its greatest value in primary education and promote the all-round development of students.

5. Conclusion

Rhythmic movement, as an activity integrating sports and art, has shown its unique charm and value in primary school education. It not only provides a way of physical exercise for primary school students, but more importantly, on the psychological level, rhythmic movement plays a significant role in cultivating students' sense of self-value and self-confidence. In the process of rhythm learning and performance, students experience a sense of achievement and self-affirmation through collective cooperation and artistic creation, which has a profound impact on the development of their personality and the cultivation of their social adaptability.

In order to further exert the positive role of prosodic movements, educators and school administrators need to work together to continuously improve teaching methods and ensure the effectiveness and interest of prosodic activities. First of all, the school is required to make systematic teaching plans, clarify teaching objectives, reasonably arrange teaching content and progress, and ensure that every student can get a balanced development in rhythmic learning. Providing professional training is also the key to improve the teaching quality. Home-school cooperation plays a crucial role in the promotion and implementation of prosodic movement. Parents 'support and participation can not only enhance students' confidence, but also promote the organic combination of school education and family education. Through parents' meetings, home visits and other ways, the school can maintain close communication with parents, let parents understand the importance of rhythmic activities, encourage parents to provide support and encouragement for their children in the family, and jointly promote the growth of children. Future research can further explore the effects of prosodic exercise on other psychological qualities, such as social ability, team spirit, creativity, etc. Researchers can focus on how rhythm movement to help students to establish a positive interpersonal relationship, how to play their advantages in team cooperation, and how to find in the creative expression of self, research can also focus on how in different regions, different cultural background of the promotion of primary school in rhythm movement, and how to combine the local actual situation and resources, develop a more suitable rhythm teaching strategy and activities[5].

References

[1] Li Ling. On the comprehensive education system of self-value realization [J]. China Journal of Education, 2022, (11): 104.

[2] Zou Lihua, Luo Weidong. Study on the influence of prosodic exercise on the physical behavior habits of 6-year-old children —— Take Nanchang city as an example [J]. Sports & Sports and Technology, 2019, (19): 225-226.

[3] Zhang Lingbo. How to make primary and middle school students extracurricular life full of vitality [J]. Chinese writers and artists, 2019, (01): 232.

[4] Tian Xiaoqin. Research on the influence of health beliefs and value perception on youth participation in sunshine sports [D]. Southwest University, 2015.

[5] Lu Zunyi, Ouyang Zhongxiang. Study on the relationship between physical exercise attitude behavior and physical self-esteem among primary and middle school students in Shanghai [J]. Research on Modern Basic Education, 2012,6 (02): 75-79.

About the author:

Qiang Zhang (April 1993-), male, Han, Hefei city, Anhui Province, second-level title of primary and secondary school, master of Physical Education, Hefei Taihu Road Primary School, school sports, aerobics, cheerleading.

EnPress

A Study on the Nature of Subjects in Generative Grammar

Xiaoying Pan

Digital Publishing Division, Social Sciences Academic Press (CHINA), Beijing 100029, China

Abstract: The article delves into the multidimensional nature of the concept of subjects based on the theory of generative grammar, aiming to clarify the distinct manifestations and functions of subjects at the syntactic, semantic, and pragmatic levels. This paper points out that the grammatical subject as defined by Lyons, being a pivotal element in the surface syntactic structure, maintains a morphological agreement with the predicate verb, serving as the central focus of syntactic analysis. In contrast, the logical subject originates from the external argument in the underlying structure, assuming the role of the agent and possessing explicit semantic attributes, thereby underscoring the significance of subjects at the semantic level. Furthermore, the paper explores the concept of thematic subjects, emphasizing their centrality at the pragmatic level, which is directly tied to the progression of discourse and the transmission of information, transcending the syntactic framework of "subjects" and highlighting the autonomy of pragmatic analysis. The article offers a novel perspective and pathway for a deeper understanding of the nature of subjects within the framework of generative grammar theory.

Keywords: Subject; Generative Grammar; Topic; Semantics

1. Issues with the Definition of Subject

The precise nature of the subject in Chinese remains undefined and unified to this day. In fact, ancient Chinese lacked the concept of subject as understood in modern linguistics. According to Modern Chinese, the definition of subject encompasses several aspects: Firstly, in a subject-predicate phrase, the subject is the object of the statement, placed before the predicate, answering questions such as "who" or "what"; secondly, noun phrases often function as subjects; thirdly, from the semantic relationship between the subject and predicate, subjects can be classified into three types: genitive subjects (indicating the actor of the action), patient subjects (indicating the recipient of the action), and neutral subjects, which do not represent either the agent or patient but rather the object of description, judgment, or explanation.

The first point, introducing the "subject-predicate phrase" before defining the subject, is inappropriate. How can one judge a subject-predicate phrase without a clear understanding of the subject? The subsequent statement that "the subject is the object of the statement, placed before the predicate, answering questions like 'who' or 'what'" is also vague, as "object of the statement" and "before the predicate" encompass broad concepts like topics. Thus, this definition fails to adequately define the subject. The second point, "noun phrases often function as subjects," is meaningless as it merely states a probability; other non-noun phrases can also function as subjects, and thus cannot serve as a criterion. Finally, the third point, analyzing subjects from semantic roles, is problematic because it only mentions patient roles, leaving the "neutral subject" undefined. This implies that subjects can have any semantic role or none at all, leading to the conclusion that subjects are unrelated to semantic roles. If so, what is the significance of mentioning semantic roles? Additionally, the "neutral subject" remains unclear.

Similarly, the definition of the subject in English is also ambiguous. The Oxford Advanced Learner's Dictionary defines the subject as «the noun, noun phrase, or pronoun that performs the action of the verb in an active sentence or is affected by the action of the verb in a passive sentence.» Quirk (1972: 58-88) defines it as «the general relationship of the subject to the matter being discussed.» The Longman Dictionary of Contemporary English states that the subject is «the noun, noun phrase, or pronoun that refers to the person or thing doing the action of the main verb or about whom or which the statement is made.» These definitions emphasize the semantic relationship between the verb and subject but neglect syntactic features, hindering accurate identification and judgment of subjects. For example:

(1) a. It is important for me to learn French

b. There is a mistake in your paper

According to the above definitions, only "me" in (1-a) qualifies as a subject. However, in English grammar, "it" in (1-a) and "there" in

(1-b) are subjects, and "to learn French" in (1-a) is also considered a subject, resulting in three different types of subjects. This multiple referentiality not only complicates the accurate definition of the English subject but also causes confusion about its grammatical nature.

2. The Debate Between Subject and Topic

Early Chinese research often confused subjects and topics without further distinction. Ma Jianzhong, the first Chinese linguist to adopt the concept of subject, based his terminology on Indo-European grammar, referring to the two main parts of a Chinese sentence. His description resembles the relationship between "topic" and "comment" rather than distinguishing between subject and topic. As Chinese syntax is less rigid than Indo-European languages, and the subject serves both syntactic and topic functions.

Similarly, English subjects also face similar issues. In different grammatical systems, the English subject has different labels. Traditional grammar refers to it as a "subject," while the Prague School founder Mathesius introduced the concept of "theme" to distinguish the initiating element of a sentence from the rest, called "rheme." Halliday (1975), the founder of Systemic Functional Grammar, views the theme as the starting point of information and the beginning of a clause. A thematic structure consists of a theme and rheme; when the subject coincides with the theme, it is unmarked; otherwise, it is marked.

From the surface level, the topic-comment relationship is often obscured by the subject-predicate relationship, with topics often coinciding with subjects. To refine syntactic analysis, it is necessary to distinguish between them. Li & Thompson (1976: 457-489) regard subject and topic as distinct concepts, highlighting three key differences: subjects are inherent in the event structure of a sentence, while topics are not; topics have textual properties, whereas subjects do not; and subjects have a noun-verb relationship with the predicate verb, while topics do not. English belongs to a ternary system ("subject-predicate-object/predicative/complement"), while Chinese belongs to a binary system ("theme-rheme"). A consensus emerges that topics and subjects belong to different grammatical planes: topics are discourse concepts referring to the entity to be explained, while subjects are syntactic and semantic concepts related to action performers. While this distinction clarifies the difference between subjects and topics, the relationship between subjects and semantic roles remains unresolved.

3. The Subject in Generative Grammar

3.1 The Subject as a Surface Syntactic Concept

According to generative grammar, Lyons' grammatical subject refers to syntactic components that agree with the predicate verb in the surface structure, while the logical subject is the external argument in the underlying structure, assigned the role of agent with semantic properties. The thematic subject, or topic, is a pragmatic concept directly referred to as "theme" or "topic," without the label "subject." These terms clearly distinguish syntactic, semantic, and pragmatic categories, enhancing clarity in grammatical analysis.

3.2 Discrimination of Subject, External Argument, and Topic

The aforementioned analysis demonstrates that external arguments, subjects, and topics belong to three distinct grammatical levels, with external arguments at the bottom, subjects in the middle, and topics at the surface. From a generative perspective, external arguments emerge first through semantic role assignment in the deep structure, followed by syntactic movement to form syntactic subjects in the surface structure. Finally, topics arise in discourse communication based on the need for information transition. Due to syntactic operations and pragmatic drives, external arguments, subjects, and topics may be distributed across different components or overlap on the same one:

(2) a. John, I love his smile

b. John, I haven't seen for ages

c. Bill was killed by an unknown assassin

d. The robber stole a radio

In (2-a), John serves as a topic, not an external argument or syntactic subject; I is the external argument functioning as the syntactic subject; his smile is an internal argument functioning as the syntactic object. In (2-b), John is an internal argument acting as a topic; I is the external argument and syntactic subject. In (2-c), Bill is an internal argument (patient) functioning as both the syntactic subject and topic; an

unknown assassin is the external argument (agent). In (2-d), the robber is the external argument, and simultaneously the syntactic subject and topic. This frequent overlap may create the misimpression that subjects and agents, or subjects and topics, are interchangeable, blurring the distinctions among syntactic, semantic, and pragmatic categories.

It must be emphasized that subjects and external arguments are fundamentally different in two key aspects: firstly, subjects are purely syntactic constructs, whereas external arguments possess both syntactic and semantic attributes; secondly, subjects belong to surface syntax, while external arguments reside in deep syntax. Subjects, unrelated to agent roles, are syntactic entities, whereas external arguments are syntactic components reflecting the syntactic manifestation of agent roles, i.e., the direct agents of the verb's action. People often associate sentence subjects with action performers but hesitate to equate them, recognizing that subjects can also be patients. Despite acknowledging the lack of absolute correspondence, there's an unconscious tendency to link subjects with agent roles. This stems from the structural proximity of subjects and external arguments in intransitive and transitive verb predicates, both preceding the verb and comprising a significant proportion of verbs, leading to the erroneous equation of subjects with external arguments and the labeling of subjects as agents.

Subjects are also frequently misconstrued as topics. In reality, subjects result from syntactic movement of external or internal arguments from deep to surface structures, a syntactic operation. Topics, on the other hand, are pragmatic manipulations of surface structures to facilitate new-old information transitions during communication, dynamic and contingent upon discourse needs. Thus, subjects and topics belong to different grammatical planes with no direct correlation.

4 The conclusion

The conclusion drawn from the above analysis is that subjects are syntactic concepts of surface structures. In generative grammar, analyzed primarily with English data, subjects are considered syntactic necessities unrelated to semantics. If a verb lacks an external argument as a subject, an internal argument is used. If neither is available, a "dummy subject" like "it" or "there" is employed. English syntax mandates subjects in declarative sentences to fulfill structural requirements. Since subjects are syntactic, they can be defined directly by syntactic formal features. While Chinese Subjects can not be defined as a grammatical subjects. The clear and effective definition avoids semantic role. Subjects are distinguished from topics.

References

[1] Beavers, John. Scalar complexity and the structure of events. In J. Dolling and T. Hey de Zybatow (eds.) Event Structures in Linguistic Form and Interpretation . Berlin: Mouton De Gruyter, 2008: 245–265.

[2] Bliss, Heather. Morpholexical Transparency and the Argument Structure of Verbs of Cutting and Breaking [J], Cognitive Linguistics, 2007(18-2): 153-177.

[3] Chao, Yuen Ren. A Grammar of Spoken Chinese [M]. Berkeley: University of California Press, 1968: 69.

[4] Folli, Rafaella and Heidi Harley. Teleology and animacy in external arguments', Lingua [J], 2008(1321): 1-14.

[5] Hawkins, R. Second Language Syntax: a generative introduction [M]. Oxford: Blackwell, 2001.

[6] Halliday, M.A.K. An Introduction to Functional Grammar [M].London：Edward Arnold，1975.

[7] Keenan, E.L.Towards a universal definition of subject . In C. N. Li（ed.）Subject and Topic . New York: Academic Press, 1976: 303-334.

[8] Levin, Beth. Semantic Roles. In M. Aronoff,(ed.) Oxford Bibliographies in Linguistics. New York: Oxford University Press, 2014: 132-151.

[9] Levin, Beth. Verb Classes Within and Across Languages. In B. Comrie and A. Malchukov. (eds.) Valency Classes: A Comparative Handbook . Berlin: Mouton De Gruyter, 2015: 1-37.

[10]Levin, Beth. Semantics and Pragmatics of Argument Alternations, Annual Review of Linguistic s 1 [J]. (URL), 2015: 1-22.

[11] Lyons, J. Semantics [M]. Cambridge: Cambridge University Press, 1977.

[12] Quirk, R. A Grammar of Contemporary English [M]. London: Longman, 1972: 58-88.

[13] Li, C.N.& S.A.Thompson. Subject and Topic: A New Typology of Language. In C. N. Li（ed.）Subject and Topic . New York:

Academic Press, 1976: 457-489.

[14] Pylkkanen, Liina. Introducing Arguments [M]. Cambridge, A: MIT Press, 2008.

Author:

Xiaoying Pan (1981-), female, Han nationality, Native place: Dalian, Liaoning Province, China, editor of the Digital Publishing Division, Digital Publishing Division, Social Sciences Academic Press (CHINA), postcode:100029, Research Interests: integrated development of publishing, Linguistics.

EnPress

Kang Youwei's Thoughts from The Book of the Great Unity

Ru Yan

School of Marxism, Nanjing Forestry University, Nanjing 210037, China

Abstract: The Book of the Great Unity, written by Kang Youwei, expounds the idea of a 'cosmopolitan world' in which all people are equal, and its description of an ideal society is clear and profound. Kang Youwei's criticism of the existing social order and his aspiration for a world free of exploitation and oppression, as well as freedom and equality, fully reflected his careful consideration of the turbulent social reality at that time. His thoughts did not exist in isolation, but had their unique historical and cultural background and real-life context, including the background of the times, the experience and lessons of social reforms, as well as his personal life experiences, which profoundly influenced Kang Youwei's system of thought.

Keywords: Kang Youwei; Cosmopolitan World; Cosmopolitan Book

After the failure of the Hundred Days' Reform, Kang Youwei went into exile in Japan, and then travelled to Europe and America, where he came into contact with the Western theories of idealistic socialism and social evolution. Between 1901 and 1902, he completed the writing of The Book of the Great Unity in India, but the book was not published in part until 1913 in the journal Intolerance, and the whole book was not finally published until 1930 by his student Qian Ding'an.

1. Philosophical Thoughts in The Book of the Great Unity

1.1. Cosmology and History

Kang Youwei made the Cosmos as a response to the changing situation of the national crisis in modern China, and his personal academic background of blending Confucianism, Buddhism, and Western learning also provided a solid foundation for the creation of the Cosmos. [1] In The Book of the Great Unity, Kang Youwei has a unique understanding of the origin of the universe. Kang Youwei summarised the traditional Chinese view of the universe, that is, there are three ancient speakers of the heavens: one is said to cover the heavens, two is said to declare the night, three is said to muddy the heavens, as well as the debate between these doctrines, arguing that 'China's ancient astronomy has not been refined by the making of a weapon has not been refined'. [2] Such a view is deeply influenced by Taoist thought, but also shows Kang Youwei's reform and innovation of traditional Confucianism. Kang Youwei's view of history is centred on the 'Three Worlds', which divides history into three stages, namely, the 'World of Chaos', the 'World of Peace' and the 'World of Peace'. 'This not only reveals the law of historical development, but also provides theoretical support for China's modernisation.

1.2. Ideology of Love and Compassion

Kang Youwei asserted that benevolence is the highest existence in the universe, and that all things in heaven and earth originate from benevolence. Thus, he declared: 'Benevolence is also electricity, ether, and all people have it ..... as the sea of ten thousand transformations, the root of everything, and the source of everything.' [3] In The Book of the Great Unity, Kang Youwei elaborated on the idea of benevolence in depth. Benevolence is both the moral emotion between human beings and the care of human beings for all things in nature. According to Kang Youwei, benevolence is the fundamental principle of the harmonious coexistence of all things in the universe, and the moral cornerstone on which human society can be sustained. The connotations of benevolence include: the love of parent and child, the love of husband and wife, the love of brother, the love of friend, the love of ruler and subject, and the love of all things. [4] All of these loves are the embodiment of benevolence, which is the basic rule of human moral behaviour.

In The Book of the Great Unity, the idea of benevolence plays an extremely important role. The idea is not only the core of Kang Youwei's political philosophy, but also the theoretical foundation of his social reform.

2. Political Ideas in the Cosmos

2.1. Political Ideas

Kang Youwei also advocated the political concept of democracy in the Cosmos. He believed that democracy was an inevitable trend towards the modernisation of a country's political system. He advocated that the state should implement universal suffrage so that the people would have the right to choose their own representatives and participate in the decision-making of state affairs. This political philosophy was forward-looking in Chinese society at that time and played a positive role in later political development.

Kang Youwei was a thinker and practitioner who sought a balance between tradition and modern political change. Kang Youwei once said of himself, 'My servant has presided over the constitutional monarchy since the Hundred Days of the Past, and the republic of the Imaginary Monarch since the Hundred Days of the Past; in bright words, there has been no change.' [5] He claimed that since the Hundred Days' Reform, he had been committed to promoting constitutional monarchy, and after the Xinhai Revolution, he changed his stance to supporting a republic of virtual monarchs, and his stance was always the same.

2.2. The Construction of a Cosmopolitan Society

In The Book of the Great Unity, Kang Youwei put forward the idea of an ideal society without class divisions. He argued that the existence of classes led to social inequality and that true equality could only be realised when classes were eliminated. He advocated the gradual elimination of class differences through such measures as reforming education, upgrading the quality of nationals and implementing public ownership of wealth, with the ultimate goal of achieving a classless society. This conception was highly idealistic at that time and had a certain influence on later socialist thinking.

3. Economic Ideas in the Cosmos

3.1. Criticism of Traditional Economic Concepts

In his work The Book of the Great Unity, Kang Youwei made a profound criticism of the traditional economic concepts. He thoroughly criticised the feudal private ownership system and put forward the idea of public ownership system. Kang Youwei's cosmopolitan economic thought had several distinctive features: firstly, it emphasised public ownership as the basis of economic development, the integrated management of scattered and independent economic units, the consistency between local and global interests, and the organic combination of the thorough implementation of centralised enlightened centralisation and the hierarchical management of the local government, in order to realise the harmony and consistency of the entire socio-economic structure. Secondly, the idea of economic management was integrated with the idea of ruling the country and the people. Thirdly, it is emphasised that human nature is not inherently good or evil, and that it can be brought to goodness through indoctrination to achieve the unity of self-interest and altruism. The good indoctrination of labourers is the basic means of economic management.

4. Cultural Thoughts in the Cosmopolitan Book

4.1. Attitudes towards cultural integration and innovation

The Book of the Great Unity, an imaginative socialist work, was the culmination of Kang Youwei's work based on the traditional Chinese concepts of cosmopolitanism and the notion of historical evolution of the three worlds, combined with the Western concepts of utopian socialism, evolution, and other bourgeois political ideas. He regarded traditional culture as the core of the national spirit, and at the same time revealed many of its problems. Kang advocated the critical inheritance of traditional culture, absorbing its essence and discarding its dregs, with a view to revitalising it in the new era.

Kang firmly believed that the exchange and fusion of Eastern and Western cultures was the trend of historical development. He recognised the advantages of western culture in science and technology, politics and philosophy, and advocated that we should learn from and emulate them. Kang Youwei put forward the slogan of 'using the past for the present and the foreign for the Chinese', advocating the incor-

poration of modern elements into traditional culture to revitalise it. [6] In practice, Kang advocated reforming the education system to cultivate innovative talents, improving literature and art to make them closer to reality, and promoting scientific and technological development to enhance the country's comprehensive strength. Through these measures, Kang Youwei hoped to realise the innovation and development of traditional culture, and thus promote the progress of our society.

5. Conclusion

5.1. Characteristics and Influence of Kang Youwei's Thought

Kang Youwei's thought has left a deep mark on modern Chinese history. It is characterised firstly by its epochal nature. As a leader of the Restoration and Reform Movement, his thought was formed against the background of China's national crisis, and thus had a strong practical concern and spirit. Secondly, Kang Youwei's thought presents comprehensiveness and inclusiveness. He not only integrated traditional Chinese Confucianism, but also absorbed Western knowledge in the fields of politics, economy and culture, and constructed his own unique system of thought.

5.2. Inspiration and reference significance to modern society

In The Book of the Great Unity, Kang Youwei combined two different kinds of idealistic socialist ideas from the East and the West, building a bridge of understanding that allowed the Chinese to quickly accept and develop socialism after it was introduced to them. His ideas also served as a bridge between Chinese tradition and Marxism. Kang's strategy of realising a moderately prosperous society before moving towards the Cosmos reflected his deep understanding of the current state of social development in China and was a transcendence based on traditional ideals. Although The Book of the Great Unity depicts a socialist economic system, which is anti-feudal and progressive, and inspires the people's aspiration for a better life, its worldview and methodology are based on historical idealism. It takes 'fraternity', 'happiness' and 'evolution' as its guiding ideology and opposes class struggle, which is contrary to the bourgeois revolution when it has become the mainstream. The book even describes the imperialist invasion as 'the forerunner of the commonwealth'. Nevertheless, its historical contribution should not be overlooked. The Book of the Great Unity is one of the most detailed utopian documents in Chinese history and an important document of modern Chinese economic thought, and its value should be recognised.

References

[1] XU Shaofeng,TAN Jie. A Brief Discussion on Kang Youwei's Cosmos[J]. Journal of Culture,2022,(02):228-231.

[2] Liu Han. Study on the Translation and Interpretation of Western Modern Astronomical Thought in the Late Qing Dynasty[D]. Beijing Foreign Studies University,2021.

[3] Wei Yixia. Benevolence in Modern Perspective--An Introduction to the Innovation of Confucian Benevolence Thought by Modern Philosophers[J]. Social Science Front,2009,(02):31-39.

[4] Hong Chunsheng. The Implications of Confucius' Thought of "Benevolence and Love" for the Cultivation of Socialist Core Values[J]. Journal of Xiamen SAR Party School,2019,(03):77-80.

[5] FANG Ling,LIN Qingqing. Reality value of Confucian benevolence thought[J]. Couplet,2023,(24):39-42.

[6] Chen Xianchu. Kang Youwei's Political Concept and Conception of Political System in the Early Years of the Republic of China--A Comparison with Liang Qichao and Sun Yat-sen[J]. Guizhou Social Science,2023,(02):87-95.

Author Resume:

Yan Ru (2001-), Female, Han nationality, Xuzhou, Jiangsu, China, School of Marxism, Nanjing Forestry University, Master's Degree in Foreign Marxism.

Innovative Action Research on the Digital Development of Education in China: A Case Study of Smart Education Demonstration Zone

Dan Wang

Senior High School of Shangzhou District, Shaanxi Province, Shangluo 726100, China

Abstract: Countries around the world are trying to deeply integrate digital and education to empower the digital transformation of education, and China has laid out a variety of education digital transformation strategies, and the region-oriented smart education demonstration zone is one of them.

Keywords: Digital Education; Smart Education Demonstration Zone; Value Implications

1. Background of the rise of digital education

The United Nations, countries around the world, and many international organizations are taking active actions to take digital education as an important way and measure to cope with the challenges of the crisis and open up a bright future.Digital transformation has become an important carrier and direction of education transformation around the world. The United Nations Transforming Education Summit identified digital transformation in education as one of five priority areas for action, and emphasized that the digital revolution should benefit all learners. Many countries have introduced digital development strategies, and education is an important part of them. China will further implement the national education digitalization strategy, enrich the supply of digital education resources, build a broad and open learning environment, accelerate the sharing of resources between different types and levels of learning platforms, promote the integration of new technologies and education learning, and accelerate the digital transformation of education.

2. Overview of the Smart Education Demonstration Zone

"Smart Education Demonstration Zone" refers to the support of the local government since 2019, the education administrative department coordinates relevant institutions, gives full play to the role of the market mechanism, uses a new generation of information technology, provides personalized support and precise services for students, teachers and parents, collects and uses the state data of the participant group and the education and teaching process data, and promotes learners to learn at any time, anywhere, in any way, and at any pace, so as to provide teachers and students in the region with a high learning experience. The supply of education with high content adaptation and high teaching efficiency to promote educational equity and improve the quality of education. The Ministry of Education has carried out the construction and practical exploration of the "Smart Education Demonstration Zone" in order to promote the digital transformation, intelligent upgrading and integrated innovation of regional education, realize the reform and innovation of educational concepts and models, teaching content and methods, improve the level of regional education, explore and accumulate advanced experience and excellent cases that can be promoted, and form new ways and models to support and lead the modernization of education.

3. Feasibility analysis of the smart education demonstration zone

There are several major points in the construction of the smart education demonstration zone, mainly including:

Promote the reform and innovation of talent training mode. Carry out the exploration of a new teaching mode centered on learners, help students improve their interest in learning, improve their initiative in learning, improve their learning efficiency, and cultivate more innovative talents with innovative thinking and ability and political integrity from "0 to 1".

Highlight the innovative application of artificial intelligence. Take the school as the unit, explore the school-based practical curriculum of artificial intelligence, and build a school-based curriculum system of artificial intelligence education: with intelligent terminals as the carrier, explore the combination of science, technology, engineering, arts, mathematics (hereinafter referred to as STEAM) and artificial

intelligence, that is, a new teaching mode of "STEAM + artificial intelligence education": In the form of an online training community, we will explore a precise teaching and research model based on big data assessment to promote the high-quality and balanced development of education.

4. the value implication of the smart education demonstration zone

4.1. Strive to improve the digital capabilities of teachers and students, and promote the innovation and application of intelligent technology

The intelligent era has put forward higher requirements for talent training goals and specifications, emphasizing the improvement of digital literacy in curriculum and practical teaching. The demonstration area fully implements the curriculum standards of information technology and information technology, and improves students' core literacy such as information awareness, computational thinking, digital learning and innovation, and information social responsibility. Create excellent online courses, apply information technology innovation to solve teaching pain points and difficulties, and improve teachers' information teaching capabilities. Widely carry out comprehensive practical courses in information technology, set up artificial intelligence education courses and experimental projects, and effectively improve students' information technology application and innovation ability. Carry out various forms of innovation education such as maker education and STEAM education to cultivate learners' interdisciplinary problem-solving ability and innovation ability.

Dongcheng District, Beijing has established a district-level "1+N+8+X" youth "college system" curriculum system and practice base, and established the Dongcheng District Youth Information Literacy Education College to cultivate students' innovative awareness, innovative thinking and innovation ability, build a platform for the display of students' innovative works, and lead young people to explore the field of artificial intelligence technology; Through measures such as the intelligent training system for teachers and the evaluation and reward mechanism, we will improve teachers' professional skills and information literacy, and promote teachers to actively adapt to new technological changes such as informatization and artificial intelligence.

4.2. Deeply promote the reform of classroom teaching and build a new teaching model

The cultivation of innovative talents needs to rely on school education, and promoting the "classroom revolution" is one of the key issues in the process of creating the demonstration area. The classroom is the main battlefield of education reform, and only by building a new teaching model that conforms to the cognitive characteristics of "digital natives" can we promote learners' active learning, unleash their potential, and develop in an all-round way. Information-based teaching helps to realize the organic combination of large-scale education and personalized training. The demonstration area deepens the innovative integration of information technology and classroom teaching, advocates teachers' innovative application of information technology to improve teaching based on evaluation, strengthens student-oriented teaching practice, and promotes the realization of classroom teaching reform. Encourage the application of new teaching methods such as collaborative constructive learning, ability-guided learning, and design-based learning, and promote the comprehensive improvement of students' comprehensive quality and ability such as cooperation, practice, and innovation ability: excavate typical cases of applying information technology to solve teaching "pain points", and give play to the leading and exemplary role of excellent teachers.

4.3. Data-driven educational evaluation reform to support the comprehensive quality evaluation of students

In the era of intelligence, the application of new technologies has changed the single, score-based evaluation criteria in traditional teaching, emphasizing the multi-dimensional evaluation of students' comprehensive quality. The demonstration area innovates evaluation tools, deepens the application of education big data, analyzes the learning process, improves the matching degree between the supply of teaching services and the demand for learning, optimizes the quality and efficiency of teaching services, and realizes the effective and high-quality supply of education services. Actively participate in the pilot work of information technology to support the comprehensive quality evaluation of students, and use data-driven solutions for the evaluation of students' comprehensive quality to explore and carry out the longitudinal evaluation of the whole process of students' learning and growth at all grades, and the horizontal evaluation of all elements

of morality, intelligence, physical fitness, art and labor.

4.4. Consolidate the intelligent integration of the learning environment, and break down the barriers of home-school-community collaborative education

Teacher-student behavior and its interaction are the main factors affecting the effectiveness of education and teaching, and the smart learning environment can shape the behavior habits of teachers and students. With the development of artificial intelligence, the Internet of Things and other technologies, the learning environment has changed from a closed physical space to an open, virtual and real space. Driven by data intelligence, the demonstration area incorporates smart education into the construction of smart cities, smart villages and smart societies, breaks the data and information barriers between schools, families and society, and promotes the all-round mining and integration of education data. Formulate rules and systems for the confirmation, openness, docking, and protection of educational big data, and promote data integration between all levels and types of digital platforms: Use learning analysis, education data mining and other means to improve the matching degree between the supply of teaching services and the demand for learning, achieve accurate push, and optimize the quality and efficiency of teaching services.

4.5. Promote the application of smart education platforms and optimize regional public service capabilities

The key to the development of regional smart education lies in the establishment of a collaborative innovation mechanism with the participation of the government, scientific research institutions, enterprises and other parties, and the reform of the organized education system. Relying on the public service system of digital educational resources, especially the national smart education platform, the demonstration zone brings together the forces of schools, scientific research institutions and enterprises to vigorously promote the digital construction of educational resources, explore new mechanisms for resource sharing and service supply, use intelligent technology to gather high-quality education and teaching resources, expand the coverage of high-quality educational resources, effectively support schools, teachers and students to carry out information-based teaching and learning applications, and comprehensively improve the digital public service capacity of regional education.

4.6. Intelligent technology empowers education governance and promotes the transformation of educational organizational forms

Forming a new pattern of education governance with the participation of the whole society and promoting the modernization of the education governance system and governance capacity have become the key to comprehensively deepening education reform. Intelligent technology empowers education governance, which will promote the reform and innovation of educational organization and management mode, and promote the scientific decision-making of education and the precision of resource allocation. The demonstration zone establishes and improves the scientific decision-making and education governance mechanism assisted by big data, makes reasonable use of the national education basic database and urban development data, effectively supports various decision-making in education, and improves the level of digital governance and service capacity of education; Carry out research on dynamic simulation of education, use machine learning, fuzzy mathematics and other methods to establish models, dynamically simulate the results of educational decision-making, and provide scientific basis for educational decision-making. Make full use of intelligent technology to perceive, predict and warn the campus infrastructure and safe operation, timely grasp the cognitive and physical and mental changes of teachers and students, and make active, timely and accurate decisions. During the epidemic period, each demonstration area gave full play to the advantages of the regional informatization public service support system, made overall planning, and deployed the relevant teaching activities of “suspending classes without suspending learning”, and walked in the forefront of this unprecedented educational informatization social experiment. At the same time, the experimental project of education social governance under the condition of artificial intelligence in relevant regions has also achieved positive results in the construction of smart education environment, promoting the combination of large-scale education and personalized training.

Wuhou District of Chengdu City uses the preliminarily built Wuhou Education Data Center to integrate the data of four application

platforms, including the national student registration system, the comprehensive quality evaluation data of Chengdu students, the data portrait of teachers in Wuhou District, and the myopia prevention and control of primary and secondary schools and kindergartens in Wuhou District, and initially realizes multiple application scenarios such as “development monitoring, remote supervision, teaching analysis, equipment management, myopia prevention and control, supervision and evaluation, and career statistics”.

Conclusion:

As one of the strategies of China’s digital education, the smart education demonstration zone has many advantages: first, to build a public platform for China Unicom to create an intelligent learning environment, secondly, to open and share high-quality resources, to narrow the digital divide in education, to promote the deep integration of digital technology and education, and to build a new education ecology, fourth, to innovate education and teaching methods, which can improve the digital literacy of teachers and students.

References

[1]Chee-Kit Looi,Hui Zhang, Yuan Gao, Longkai Wu.2020.(eds.) ICT in Education and Implications for the Belt and Road Initiative. Lecture Notes in Educational Technology. Springer Singapore.

[2]Chee-Kit Looi,Hui Zhang, Yuan Gao, Longkai Wu.2020.(eds.) ICT in Education and Implications for the Belt and Road Initiative. Lecture Notes in Educational Technology. Springer Singapore.

[3]Ministry of Education, China.2020.[Letter on Reply to Proposal No.2103(No. 173 for Education) of the Third Session of the Thirteenth National Committee of the Chinese People’s Political Consultative Conference]. Beijing, Ministry of Education, China. (In Chinese.) Available at:

[4]RongxiaZhuang,DejianLiu,Demetrios Sampson,Danimir Mandic, Siyi Zou, Yu Huang,Ronghuai Huang.2023. (eds.) Smart Education in China and Central & Eastern European Countries. Lecture Notes in Educational Technology.Springer Singapore.

About author:

Wang Dan (1990), female, Han nationality, first-level teacher, master candidate, senior high school of Shangzhou District, Shaanxi Province, research interests: geography teaching, teacher development, interdisciplinary theme teaching.

Train Shunting Operation Plan for Detachment and Coupling

Fei Wang

Southwest Jiaotong University Hope College, Chengdu 610400, China

Abstract: This paper focus on two study cases for shunting train stocks which are required to be broken by two sections. First the position of the pulling out of the train stock shall be confirmed before detaching, followed by breaking up carriages or train stock according to the destinations. Then locomotive back to the line where the train stock waiting and pull out the other carriages and break them up again. Finally, all the carriages are made up in order and ready for departure.

Shunting list is used in the shunting operation to help railway working staff and locomotives to apply and check the lines. Shunting trip such as wagon coupling trips and wagon uncoupling trips are calculated in the shunting plan in both two study cases. In the end, the railway station is supposed to take the least shunting lines, least wagon coupling trip, least wagon uncoupling trip and least shunting working time to deal with the most shunting work.

Keywords: Shunting Plan; Wagon Coupling Trips; Wagon Uncoupling Trips

1 Introduction

Shunting work is an important and complex task in the train station work organization, especially in the marshalling yards. Shunting work also is the main production activity and situated in the central position. Whether the train can arrive and departure on time, goods can be loaded and unloaded on time, carriages or train stocks can be selected and delivered reasonably, equipment capabilities can be effectively utilized to achieve production plan targets largely depend on the decision-making level and quality of shunting operations.[1] As far as shunting work, there are Break-up shunting, Make-up shunting, Detaching and attached of wagons shunting, Taking-out and placing-in of wagons shunting and other shunting work. In this paper, we will focus on two cases which are both belongs to Detaching and attached of wagons shunting.

2 Case Study 1

Train stock 437323716533124354726352 24 stops in shunting yard line 10, waiting for breaking train stock up by sections according to the order of arrival of stations (the final order of train stock is 1234567). The shunting locomotive works on the right of the train stock. There are five shunting lines (line 10, 11, 12, 13 and 14) allowed to use, and the train stock will prepare in line 1 waiting for departing.

Position to Pull Out

Train stock 437323716533124354726352 24, the first bigger figure mains the destination, and the second smaller figure mains the number of carriages. For example, 43, there are three carriages will arrive at 4 Station, and 73, there are three carriages will arrive at 7 Station.

The train stock is required to be broken by sections, therefore train locomotive shall pull out twice. There are 13 groups in the strain stock (43, 73, 23, 71, 65, 33, 12, 43, 54, 72, 63, 52, 24), where the farthest station groups are 73, 71, and 72, and the nearest group is 12. We take the 72 (far right of the three farthest station groups) as the finally farthest station group, which is also on the right hand of the nearest group (43, 73, 23, 71, 65, 33, 12, 43, 54, 72, 63, 52, 24).

The finally farthest station group is on the right, and the nearest group is on the left, so the first train stick pull out is 12, 43, 54, 72, 63, 52, 24, and the second train stock 43, 73, 23, 71, 65, 33.

Drop Down

The two sections of train stocks shall drop down in one time.The result of dropping down Train stock 437323716533124354726352 24 is shown in Form 1 Shunting List – Drop Down.

Form 1 - Shunting List – Drop Down

Train Stock Row / Line														
									43	73	23	71	65	33
12		43	54	72	63	52	24							
A	10	12						24			23			33
B	11		43						43					
C	12			54			52						65	
D	13					63				73		71		
E	14				72									

Shunting Plan

Train locomotive pulls 12, 43, 54, 72, 63, 52, 24 out at the first time from Line 10 before breaking them up. Then train locomotive needs back to Line 10 to pull out 43, 73, 23, 71, 65, 33. Finally, the made-up train will departure from Line 1.The shunting plan is shown in Form 2. (“+” wagon coupling trip, “-” wagon uncoupling trip) (Line +/- carriages)

Form 2 - Shunting plan for Case Study 1

the first section	the second section	make-up	departure
10+18	10+18	14+2	DF1-38
11-3	11-3	13+7	
12-4	13-3	12+11	
14-2	10-3	11+6	
13-3	13-1	10+12	
12-2	12-5		
10-4	10-3		

Overall

In this case study, use 7 wagon coupling trips, 12 wagon uncoupling trips (not include the shunting trip for transferring to the arrival and departure line) and five shunting lines.

3 Case Study 2

Train stock 637223521145113223643213 stops in shunting yard line 7, waiting for breaking train stock up by sections according to the order of arrival of stations (the final order of train stock is 1234567). The shunting locomotive works on the right of the train stock. There are five shunting lines (line 7, 8, 9, 10 and 11) allowed to use, and the train stock will prepare in line 2 waiting for departing.

Position to Pull Out

Train stock 637223521145113223643213, the first bigger figure mains the destination, and the second smaller figure mains the number of carriages. For example, 63, there are three carriages will arrive at 6 Station, and 72, there are two carriages will arrive at 7 Station.

The train stock is required to be broken by sections, therefore train locomotive shall pull out twice. There are 12 groups in the strain stock (63, 72, 23, 52, 11, 45, 11, 32, 23, 64, 32, 13), where the farthest station group is 72, and the nearest groups are 11, 11, and 13.

We take the 11 (far left of the three nearest station groups) as the finally nearest station group, which is also on the right hand of the farthest group (63, 72, 23, 52, 11, 45, 11, 32, 23, 64, 32, 13).

The finally farthest station group is on the left, and the nearest group is on the right, so the first train stick pull out is 11, 45, 11, 32, 23, 64, 32, 13, and the second train stock 63, 72, 23, 52.

Drop Down

The two sections of train stocks shall drop down in one time. The result of dropping down Train stock 637223521145113223643213 is shown in Form 3.

Form 3 - Shunting List – Drop Down

Train Stock Row / Line													
11		45	11	32	23	64	32	13		63	72	23	52
A	7	11		11					13			23	
B	8					23		32					
C	9				32								
D	10		45										52
E	11						64			63	72		

Shunting Plan

Train locomotive pulls 11, 45, 11, 32, 23, 64, 32, 13 out at the first time from Line 7 before breaking them up. Then train locomotive needs back to Line 7 to pull out 63, 72, 23, 52. Finally, the made-up train will departure from Line 2.

The shunting plan is shown in Form 4. ("+" wagon coupling trip, "-" wagon uncoupling trip)

(Line +/- carriages)

Form 4 - Shunting plan for Case Study 2

the first section	the second section	make-up	departure
7+19	7+10	11+9	DF2-31
10-5	11-5	10+7	
7-1	7-3	9+3	
9-3	10-2	8+5	
8-3		7+8	
11-4			
8-2			
7-7			

Overall

In this case study, use 7 wagon coupling trips, 10 wagon uncoupling trips (not include the shunting trip for transferring to the arrival and departure line) and five shunting lines.

4 Conclusion

Breaking train stock up by sections is one of the shunting operation work. Due to the factors such as the layout of the railway station yards, the length of the traction lines, capabilities of the locomotives or the nature of the goods, train stocks can be pull out in one or two, even more than two times. Therefore, when the train stock is required to be pull out twice, the position is required. As for the shunting trip, wagon coupling trip and wagon uncoupling trip are both used in the shunting plan. Wagon coupling trip is use to hang on carriages or train stock, and the wagon uncoupling trip is used to break up carriages or train stock.

Overall, when the farthest group is on the left and the nearest group is on the right, the position of pulling out is between the two groups. Otherwise, when the farthest group is on the right and the nearest group is on the left hand, the position of pulling out is on both sides. Sometimes, there are more than one farthest groups and more than one nearest groups. Usually, we take the far left among the nearest groups as the finally nearest group, and take the far right among the farthest groups as the finally farthest group. No matter what kind of shunting operation work, the most important is keeping safe, efficient, and economic.

References

[1] Peng Qiyuan, Wang Ciguang, Organisation of Train Operation, Chapter 1, The Theory and Methods of Shunting Work, 2006, p:25.

A Study on the Reconstruction of Western Regions' Ancient Sites in Tang Poetry Under AIGC and VR Empowerment: A Case Study of Loulan

Yi Zhao

School of Literature, Northwestern University, Xi'an 710000, China

Abstract: Ancient relics in the Western Regions refer to the remnants of historic structures located in these areas.Using the example of Loulan from Tang poetry, and drawing on Mary Lou's digital narrative theory and Daoist concepts of interdependence, this paper analyzes how AIGC enhances VR imagery through spatiotemporal embedding. It also discusses the contemporary value and significance of AIGC + VR in the reconstructive creation of Tang poetry relics.

Keywords: Tang Poetry; VR + AIGC; Intelligent Interaction

"Being" and "Non-being" have historically served as fundamental philosophical categories in Chinese thought to explain the origins of the cosmos. The synthesis of "being" and "non-being" culminates in the concept of the "Dao." As Zhuangzi observes, "All things emerge from the realm of non-being. What exists cannot be accounted for by existence alone; it must arise from non-being, and thus, non-being encompasses all that exists"[1] Additionally, Mary Lou Ryan, in her work Narrative as Virtual Reality[2], posits that immersion and interaction are the primary feedback mechanisms of virtual reality. She proposes a theory of possible worlds based on text features categorized into spatial immersion, temporal immersion, and emotional immersion.

Virtual Reality (VR) utilizes contemporary technological methods to reconstruct ancient Western Region relics from Tang poetry. Furthermore, the integration of cutting-edge AIGC (Artificial Intelligence Generated Content) technology enables the visualization and spatial narrative reconstruction of the ancient Loulan kingdom.

1. Constructing the Concept of "Loulan" in Tang Poetry: The Conditions of Being and Non-being and Immersive Interaction

As Zong Baihua articulates in The Birth of Artistic Conception in Chinese Art: "Not merely 'being' or 'non-being,' neither clear nor obscure, this represents the symbolic function of artistic form. 'Symbol' denotes the imagery of the realm, while 'deception' pertains to the illusory. Artists create illusory imagery to symbolize the true nature of the universe and human life."[3]

Mary Lou Ryan's theory of digital narrative, grounded in computer hardware, represents a novel narrative paradigm characterized by interactivity and immersion.She innovatively introduces the concepts of "immersive poetics" and "interactive poetics," leveraging computer theory to enhance narrative studies while drawing on Aristotelian poetics for theoretical approaches.

In summary, digital narrative theory benefits from the ongoing innovation driven by VR technology, which, in turn, seeks to gain a broader, more sophisticated theoretical framework through digital theory. As the Greek sage Protagoras famously stated, "Man is the measure of all things."VR imagery, through its immersive and interactive experiences, places viewers within worlds constructed by digital technology, thereby facilitating a reconstitution from ancient times to the present, and from historical texts to virtual reality.

2. The Constructive Practice of the "Loulan" Imagery in Tang Poetry

2.1. The Imagery of "Loulan" in Tang Poetry

The term "Western Regions" is first documented in the Book of Han: Treatise on the Western Regions, which states: "The Western Regions were first opened during the reign of Emperor Wu of Han. Initially comprising thirty-six states, this number later expanded to over fifty, all located west of the Xiongnu and south of the Wusun. To the north and south are great mountain ranges, with a central river.This sea is located over three hundred li from Yumen and Yangguan, covering an expanse of three hundred li. Its waters remain constant throughout

the seasons, believed to flow underground and emerge in the Jishi region, which is the River of China."[4]

As an important state in the Western Regions during the Han Dynasty, Loulan, though buried under shifting sands and renamed over time.This sustained literary representation has rejuvenated the ancient, sand-buried relics within the realm of literature. Tang poetry contains twenty-eight poems that reference Loulan. Due to Loulan's strategic location in the Western Regions, it often serves as a metonym for the frontier lands of the region. These poems, which incorporate the Loulan imagery, convey diverse meanings and can be categorized into several thematic types:

The first category reflects the themes of military campaigns and the longing of women left behind, exemplified by Li Bai's poem:

"In the remote land of Youzhou, the Hu horseman rides with a green-eyed tiger-skin cap. Laughing, he brushes away two arrows; a thousand men could not impede him. Drawing his bow like the crescent moon, the white geese descend from the clouds. With whips falling in pairs, he hunts towards Loulan. Leaving home without a backward glance, how difficult it is to die for one's country!" [5](The Hu Horseman of Youzhou, Li Bai);Similarly, in the poem by Yu Yuke:

The second category uses Loulan as a broad metaphor for the antagonistic states on the Western frontier in contrast to the Central Plains, as illustrated in the works of poets such as:Ong Shou, who writes: "The waning moon rises over the forest, shining on the swords and spears. On the flat sands, cattle and sheep are visible across the water. The rulers of the land are all nobles; who will slay Loulan and present it to the Emperor?" [6](Lǒngtóu Yín, Ong Shou).

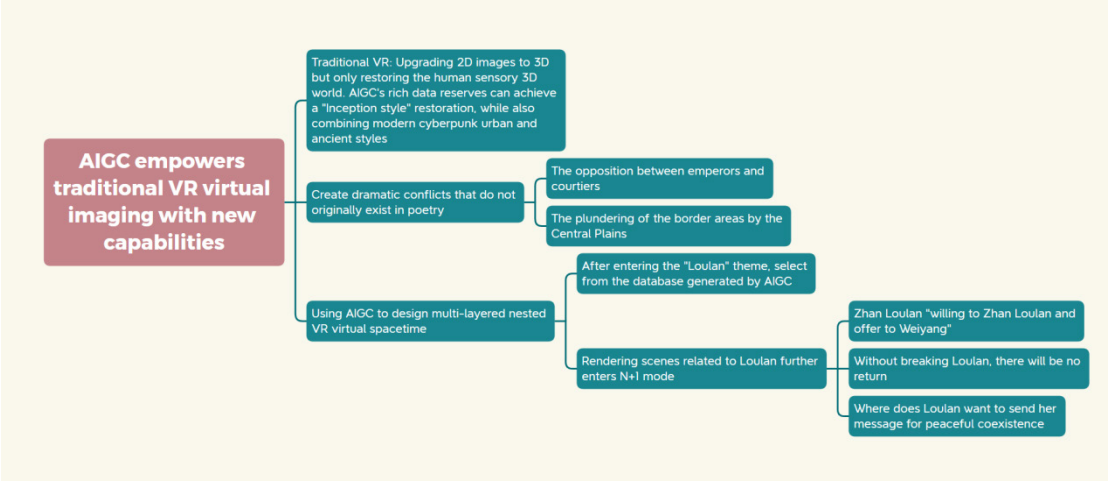
2.2. Practical Reconstruction of the Imagery of "Loulan" in Tang Poetry Through AIGC-Enhanced VR Visualization

AIGC, or Artificial Intelligence Generated Content, utilizes advanced AI technologies to generate content based on specific directives, leveraging models that accomplish tasks with minimal human intervention. As the adage goes, "bringing narrative into life," the integration of AIGC and VR is conducive to advancing narrative visualization by embodying characteristics such as "blending the virtual with the real," "generating existence from non-existence," and "immersive interaction."[6]The AIGC+VR model represents a significant innovation in traditional narrative visualization.

Furthermore, AIGC demonstrates potential in understanding and reproducing abstract concepts. AIGC's ability to recreate not only the external forms of Eastern traditional aesthetics but also to convey the core spirit of Tang poetry is exemplified in the model's rendering of the Loulan ruins.

Additionally, I propose that the

AIGC+VR model could further expand the temporal and spatial dimensions of Tang poetry. While three-dimensional space enhances visual volume, high-dimensional temporal-spatial expansion remains challenging. The nested temporal-spatial structures seen in films like Inception could offer valuable insights for the AIGC+VR model, enabling a higher-dimensional, cross-temporal experience that transcends reality. The system, supported by AIGC technology, would then render the relevant poetic scenes. Based on interactive feedback, the system would automatically generate a secondary layer of temporal-spatial experience, with variations tailored to individual interactions.



3. The Value and Significance of AIGC+VR in the Reconstruction of Loulan Ruins in Tang Poetry

In "Art and Visual Perception," Rudolf Arnheim asserts, "Visual images are never mere mechanical reproductions of sensory material but rather creative interpretations of reality. The images they capture are imbued with rich imaginative, creative, and perceptive qualities. An undeniable fact is that what endows the actions of thinkers and artists with nobility can only be the mind."[8] While the grandeur of this era can only be sensed through poetry, the spiritual resonance can still be experienced through the subtleties beyond the language—the imagery beyond the text, the scenes beyond the descriptions, and the flavors beyond the literal meanings.

The integration of AIGC and VR technology provides a tangible supplement to this abstract experience. As elucidated in Professor Ye Jiaying's theory of "evocative inspiration" in poetic aesthetics, where sensory engagement is required to achieve a "stimulating appreciation of meaning," the fusion of AIGC and VR leverages interactive and immersive sensory experiences to bridge the gap to the free spirit. This technological synergy not only reconstructs the lost spatial dimensions of Tang poetry's ancient ruins but also extends our spiritual realm, offering a renewed perspective on the magnificent ethos of the Tang dynasty through interactive imagination.

References

[1]Zhuangzi, Shallow Commentary, Cao Chuj, Zhonghua Book Company, 1982.

[2]]Marie-Laure Ryan，Narrative as Virtual Reality：Immersion and Interactivity in Literature and Electronic Media，Baltimore and London：The Johns Hopkins University Press，2001.

[3]ZongBaihua, *The Birth of Artistic Conception in Chinese Art*, in *Aesthetic Walks*, Shanghai People's Publishing House, 2005, p138.

[4][Han] Ban Gu wrote the Book of Han, Vol. 96, Zhonghua Book Company, 1962, p. 387

[5][Tang] Li Bai, [Qing] Wang Qi, The Complete Works of Li Taibai, Volume 4, Zhonghua Book Company, 1977, p268.

[6][Qing] Peng Dingyu et al., The Complete Tang Poems, Volume 24, Zhonghua Book Company, 1960, p 322.

[7][Qing] Peng Dingqiu et al., The Complete Tang Poems, Volume 600, Zhonghua Book Company, 1960, p. 6939.

[8][Tang] Zhang Jiuling, Xiong Fei, Zhang Jiuling, Volume 3, Zhonghua Book Company, 2008, p189.

[9][Qing] Peng Dingqiu et al., The Complete Tang Poems, Volume 24, Zhonghua Book Company, 1960, p. 1444.

[10][De] Rudolf Arnheim. Art and visual perception [M]. Teng Shouyao et al. Beijing: China Social Sciences Press, 1984:2.

EnPress

Study on the relationship between the contents of Wuguantun Grottoes and Yungang Grottoes

Ying Zhao

Academy of Fine Arts, Shanxi Datong University, Datong 037001, China

Abstract: This article takes the contents of the carvings in the Wuguantun grottoes as the research object, analyzes the patterns, Buddha clothes and Buddhist niches carved in the Wuguantun grottoes.And discusses the Wuguantun Grottoes period, Buddhist belief, cultural influence and other aspects of the study. In addition, by comparing the relevant cultural factors of Yungang Grottoes, the relationship between Wuguantun grottoes and Yungang Grottoes is sought, so the value of Wuguantun grottoes is further explored.

Keywords: Wuguantun Grottoes; Yungang Grottoes; Carving Content; Relationship

Wuguantun Grottoes is located on a cliff about four kilometers northwest of Yungang Grottoes in Datong City, stretching for more than 200 meters from east to west. It is the fifth batch of cultural relics protection units in Shanxi Province.Luyeyuan Grottoes,Wuguantun Grottoes, Jiaoshan Temple Grottoes and other grottoes were completed successively after the excavation of Yungang Grottoes. During the period, private funds were widely absorbed, and princes and ministers, local officials all participated in the construction of the grottoes in the form of individuals and families.[1]There are 32 caves here, but the scale of the grottoes is small. Compared with the Yungang Grottoes, the overall sculpture of the Buddha is thinner, delicate and delicate.

1.Analysis according to the content and layout of the cave carving

The 32 existing caves in Wuguantun Grottoes are all small in shape, and most of them have a width and depth of only about 1 meter. Because the grottoes are close to the 109 National Road,which carries coal all the year round, they have not been properly protected,resulting in serious differentiation of Buddha statues in Wuguantun Grottoes, but we can still see the various forms of Buddhist shrine. Most of the caves are three walls and three niches, including statues of intersecting feet Bodhisattva and two Buddhas sitting together, etc. There are also donors in the cave, and the Buddha is mainly composed of the robe, with overlapping clothing and decoration. The niche is mainly of round arch, shape and curtain. The lintel is usually carved to support the sky and seven Buddhas. Some of the grottoes are carved with lotus flowers, and the flying sky image revolves around the lotus flower. In addition, there are a large number of small grottoes in the Wuguantun Grottoes that only accommodate one person, which also reflects the prevalence of Zen law at that time.

From the perspective of the carving content, the carving content of Wuguantun Grottoes is basically similar and the layout is simple. We can judge the connection with the appearance of Yungang Grottoes from the carved lotus pattern, Buddhist clothes and the shape of the Buddhist niche.

1.1 Lotus pattern

Lotus pattern is a common pattern in Yungang Grottoes, usually appearing on the top of the cave, the ground, the lintel, the window, the platform, the light on the back of the Buddha. And Wuguantun Grottoes in the lotus pattern in 22 grottoes have obvious traces, the center for the round, superposition of double lotus petals.Although the lines inside the lotus petals have been weathered, but according to the lotus of the Yungang Grottoes,it is likely to belong to the straight lotus pattern of the Yungang Grottoes. Most of these lotus patterns are the representatives of the late Yungang Grottoes, which were carved by the people after the Northern Wei Dynasty moved the capital to Luoyang, and have similarities with many lotus patterns in Longmen Grottoes.[2]

1.2 Buddha's clothes

The main Buddha on the right side of Cave 3 of Wuguantun Grottoes is similar to the main Buddha on the west wall of Cave 38 of Yungang Grottoes, with a Buddha sitting in a chair and a clothes. In the sitting statue of the two Buddhas in Cave 5,the lower coat lines is

obvious, This is consistent with the clothing pattern of the main Buddha in the north niche of the west wall of Cave 26 of Yungang Grottoes (Figure 1). These examples also illustrate the weathered grottoes in the Wuguantun Grottoes. Most of them are similar to the Buddha clothing statues in the late western area of Yungang Grottoes.It belongs to the style of Buddhist clothes. Its wearing style is relatively close to the traditional Chinese Confucian costume.

In addition, most of the grottoes in Wuguantun are dominated by statues of intersecting feet Bodhisattva and two Buddhas sitting together, with flanks carved on both sides. They are also popular into the main Buddha statues in the second phase of Yungang Grottoes, and more in the third phase of the grottoes, so the statue theme of Wuguantun Grottoes is produced in line with the trend of the second phase of Yungang Grottoes.

Figure 1 Cave 5 of Wuguantun Grottoes (left) and the lower layer of the west wall of Cave 26 of Yungang Grottoes (right)

1.3 Niche for a statue of the Buddha

The round arch niches and tent-shaped niche with a truncated pyramid top in Wuguantun Grottoes are the most common.But the sharp arch niches, square niches and houses niches are hardly visible, and because of the small niches, there is no carving of the central tower columns in the grottoes. Among them, in the Wuguantun Grottoes 2 to 6,8 to 17,19 to 21 grottoes such as round arch niche, lintel is pointed and decorate all kinds of small Buddha. The top of the lintel also surrounded by the Buddha, such as caves 2,3 and cave 26 of Yungang Grottoes east wall lower south niche similar (figure 2). In addition to the round arch niche in Wugutun Grottoes, there is also a tent-shaped niche with a truncated pyramid top in the seventh cave.The lintel carved the folding sitting Buddha.And it's neatly carved, the periphery also appeared the carving characteristics of the donor.

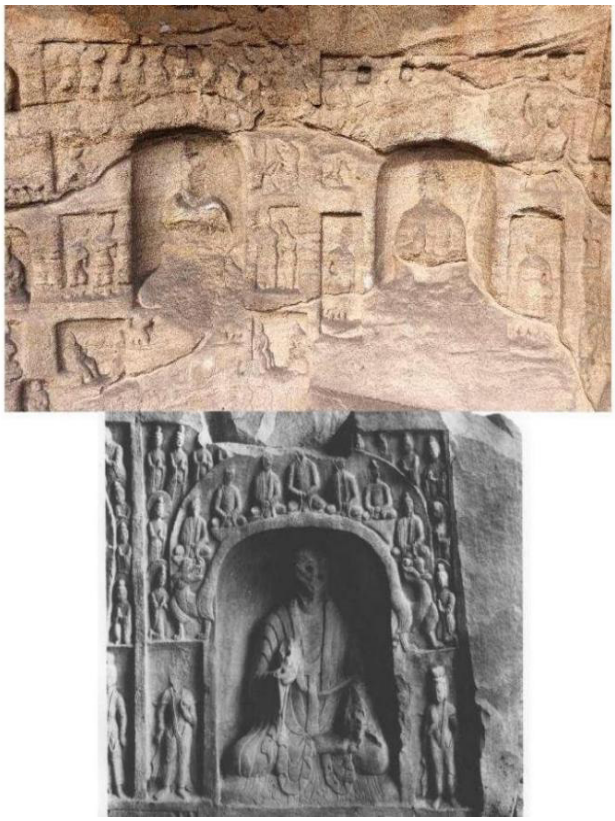


Figure 2 Grottoes 2 and 3 of Wuguantun Grottoes (top) and the lower layer of cave 26 of Yungang Grottoes (bottom)

Wuguantun Grottoes are basically consistent with Yungang Grottoes in terms of niche, grottoes and combination of statues. The layout of the statues is three walls and three niches composed of square plane and flat top, the main wall is the statue of Sakyamuni, and the side wall is the statue of Maitreya, and the main themes of the statues are Sakyamuni, Maitreya and seven Buddhas. This style is very popular in the third phase of Yungang Grottoes, located in the western caves of caves 5-11,21,31,33-4 and 36-3.[3]In the Northern Wei Dynasty, the grottoes with three walls and three niches first appeared in Pingcheng area of Datong, not only Yungang Grottoes, but also small surrounding Buddhist shrine and Wuguantun Grottoes. Their styles have had a great impact on the Longmen Grottoes in Luoyang area.

To sum up, through the comparative analysis of the above factors, the time of the cave and it is known that the Wuguantun Grottoes were excavated by folk believers after Emperor Xiaowen moved the capital to Luoyang.

2.The Buddhist beliefs in the grottoes

Cave carving content is a manifestation of Buddhism beliefs.Caves serve the monks and believers daily religious ceremony.Its function is the main properties of the cave design.So the cave, the carving content and the religious belief should be integrated.And the whole worship and practice process of monks and believers is divided into four parts: worship, long kneeling inquiry, right circle worship and meditation. At the same time, the design of the main Buddha statue in the center of Wuguantun Grottoes and the many Buddhas around it mainly reflects the popular Fahua belief thought in this period,which is also a typical style of grottoes statues in the development of Mahayana Buddhism.

In addition, Fahua belief appeared in the second phase of Yungang Grottoes, and Sakyamuni in the “Lotus Sutra of Magic Fa” was a common theme of sculpture in that period. Until the third phase, the theme of Sakyamuni and in the sitting statue of the two Buddhas was more extensive and affected the Wuguantun Grottoes, which showed the popularity of Fahua thought at this time. On the other hand, it also shows the expectation of the folk believers for a better life in the afterlife.[4]

3.The relationship between Wuguantun Grottoes and Yungang Grottoes

The excavation of the Wuguantun Grottoes is closely related to the Yungang Grottoes, and its carving features are more consistent with the shapes and themes of the late Yungang Grottoes, which is a continuation from the royal grottoes to the non-royal grottoes.

Yungang Grottoes is generally divided into three periods in archaeology. The first phase is five large grottoes (caves 16 to 20) dug by Tan Yao.The second phase is mainly carved in the eastern and central grottoes (caves 1 to 3,5 to 13).And the third phase is mainly distributed in the western area of Yungang in the west of Cave 20.[5]Among them, the first phase of Yungang shows a strong western atmosphere.The second phase belongs to the process of Sinicization and has the new style of the Chinese nationality. In the third phase, the grottoes changed rapidly, most of which were carved separately, not in groups, and the overall elegant and elegant artistic style. The first and second phases were built on the basis of the royal excavation, while the third grottoes were dug by folk believers after Emperor Xiaowen of the Northern Wei Dynasty moved the capital to Luoyang. Therefore, manpower and material resources were limited, and the scale of the grottoes was small. However, at this time, the grottoes changed their previous style.The Buddha statues were showed the bones and clear statues. The Binyang Cave of Longmen in Luoyang also imitated the new style and new style of Yungang period. It is because the royal grottoes are generally the main model of the folk grottoes dug. So the excavation of the Wuguantun Grottoes is also a continuation of the Yungang Grottoes.Together with the Yungang Grottoes, the royal grottoes system centered on Yungang Grottoes constitutes a relatively complete Buddhist temples system. Therefore, in Wuguantun Grottoes, the cave layout, carving style and cultural beliefs have continuity.It can be seen that Wuguantun Grottoes not only inherited the carving mode of Yungang Grottoes,but also absorbing the secular nature of folk culture.Wuguantun Grottoes are not only the inheritance and supplement of the third phase of Yungang Grottoes, and it can not be ignored in cultural communication.

References

[1] Gu Min.Yungang Grottoes in Shanxi Province.Shanxi People's Publishing House，2013:1-2.

[2] Zhao Ying.Discussion on the uniqueness of lotus pattern in Yungang Grottoes. New Beauty domain,2022(10).

[3] Yan Wenru.Research on the Yungang Grottoes. Guangxi Normal University Press,2003:259-261.

[4] Guo Jingna. Research on luban Kiln Grottoes. Shanxi University,2021 (6):133-137.

[5] Feng Jicai. China Datong Sculpture complete works of Yungang Grottoes carving volume.Zhonghua Book Company,2010(8):4-7.

Project:

School of Fine Arts, Shanxi Datong University research project "Yungang Grottoes Lotus patterns on the Silk Road cultural Blending" (project number: 2022YGZX047) phased research results

EnPress

Macroeconomic Analysis of 1998 FIFA World Cup

Luyu Chen, Kexin Mi, Yunqing Bai

RCF Experimental School, Beijing 100000, China

Abstract: After holding FIFA World Cup in 1998, France experienced a turning point after four years of recession. We are aiming to discover the income and expenditure in the French economy before, during, and after the FIFA World Cup 1998. Including the government spending to support this event, some domestic and foreign investment, and the change amount of total output in the economy as well. Using method of literature review and macroeconomic analysis, we find out that the economic success of 1998 FIFA can be attributed to augment of demand for transportation, high foreign direct investment, and sponsorship.

Keywords: Macroeconomic Analysis; Economic Growth; Social Impact

1. Introduction

1.1 Research Background

As a country with a great passion for sport, and football, in particular, the fact that France was allowed to host the World Cup in 1998 has to some extent lifted the spirits of its people. Therefore, people in football education, publicity, advertising, and other industries have greater investment and consumption. Hosting FIFA has certainly been a boon to French tourism, both in manufacturing and services. Moreover, in the era of rapid information and communication, FIFA's launch in 1998 attracted a large number of advertising investors, notably Coca-Cola. Most notably, France's victory brings the World Cup in France to a close and maximizes FIFA's profits. Because a victory by a home team as a host is rare and remarkable, both at home and around the world, France's success has largely inspired people, even those who are not football fans, to engage in more active work and production

1.2 Significance of the Study

The impact of a large-scale sports event on the country and even the world economy can be deeply studied by examining and investigating the way of holding the FIFA World Cup. From the national perspective, we can better understand how to hold the next event and to prevent extra unnecessary money spent on the activity; in terms of individuals, sellers can know more comprehensively how to maximize the profit by using active resources and buyers will have a clearer idea on what's the most economical product.

2. Literature Review

According to "Economic impacts of the FIFA Soccer World Cups in France 1998, Germany 2006, and outlook for South Africa 2010", by (Swantje Allmers and Wolfgang Maennig 2009), analyzing overnight stays, service balance sheets, and retail sales, the author mentions that According to the comprehensive data analysis, the number of tourists and international tourism income did not increase significantly during the World Cup in France. In a word, the impact on the tourism industry is small. Also, the test according to deflated monthly retail sales index did not show any significant impact of WCs, the negative impact of the World Cup on retail sales. Though not significant on the statistical data, produced a "couch potato effect": consumers may be themselves, the World Cup stadium game or a mile "fans" street market transfer their normal consumer behavior, or, they may choose to entertain themselves at home, watch the football match, can only eat fast food "potato".

"The 1998 World Cup Impacts the French Economy"(anonymous writer in cip community), French stocks rose 40 percent in the first half of 1998. The 1998 World Cup also helped unite the French people, who had problems with racial integration. The problem is mainly between Algerian immigrants and French citizens, who have been united for a short period. An expert on football finance at the University of Leeds Business School said that "the French economy grew by 3% to 3%"; much of that was attributed to Frances winning the World Cup (Gerrard, 1998). As people thronged the streets to celebrate, it was seen as a sense of excitement that, albeit short-lived, provided a boost to

the economy.

The passage “THE QUEST FOR THE CUP: ASSESSING THE ECONOMIC IMPACT OF THE WORLD CUP” (Robert A. Baade) focused on whether the World Cup boosts the host economy and balances costs and risks. It mentions that in FIFA, most viewers are from other countries and their spending is counted as export spending. Despite not being in the city or community where the games are being held, residents of the host country who do not attend the games may not reduce their spending in that country. One might think that the direct expenditure of non-residents attending the event is close to the net effect, but this conclusion is not true if non-residents choose to reduce consumption because of congestion and high prices during the Olympics.

The essay “The Announcement Impact of Hosting the FIFA World Cup on Host Country Stock Markets” (Bijen Ramdas, Reinettevan Gaalen, and Jordy Bolton 2015) sums up some major economic effects on the French economy while preparing for and hosting FIFA World Cup. According to a paragraph, as the host of the World Cup, it naturally helps to boost the French economy by providing accommodation for tourists, creating new jobs through construction and selling services, selling goods, and other ways. People tend to spend more on hotel accommodations, restaurants, and alcohol to cater to happiness.

3. Analysis

3.1 Methodology

The methodology chosen for this research was very crucial and important. The chosen methods were based on the topic and the research questions and this gave a guidance about the philosophical principles guiding the entire research procedure (Easterby-Smith et al. 2012). Hosting the world cup was greatly dependent and based on the positivist and constructivist epistemologies (Cresswell, 2013; Creswell & Plano Clark, 2011). Quantitative data used in this study, though dependent solely on numerical values, was concise and created an objective study based on the perceptions (Lather, 2014). The qualitative approaches depend on the ‘interpretive’ or social constructivism (Krathwohl, 2010). This approach focused on the “why” and “how” of the study not solely on the “what” of the study and as such provided the investigator different experiences of the population sample regarding the teaching strategies under review.

3.2 Data analysis

Inferential quantitative research is targeted at studying the relationship between two variables. According to the submission of Easterby-Smith et al (2012, p.43), inferential techniques “adopt an internal realist ontology” by examining the existing beliefs that have been concealed. Examining from the perspective of internal realism, the methodology and instruments adopted for this study were able to unmask the hidden fact(s) about the relationships that exist between hosting the FIFA world cup and economic growth of France in 1998. Thus, this confirmed the effectiveness of the strategies used in the data collection process and the methodology and the research questions. The research aims, research objectives and the research question have all been linked together (Evans et. al., 2004). Data analysis gave room for assembling, disassembling, and breaking up, separating, putting together research materials which were then sifted into smaller pieces of manageable information for logical, coherent and clarity purposes (Hesse-Biber & Leavy, 2011). Data were arranged by sections to reveal any underlying structure in the data.

3.3 Ethical considerations

Ethical considerations which enhance research validity, protect the rights of research participants and maintain research integrity were well catered for in this research. Ethical issues considered were anonymity, confidentiality, and dissemination of findings, informed consent and avoidance of data fraud (Baud et. al, 2013) since research ethics are important for integrity, rights and dignity of in the society. In order to get accurate information from the secondary sources, the researchers were equipped with assurance of confidentiality and anonymity (Calahan, 2019). Ethical issues were decided before the commencement of the research and it was considered throughout the research process (Brooks et al., 2014).

4. Findings/Results

4.1 Hosting The World Cup brings France dramatic economic growth.

In 1998, French experiences 1.25% of economic growth, which is a large number compared to other years. Before the World Cup in France, GDP growth was negative; After the World Cup, especially in the year following France's World Cup triumph, its GDP not only turned negative into positive but grew by 4%.

4.2 The World Cup brings high brand sponsorship revenue.

Explanation: The sponsorship of the World Cup has different levels, divided into global partners, sponsors, and regional sponsors. Together, they support and provide financial assistance to the World Cup.

4.3 The selling of broadcasting rights brings huge economic benefits.

Some statistics about the 1998 World Cup in France reveal the huge financial benefits of its televised nature. The cumulative television audience for the 64 matches was approximately 40 billion people, the largest for a single event in history and 14,000 times larger than the stadium audience. The final was watched by 1.7 billion people, making it the largest collective experience in human history. Audience and viewing figures show the marketing potential of the event.

4.4 WorldCup increases traveling transportation companies' income.

More people will travel long distances to the host country and tend to travel by vehicle. As the result, companies that provide transportation products and services will gain more revenue.

4.5 World Cup advertising is a big source of profits.

Worldwide, 12 multinational companies, including Coca-Cola and McDonald's, MasterCard, and Adidas each paid about $35 million for the privilege of being associated with the event. It is also a big source of advertising revenue for the World Cup.

4.6 The host of the FIFA World Cup brings more foreign direct investment.

According to the diagram below, the investment rate increases sharply during 1997-2000, which is exactly the time period in which FIFA World Cup is being hosted. A possible reason for that is the advertising and increment of the French products' value.

References

[1] Allmers, S., & Maennig, W. (2009). Economic Impacts of the FIFA Soccer World Cups in France 1998, Germany 2006, and Outlook for South Africa 2010. Eastern Economic Journal, 35(4), 500–519. http://www.jstor.org/stable/40326165

[2] Baade, R. A., & Matheson, V. A. (n.d.). The quest for the cup: Assessing the economic impact of the World Cup. Clemson.edu. Retrieved December 29, 2022, from https://media.clemson.edu/economics/data/sports/Stadiums%20and%20Econ%20Impact/world-cup.pdf

[3] Baud, M, Legêne, S, Pels, P (2013) Circumventing reality: Report on the anthropological work of Professor Emeritus M. M. G. Bax. 9 September 2013. Amsterdam. Available at: www.vu.nl/ en/Images/20131112_Rapport_Commissie_Baud_Engelse_versie_definitief_tcm270-365093.pdf (accessed 17 April 2021).

[4] The Announcement Impact of Hosting the FIFA World Cup on Host Country Stock Markets, Procedia Economics and Finance, Volume 30, 2015, Pages 226-238,

[5] Brooks, Rachel, et al. (2014) Ethics and Education Research. 55 City Road, London: SAGE Publications, Inc.

[6] Calahan, S (2019). The great pretender. New York, NY: Hachette.

[7] Creswell, J.W. (2013) Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 4th Edition, SAGE Publications, Inc., London.

[8] Creswell, J. W., & Plano Clark, V. L. (2011). Designing and conducting mixed methods research (2nd ed.). Thousand Oaks, CA: Sage.

[9] Easterby-Smith, M., Thorpe, R. and Jackson, P. (2012) Management Research. London: Sage.

Author Information:

Chen Luyu (2007-), female, Han ethnicity, Beijing nationality, Renchao Fen Experimental School, high school, macroeconomics.

Mi Kexin (2007-), female, Tujia ethnic group, Hubei nationality, Renchao Fen Experimental School, high school, macroeconomics.

Bai Yunqing (2005-), female, Han ethnicity, Beijing nationality, Ren Chaofen Experimental School, high school, macroeconomics.

Mapping Challenge - Downtown Armidale

Jiaxin Yi

School of Architecture, Design and Planning, University of Sydney, Sydney, Camperdown NSW 2050, Australia

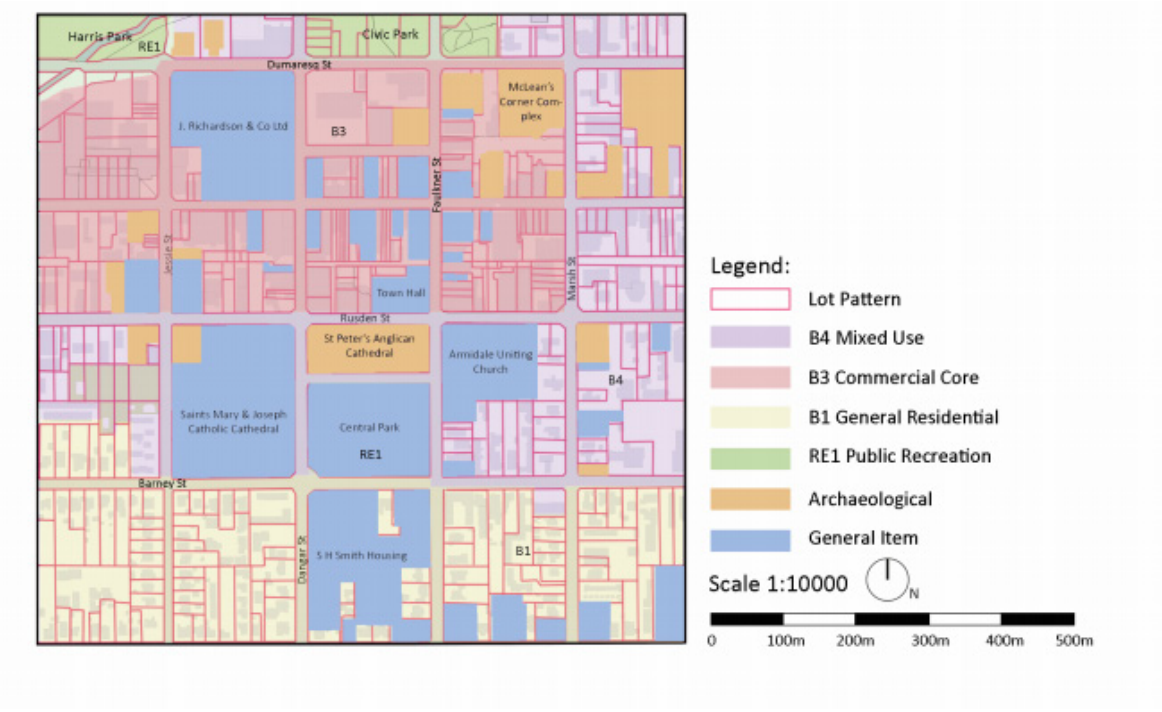
Abstract: Armidale is a regional city in Northeast New South Wales, and also the key hub of the New England High Country (Destination NSW 2022). While the study neighbourhood is a representative component of the downtown, located in the north of downtown in Armidale, which not only contains the urban structure, and diverse land zoning, and also describes the gorgeous history of this city.

Keywords: Heritage Zoning; Landuse; Mapping; Lot Pattern

This combination plan distinctly displays the characteristics of the street layout in Downtown Armidale, with a coverage of grid pattern of streets, and most blocks are divided following the grid subdivision concept. In addition, with the commercial core as the centre of this neighbourhood, multi-function, green space and residential areas are distributed in turn. The study area also contains a lot of heritages that constitute the storytelling feature that can be used to convey the historical background of this city and country. Subdivision of urban land can be continued a\er zoning to form communities and streets, the subdivision of land can affect the development planning of the whole city, which has great environmental, social, and economic significance.

Therefore, the following three maps are selected for an overview: heritage zoning, land zoning, and lot pattern. Through the analysis and research of these three maps, they will combine to form one logical story that has a deeper understanding of the history of Armidale.

The Study Neighbourhood - Combination Plan



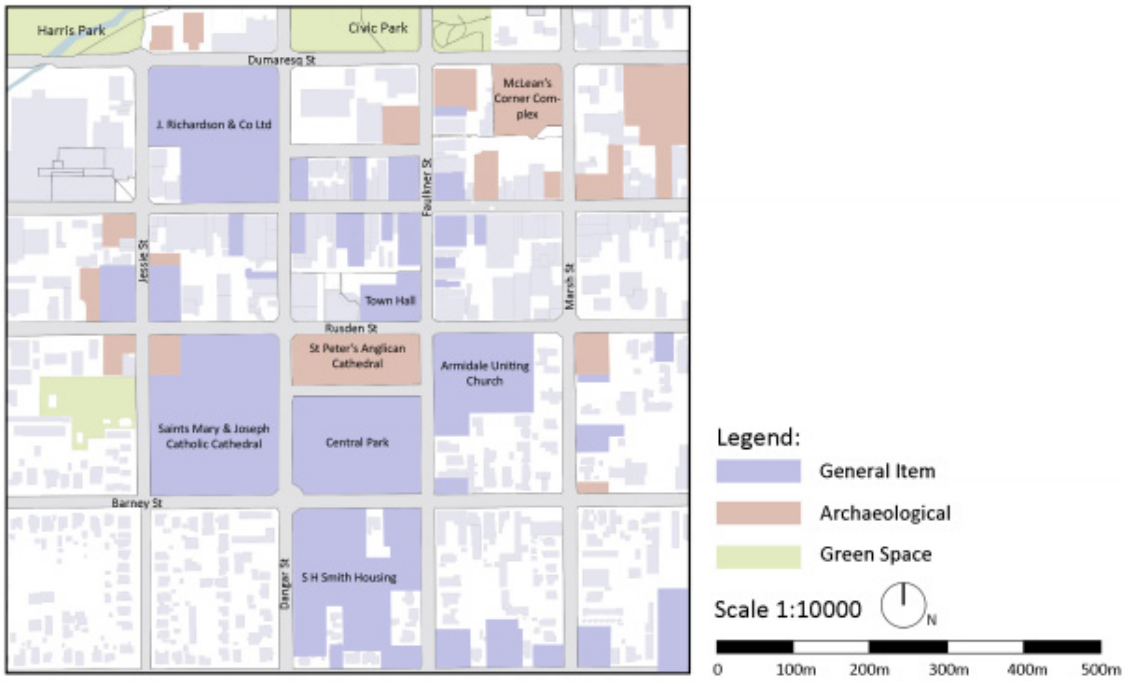
Heritage Zoning

The Anaiwan people used to live in the vicinity of Armidale, they hunted and gathered for a living. In 1846, the government officially

approved Armidale as a town, and the completion of the railway, the development of gold, and the discovery of Tn metal brought economic growth to this area (Heritage - Visit Armidale, 2022). Armidale upgraded to a city in 1885 (Armidale: Heritage, Museums and Galleries, 2022), and attracted a large number of settlers to come here (Armidale: Heritage, 2017).

The Central Park on the map was built in 1874, it approved as a park in 1887 and rebuilt in 1922 to commemorate World War I (Central Park - Armidale Regional Council, n.d.), in December 2018, Armidale's Central Park became a NSW National Heritage Park (ARMIDALE'S CENTRAL PARK AWARDED STATE HERITAGE STATUS | Adam Marshall, 2018). St. Mary and Joseph Catholic Cathedral was the first church in Armidale, and installed as a chapel in 1871 (n.d.). The S H Smith Housing belongs to Armidale Teachers College, in March 1928, the head of the college Smith began his teaching career, this is a starting point in the history of education in New South Wales (Belshaw, 2017). The Town Hall was built in 1882, a theatre which contains more than 200 people (Armidale Town Hall - Armidale Regional Council, n.d.). General heritages has larger proportion than archaeological heritage, these heritage are related to historical churches, and currently remain. The company on the North side of the study neighbourhood is now divided into a mall and some retails, Mclean's Corner has changed from a commune to a large supermarket. Therefore, Armidale's historic heritage reflects the lives and greatness of 19th-century settlers (Armidale: Heritage, Museums and Galleries, 2022).

The Study Neighbourhood - Heritage Zoning



Source: https://www.planningportal.nsw.gov.au/spaTalviewer/#/find-a-property/address

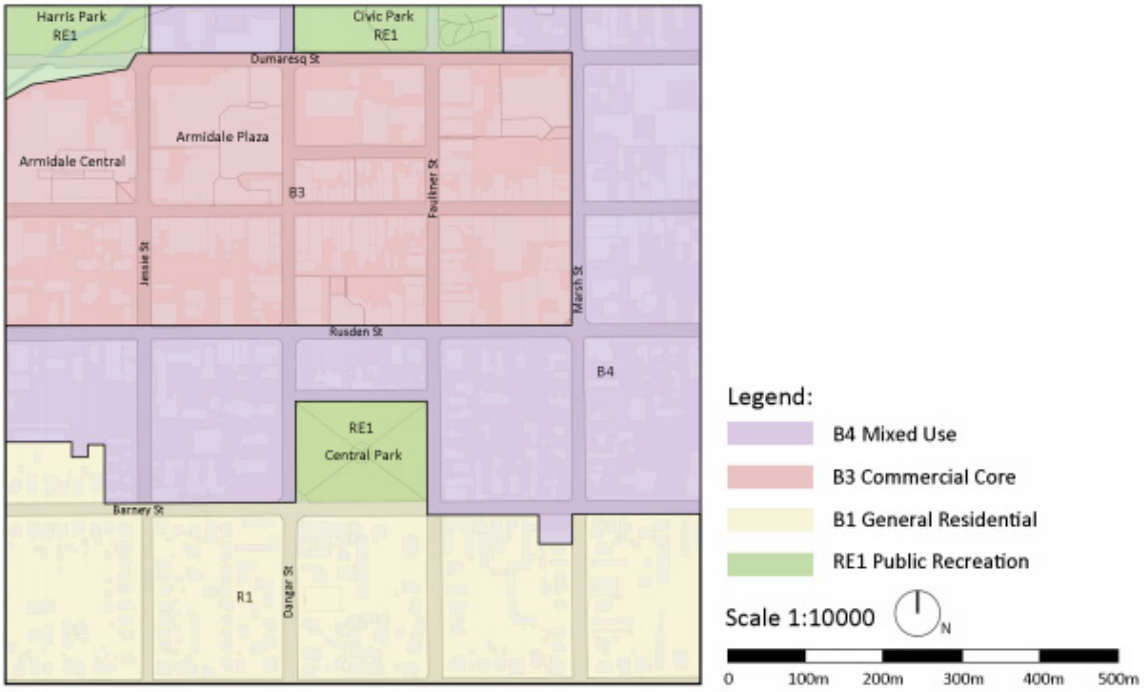
Land Zoning

As the New England Development Strategy 2010 (Worley Parsons, 2010) referred that the city of Armidale is an emerging region required to actively develop the CBD area, and plan enough land commercial activity for the projected population in 2021. Compared with the current land zoning of the study neighbourhood and key recommendations in the 2006 Strategic Analysis for Armidale (Worley Parsons, 2010, P.40), it is undoubtedly that almost achieved the visions. The large-scale commercial premises are restricted to the B3 (Commercial Core) area and replaced by B4 (Mixed Use) with a wider scope, the combined development of retail and housing makes efficient use of the land.

From the map of land zoning, each functional land has sufficient size and shape, while the urban structure composed of reticular streets provides complete street frontage for them, which not only meets the requirements of a series of new businesses but also makes it

more convenient for residents to travel. Moreover, the government did not allow Downtown Armidale to be completely dominated by commerce, they still paid attention to the development of public recreation and cultural history. For example, Central Park is not only RE1 (Public Recreation) but also a valuable heritage that strengthens urban residents' sense of history.

The Study Neighbourhood - Land Zoning



Source: https://mecone.com.au/mosaic/

Lot Pattern

The lot pattern map shows the lot subdivision within the chosen area, in which the green spaces is in the form of a large block and do not need to be subdivided, however, other blocks such as the mixed-use and the commercial functional areas have been subdivided. All areas in the study neighbourhood are divided into different lots, and each block is distributed in a certain pattern, which offers convenience for both transport and people. The subdivided lots form is suitable for mixed communities, combining blocks with living, leisure, and entertainment, meeting people's requirements for new residences, and better promoting neighbourhood relations. The blocks within the study neighbourhood are centralised integration of business and living, which makes a major contribution to the local economy.

The study neighbourhood is located in the commercial centre, with a certain flow of pedestrians, so the grid subdivision has the largest proportion in the study neighbourhood due to its pedestrian and traffic-friendly and highly accessible features, and most commercial areas follow the cluster subdivision model to Move closer to the transport network while preserving open space and helping reduce costs for infrastructure and essential services (Pena, 2022). Move closer to the transport network while preserving open space and helping reduce costs for infrastructure and essential services, therefore, lot subdivision provides a more liable living model for people.

The Study Neighbourhood - Lot Pattern

Source: https://mecone.com.au/mosaic/

References

[1] Adam Marshall. 2018. ARMIDALE'S CENTRAL PARK AWARDED STATE HERITAGE STATUS | Adam Marshall, viewed 22 September 2022, https://www.adammarshall.com.au/armidales-central-park- awarded-state-heritage-status

[2] Armidaleregional.nsw.gov.au. n.d. Armidale Town Hall - Armidale Regional Council, viewed 22 September 2022, https://www.armidaleregional.nsw.gov.au/community/council-s-funcUon-and- community-centres/armidale-town-hall

[3] Armidaleregional.nsw.gov.au. n.d. Central Park - Armidale Regional Council, viewed 22 September 2022, https://www.armidaleregional.nsw.gov.au/community/sport-and-recreaUon/parks-and-gardens/central-park

[4] Armidale: Heritage, M., 2017. Armidale: Heritage, Museums and Galleries, viewed 22 September 2022,https://historicalaustraliantowns.blogspot.com/2018/01/armidale-heritage-museums-and- galleries.html

[5] Armidale& Surrounds, Destination NSW, viewed 20 September 2022, https://www.visitnsw.com/ destinations/country-nsw/armidale-area

[6] Belshaw, J., 2017. The college becomes a reality. The Armidale Express, viewed 22 September 2022,https://www.armidaleexpress.com.au/story/4582266/the-college-becomes-a-reality/

[7] Historicalaustraliantowns.blogspot.com. 2022. Armidale: Heritage, Museums and Galleries, viewed 22 September 2022, https://historicalaustraliantowns.blogspot.com/2018/01/armidale-heritage- museums-and-galleries.html

[8] Pena, J., 2022. AcUve Living OpportuniUes through Cluster Housing. [online] American Planning AssociaUon, viewed 22 September 2022, https://www.planning.org/blog/9227411/acUve-living- opportuniUes-through-cluster-housing/

[9] Smjcathedral.org.au. n.d, viewed 22 September 2022, https://smjcathedral.org.au/wp-content/ uploads/2021/06/RYfIy7OH1jDfD-wifwpODZv888RfznnmemCXUJMBL5e1JKjZhJNUJj2RrU71huowQ.pdf

[10] Visit Armidale. 2022. Heritage - Visit Armidale, viewed 22 September 2022, https://www.visitarmidale.com.au/experience/heritage

[11] Worley Parsons, 2010, New England Development Strategy 2010, viewed 20 September 2022,https://www.armidaleregional.nsw.gov.au/development/planning-controls---guidelines/planning- strategies-and-documents

Author information:

Jiaxin Yi was born on March 16,1998, lives in Xi'an, female, Han Nationality. Jiaxin graduated from the School of Architecture,Planning and Design of the University of Sydney, majoring in Urban design. Her research direction is urban regeneration and landscape planning.