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Table of Contents

Exploration of Ideological and Political Teaching in Management Psychology Courses under the "Four-Stage Case" and "Three-Loop Guidance"

Yanxia Li*, Dong Hu

Chuxiong Normal University, Chuxiong 675099, Yunnan Province, China

*Corresponding author: Yanxia Li, lyx@cxtc.edu.cn

Abstract: This paper focuses on innovating ideological and political teaching modes in Management Psychology courses, constructing and practicing the "Four-Stage Case" and "Three-Loop Guidance" teaching modes. This mode adopts a progressive case system consisting of life cases, role model cases, local cases, and practical cases, stimulating students' interest and thinking through deep interaction. Simultaneously, it integrates the "Three-Loop Guidance" strategy of cognition, emotion, and behavior into the teaching process, comprehensively cultivating students' overall quality. This teaching mode has significantly improved students' learning enthusiasm, critical thinking ability, and value shaping. Life cases effectively connect theory with practice, role model cases inspire students' spirit of struggle, local cases enhance cultural identity, and practical cases cultivate students' ability to solve practical problems. The "Three-Loop Guidance" strategy effectively promotes students' emotional resonance and behavior formation based on knowledge imparting.

Keywords: Four-Stage Case; Three-Loop Guidance; Management psychology; Ideological and political education in courses

1. Introduction

General Secretary Xi pointed out, "We should adhere to the unity of explicit and implicit education, and tap into the ideological and political education resources contained in other courses and teaching methods." Management Psychology is a highly integrated field involving many elements of ideological and political education in courses. Teachers need to explore these elements from teaching modules and extract valuable teaching designs to educate students and improve the overall quality of education [1]. As one of the core courses for cultivating future management talents, Management Psychology not only needs to impart professional knowledge but also should focus on cultivating students' comprehensive quality and shaping their values.

However, the current ideological and political teaching in Management Psychology courses faces problems such as "superficiality" and "forced integration" of theoretical courses, ignoring students' reality, lacking affinity and appeal, and difficulty in empathizing with students. This study proposes a teaching model for ideological and political courses in Management Psychology combining "Four-Stage Case" and "Three-Loop Guidance."

The aim is to achieve an organic unity of knowledge imparting, ability cultivation, and value shaping through a multi-dimensional case system and a comprehensive guidance strategy. The "Four-Stage Case" includes life cases, role model cases, local cases, and practical cases. Through advanced case interaction, students are expected to develop their ability to solve practical problems while mastering professional knowledge, enhancing their sense of social responsibility and professional ethics [2]. The "Three-Loop Guidance" includes cognitive guidance, emotional guidance, and behavioral guidance. Through strategies that span the entire teaching process, it promotes students' comprehensive development. This study aims to empirically verify the effectiveness and feasibility of this teaching model, providing new ideas and practical cases for ideological and political reforms in Management Psychology courses in universities [3].

2. Theoretical construction of the "Four-Stage Case" and "Three-Loop Guidance" curriculum ideological and political teaching model

To achieve the three-level curriculum ideological and political goals of "national sentiment, professional literacy, and mental health" in the course of Management Psychology, the teaching model of "Four-Stage Case" combined with "Three-Loop Guidance" is constructed. This model involves deep interaction through progressive cases, including life cases, role model cases, local cases, and practical cases, and integrates cognitive, emotional, and behavioral "Three-Loop Guidance" teaching strategies into the instruction.

2.1. Construction of "Four-Stage Cases" curriculum ideological and political cases

The "Four-Stage Case" teaching model is a progressive and in-depth case teaching system designed to comprehensively enhance students' theoretical understanding, practical application, and value identification abilities through multi-dimensional and multi-level case designs. The four-stage progressive case system includes:

(1) Life cases: Bridges between theory and practice. Life cases are selected to be close to students' lives, easy to understand, and correspond to theoretical knowledge points, aiming to stimulate students' interest in learning. Cases related to students' daily lives, social hotspots, and Chinese traditional culture are collected, focusing on those closely linked to students' existing knowledge, containing ideological and political elements, and featuring a lively and vivid style. Students are encouraged to share their own experiences and analyze them from the perspective of Management Psychology.

(2) Role model cases: Inspiring students' fighting spirit. Role model cases introduce outstanding figures and their deeds in the field of Management Psychology or related industries, establishing positive examples to motivate students' learning drive and career aspirations. The curriculum deeply explores role models, including labor models, advanced typical figures, management scholars, entrepreneurs, and typical figures of Chinese traditional culture and their stories, forming a collection of role model cases. These cases can encourage students to establish correct professional values and enhance their professional identity and sense of mission.

(3) Local cases: Enhancing cultural confidence. Local cases combine Management Psychology theories with Chinese local management practices, strengthening students' cultural confidence and localized thinking. The curriculum deeply explores excellent enterprise management cases in China and Yunnan, tells good Chinese management stories, and analyzes the management modes of Chinese enterprises, such as Huawei's wolf culture and Alibaba's value-driven approach. It also explores the impact of Chinese excellent traditional culture on modern Management Psychology, forming a collection of local cases to cultivate students' cultural and institutional confidence.

(4) Practical cases: Cultivating problem-solving abilities. Through real management situations, practical cases in the "Four-Stage Case" aim to cultivate students' problem-analysis and problem-solving abilities. Complex and open practical management problems are selected, requiring comprehensive application of the knowledge learned. Simulated management situations, such as role-playing or management decision-making simulations, are set up. Students are organized to participate in enterprise internships and write case analysis reports. Practical cases with strong practicality, such as classic experiment simulations, debate competitions, and group task activities, are conducted. A collection of practical cases is formed to strengthen and train students' ability to actively observe practical management, cultivating their comprehensive qualities.

The "Three-Loop Guidance" teaching strategy permeates pre-class, in-class, and post-class activities. Centered around the three-tier objectives of ideological and political education in the curriculum, the "Three-Loop Guidance" of cognitive change, emotional cultivation, and behavioral modification is consistently applied when presenting the "Four-Stage Case."

(1) Cognitive guidance: Knowledge imparting and thinking cultivation. Cognition is the foundation for the effectiveness of ideological and political education in the curriculum and the knowledge base behind attitude change. Teachers should provide clear explanations and guidance at the cognitive level during ideological and political education in the curriculum, forming correct cognitions and correcting misconceptions.

(2) Emotional guidance: Values shaping and emotional resonance. Emotional guidance focuses on cultivating students' positive emotions towards management work and shaping correct professional values. Emotion is the catalyst for ideological and political education in the curriculum, facilitating students' internalization of values. Teachers should inject emotion into ideological and political education in the curriculum, moving students with emotion and guiding them to develop reasonable emotions and feelings.

(3) Behavioral guidance: Practical ability and behavioral habits. Behavioral guidance emphasizes converting theoretical knowledge into practical actions and cultivating good management behavior habits. Behavior is the subsequent result of ideological and political education in the curriculum, and it can also produce the effect of belief through action. Clearer cognition and stronger emotions make it easier to produce behavior, which in turn reinforces cognition. Teachers should encourage students to act during ideological and political education in the curriculum to consolidate their attitudes.

These three elements interact and effectively connect. Changes in cognition promote emotional transformation, emotions influence behavior and behavior, in turn, strengthens cognition. This approach gradually infects students from the shallow to the deep levels in teaching, enhancing the warmth and enthusiasm of theoretical teaching content.

3. "Four-Stage Case" and "Three-Loop Guidance" practical teaching strategy

3.1. Focus on individual differences and manage negative emotions

In the ideological and political teaching of Management Psychology courses, teachers should adhere to the student-centered principle, allowing students to first understand themselves and enhance their self-awareness. Then, they should manage any potential negative emotions, starting with inner optimization and improvement to lay a solid foundation for learning Management Psychology.

Taking individual differences and management modules as an example, teachers can analyze the temperaments and personalities of characters from the four great classical novels for students. Using Lin Daiyu as an example, teachers can help students understand her sensitivity, suspicion, and pettishness, thereby enhancing their self-awareness. In class, teachers can explain in combination with the original work, showing that Lin Daiyu's prominent characteristics are sensitivity, suspicion, aloofness, and pride. She inherits the great tradition of traditional scholars who are cynical and refuse to associate with vulgarity. In the secular environment of the Jia Mansion, which is full of power struggles and intrigues, Lin Daiyu not only feels the oppression and restraint of being a guest but also demonstrates her aloofness and high standards in every aspect of her life. She is overly concerned with others' words and opinions, forming many troubles in her sensitive heart. Her sensitivity mainly comes from her family environment and the experience of losing both parents, while her jealousy is mainly due to Jia Baoyu.

The line "Three hundred and sixty days a year, like a sword cutting wind and frost" in "Burying Flowers" is a true expression of Lin Daiyu's feeling of oppression and suspicion in the Jia Mansion. She is constantly concerned about others' evaluations and opinions. In the chaotic relationships within the Jia Mansion, where men are almost all ignorant and elders are either violent or incompetent, and also dissolute, Lin Daiyu seems out of place. Having read books and opened her mind, she realizes that she is trapped, deprived, denied, belittled, and powerless to resist. She knows that she cannot achieve her long-cherished wishes, that the poetry club is ultimately an illusion, and that her future is bleak. Under such circumstances, it is natural for her to be sensitive and suspicious. She also shows jealousy in her language and behavior when interacting with Jia Baoyu and other women, often being pettish.

There are many descriptions of this in "A Dream of Red Mansions." Through the analysis of Lin Daiyu's personality and temperament, students not only strengthen their understanding of the original work but also recognize the importance of managing their inner negative emotions, correctly facing changes in the external living environment, enhancing their self-awareness, and clarifying their self-positioning, thus achieving the ideological and political teaching goals of the course.

3.2. Motivating work attitudes and infiltrating core values

In the ideological and political education of Management Psychology courses, it is essential to strengthen the education of socialist core values. Students should be made aware that they will eventually work in a specific industry or field, thus psychologically preparing them to embrace professionalism and consciously internalize socialist core values, influenced by advanced deeds and cases.

Taking the attitude theory and management module as an example, teachers should primarily cultivate students' professionalism and selfless dedication, introducing cases of great craftsmen in large countries. Simultaneously, teachers should connect the spirit of these craftsmen with the spirit of the 20th National Congress, allowing students to recognize the fundamental consistency between the two. Both emphasize the

efforts of the people and promote China's modernization and the great rejuvenation of the Chinese nation through their valiant struggle. The craftsman spirit embodies meticulous dedication to professional labor and the pursuit of excellence.

In summary, it is about achieving self-worth or life value through labor [4]. In this golden age, led by the Party, the people of China are confidently striding towards the future with the fullest attitude and spirit. Showing students the documentary "Great Craftsmen of Large Countries" featuring the deeds of scientists and teachers can inspire students to study diligently. Deep integration of the craftsman spirit with computer science knowledge can achieve remarkable results, touching students' hearts. Teachers can use specific cases to acquaint students with the real stories of great craftsmen, allowing them to experience the craftsmen's charisma. A notable example in the computer industry is Le Jiajin, whose deeds can be used to infiltrate moral education as a key aspect of ideological and political education in the curriculum. As a great craftsman, Le Jiajin embodies a unique "digging spirit," which has made him a great scientist and craftsman in the computer industry. His meticulous and great spirit has established his illustrious image in the computer industry, not only making tangible contributions to the country but also constantly infecting others with his spirit and qualities, enabling them to gain from continuous effort and learning. His influence as a great craftsman has transcended the boundaries of the computer industry, reaching even higher realms.

3.3. Understanding leadership psychology and introducing grand narratives

In the ideological and political classroom of Management Psychology courses, teachers should also educate students on leadership psychology, leadership qualities, decision-making abilities, and other aspects according to the needs of different students. By introducing grand narratives, teachers can help students consciously understand the mission and responsibility that leaders should possess, comprehend management itself from a broader perspective, and strive to do their best in everything.

Taking the leadership psychology and management module as an example, teachers explain to students Chairman Mao's decision-making abilities. From the perspective of administrative development thinking, students are guided to understand that leaders must base their decisions on actual conditions and seek truth from facts to make correct decisions and manage effectively [5]. Administrative development refers to the positive changes in administration, continuously improving in the right direction and adapting to new things in the context of the new era. It is inseparable from the real-world administrative system and can promote the comprehensive development of a country's politics, economy, and culture, which is an important reflection of the country's prosperity.

Under complex historical backgrounds, Chairman Mao proposed the establishment of a scientific and comprehensive administrative management mechanism, which is a significant contribution of his administrative thought to China's development. Chairman Mao created a political party system under the leadership of the Communist Party of China and a political system of democratic consultation. He also established a unique administrative management system featuring centralized leadership and appropriate decentralization of power to local authorities, as well as a system of regional ethnic autonomy under unified national leadership. These are all the most appropriate administrative management systems adopted by Chairman Mao based on local conditions and after studying domestic and international situations.

It is precisely because Chairman Mao demonstrated the "Chinese style and Chinese manner" that he promoted the independent development of administrative management in China, which is not only very different

from Western capitalist countries but also distinct from the Soviet Union, which was also in the socialist camp. Regarding the process of administrative development, Chairman Mao's administrative thought accurately pointed out the important force of the people and clearly stated that administrative development needs to be closely connected with the people. The people also indirectly determine the quality and speed of administrative development. Analyzing from the perspective of establishing base areas, Chairman Mao showed that the enthusiastic support and loyal backing of the local people are important guarantees for the administrative development of the base areas, ensuring that workers, farmers, and the petty bourgeoisie are closely united and serve the administrative construction of the base areas together.

Chairman Mao achieved initial success in replacing feudal and capitalist administration with socialist administration, realizing a revolutionary breakthrough in administrative management. Fundamentally, this was because it aligned with the fundamental interests of the broadest masses of the people. This recognizes the role of the simple science and technology of the people. Chairman Mao pointed out that workers, farmers, and intellectual workers create all the wealth in society, and the practice of the people is the material foundation for administrative development. The people's mastery of advanced science and technology is a crucial force driving administrative development. Administrative development is closely related to people's lives.

From the perspective of people-oriented thinking, Chairman Mao elaborated on the fundamental principle that the people determine administrative development and administrative development reacts to people's lives, allowing the people to participate in administrative development and injecting a critical decisive force into the continuous evolution of administrative development. By studying historical facts and integrating their thinking, students learn about the efforts required by leaders in management and achieve progress and improvement.

4. Analysis of the practical effects of the "Four-Stage Case" and "Three-Loop Guidance" teaching model

4.1. Implementing moral education and cultivating comprehensive talents

Through the progressive learning of the "Four-Stage Case," students can start with life cases and gradually transition to role model cases, local cases, and practical cases, deepening their understanding of the principles of Management Psychology step by step. This learning approach not only helps consolidate theoretical knowledge but also enables students to flexibly apply what they have learned in practice. During the case study process, students need to analyze the case background, problems, and solutions, which cultivates their case analysis skills. By comparing different cases, students can better understand the application of Management Psychology in various contexts, thereby enhancing their ability to solve practical problems. In the "Four-Stage Case" and "Three-Loop Guidance" teaching models, the improvement of ideological and political literacy is closely integrated with the learning of professional knowledge. While learning professional knowledge, students are constantly exposed to ideological and political education, achieving a dual improvement in knowledge and literacy, which is conducive to cultivating comprehensive talents.

4.2. Significant improvement in ideological and political literacy and its remarkable educational effects

The new teaching model has demonstrated significant effects in multiple dimensions, including knowledge mastery, critical thinking, practical application, and innovation ability. Students' interest in learning and self-learning abilities have been significantly improved, laying a foundation for lifelong learning. The advanced

design of the "Four-Stage Case" effectively promotes students' ability to transform theoretical knowledge into practical skills. The "Three-Loop Guidance" strategy plays a vital role in cultivating students' correct values and professional ethics. Through the systematic construction and implementation of the "Four-Stage Case" and "Three-Loop Guidance" teaching model, the aim is to achieve innovation in ideological and political teaching in Management Psychology courses and cultivate management talents with both moral integrity and professional ability.

5. Conclusion

The innovative reform of the Management Psychology course has been carried out through the construction and practice of the "Four-Stage Case" and "Three-Loop Guidance" models. These models have demonstrated significant advantages in enhancing students' interest in learning, classroom participation, practical abilities, value formation, and overall quality, providing an effective pathway for the reform of ideological and political teaching in courses. The organic integration of professional knowledge teaching and value cultivation can better achieve the educational goals of higher education. Research shows that multi-dimensional and multi-level teaching designs contribute to meeting the comprehensive development needs of students.

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Disclosure statement

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Curriculum Assessment Reform for Convention and Exhibition English

Fang Zou*

School of Foreign Languages, Guangdong Technology College, Zhaoqing 526100, Guangdong Province, China

***Corresponding author:** Fang Zou, zoufang@gdlgxy.edu.cn

Abstract: Convention and Exhibition English is a typical course in English for Specific Purposes (ESP). With Chinese business activities increasing, there is a growing demand for convention and exhibition-related talents, since most businesses are in connection with these events. To cultivate competent graduates, Guangdong Technology College has tried replacing traditional written test with a v ideo in the assessment of students' performance after their learning of this course to stimulate practice and self-exploring. Role play in the videos can inspire students' interest in this field and build up their confidence in English. This article will introduce the background information on the development of the course, the necessity of its reform, and how it has been implemented. This paper aims to attract attention to the creative reform of teachers and hopes to contribute to more studies on ESP teaching for the better cultivation of English talents that the growing Chinese economy requires.

Keywords: Convention and Exhibition; ESP; Guangdong Technology College

1. Introduction

On April 13, 2020, the Chinese Ministry of Commerce officially issued The Notice on Innovating ExhibitionService Models and Cultivating New Momentum for the Development of the Exhibition Industry requiring that "actively build a new platform for online exhibitions and promote the integrated development of online and offline exhibitions." Under the policy advocacy of the state, exhibition enterprises have tried to use network platforms and adopt digital technology for online product display. This new development trend puts forward new requirements for the knowledge and ability of exhibition practitioners. To better train the professionals needed for the development of the new era, it is urgent to adjust and reform the existing teaching mode of Convention and Exhibition English course [1].

With an eye on the cultivation of related talents, Convention and Exhibition English course has been introduced in some college education plans, and Guangdong Technology College is one of them. In the study

of this course, it is noticed that the traditional assessment plan needs some amendments to well reflect the real needs of the talent market since a competent conventional employee should be multi-faceted instead of only being rich in textbook knowledge. In this context, the curriculum assessment reform has been conducted.

As an English for Special Purpose course, Convention English is not only featured with its wide range of typical industry knowledge, unique terms, as well as language style but also requires abundant practice to turn knowledge into experience, so that the students are capable of undertaking convention-relevant work after their graduation, which is a necessary preparation for those ready to work after getting their Bachelor degree.

2. Convention and Exhibition English course at Guangdong Technology College

Convention and Exhibition English is a selected course for Business English major students. The instructors teach exhibition-related knowledge in English to provide learners with an understanding of the development trends and trajectories of exhibition-related professional practices abroad. The basic objective of this course is to cultivate learners' ability to read exhibition-related books in English and engage in academic exchange in the field. The ultimate goal of exhibition English teaching is to train talents who can use English for work and communication in the exhibition industry and enterprises [2]. As an application-oriented university, Guangdong Technology College highlights the practice of specialized knowledge and advocates the combination of class with industry operations.

Yan Xiaoli has pointed out that cultivating exhibition talents the market needs means:

(1) optimizing the curriculum system and providing more practical teaching

(2) combining production, university, and research to achieve a win-win situation between schools and enterprises

(3) constructing off-campus practice and training bases

(4) learning more about convention and exhibition [3].

In Yan's article, she noted that the practice teaching should take typical convention and exhibition related cases as the cutting point. Presentation, analysis, and even role-playing of those Meetings, Incentives, Conferences, and Exhibitions (MICE) projects will help students form a broad understanding of the transference from abstract and concrete, and from theoretical to practical. Under such circumstances, it is necessary to undertake the reform of this course.

"Ability-centered" is increasingly a guide for education. Students have been educated to master theories and textbook knowledge all the way, a solid foundation for their excellent performance in the future. However, the transference and application of what they have learned may not be easy for most of them, which requires sufficient practice during their growth. Based on its characteristics and social positioning, the development orientation of an application-oriented college should focus on serving the local economic construction, promoting social and cultural development, and cultivating applied talents with practical application skills and innovative spirit for various fields in society [4]. Zhaoqing,the locationof Guangdong TechnologyCollege, is a part of the Guangdong-Hong Kong-Macao Greater Bay Area. Naturally, there are a lot of opportunities for graduates to work in the MICE industries. Developing MICE talents in the college is not just driven by the vibrant industry, but also a result of the favorable position. Talents support will attribute to the growth of surrounding economy. Consequently, the booming demand for such kinds of talent contributes to the growing interest of students to take the course and also raises the universities' attention to reforming to allow the students

to quickly adapt to the MICE industry and be competent in their careers.

Application-oriented colleges should clearly define the objective of cultivating students' practical English application abilities. They should actively launch a variety of on-campus and off-campus English communication activities, emphasizing the communicative aspect of English learning and encouraging student initiative in participating in these practical activities. Practical teaching activities constitute a significant component of the teaching work in higher education, serve as an important means to cultivate students' innovative spirit and practical ability, improve their comprehensive quality, and are key links in nurturing innovative talents [4]. Guangdong Technology College has cooperation with some exhibition companies, therefore the reform can be conducted with intellectual support from those enterprises, which will make the practical teaching more operational. Meanwhile, the popularity of this course in the college makes those educators deeply think about the learning effect and the reform has been put into the agenda as a result of it.

3. Guiding theories for the curriculum reform

Under the background of nationwide curriculum reform, teachers are devoted to the exploration of education. According to what society needs and what improvements are needed, adjustment and innovation are inevitable for the current college students' cultivation. With the guidance of Outcome-Based Education (OBE), teaching goals are the instruction for various teaching activities. What kind of skills and competence will the students get after the course is a frequently asked question for educators.

Outcome-Based Education is student-centered, which means the core task of the teachers is to help the students succeed. In the process, each course should inspire students' motivation for self-learning and provide proper methods and ways to better realize the goals. At present, future successful employment is what college students care about most. The course therefore should be designed and reformed relatively. Just as Smith and Webster have pointed out, today's employers expect employees with "suitability," "capability," and "acceptability" [5]. All of these mean that there are more things than skills that matter for employment, such as communication, problem-solving, quality, and so on. In terms of the MICE industry, the complexity of relevant jobs makes course reform necessary. The assessment of the convention course is highly focused here. With the combination of teaching goals, this course is creatively assessed with new forms to drive the students to foster the capabilities and minds that their future work may require.

According to Ning Chunyan, ESP teaching should follow three rules:

(1) Based on the actual demand of the learners: The course design should consider their motivation. For students from applied universities, the drive for their English learning mostly is to get an ideal job after graduation.

(2) Student-centered: It is also in line with the Outcome-Based Education (OBE) idea. The educators should always put the learners in the first place and try to mobilize their initiatives, with which they can learn more effectively.

(3) Creating connection with real practice: Teaching content and materials coming from real cases will be more attractive and can help students get real useful experiences. In the age of big data, students tend to do autonomic learning. Driven by tasks, they will actively explore what they need to know and master it, which is more highly efficient than traditional teachers lecturing [6]. Lin Yi and Gao Xinming has suggested that ESP teaching in Convention and Exhibition should guide the students in self-

teaching and improve their English as a working language with application ability, practical ability, and professional competence for the sake of their success in the convention and exhibition industry, which is what the reformer of this course is concerned with [7]. As the students' guide in this field, the teacher should shoulder responsibility for the students' trust and create favorable conditions to support them in the way of exhibition employment.

4. LEAP teaching

With the study on Convention English teaching, Zhou Minyi has put forward the LEAP teaching mode, which includes Learning, Experience, and Action Project [1]. In this course, students will get in touch with something new. Therefore, at the very beginning, it is necessary to impart them with industry information and relevant English expressions. It can build up students' confidence for later employment if they have a thorough understanding of the industry overview and learn the activities and events in Convention and Exhibition. During this period, lecturing with real exhibitions will make teaching more attractive and make the industry seem more appealing. Experience not only concerns the teaching content but also should involve students' participation in some tasks. In this reform, video shooting is also a part of the ordinary assignment, which works as a rehearsal of the final work. The teacher will collect all paired homework and give targeted suggestions, which will benefit them in treating the assignment seriously, let alone improving the final role-play performance. As to the final assessment, it is the production after this course study. In this section, students should demonstrate they have mastery of routine in Convention and Exhibition knowledge with their words and actions, which will bring the audience the feeling of reliable professionals.

The feature of this course makes the LEAP teaching applicable. Most students may have never gotten in touch with professional knowledge of Convention and Exhibition before. Naturally, the learning-experience-action process aligns with the natural progression of students' development, providing step-by-step guidance toward success. Each part is inseparable and deserves the instructor's attention. However, the action, as a demonstration of learning outcomes, requires more strategies, which is why a new form of assessment has been proposed and implemented.

5. The construction and implementation of the reform

This assessment reform is to replace traditional written tests with videos. The traditional assessment highlights the mastery of knowledge. Therefore, words and expressions of the Convention industry are what the paper concerns. Reading, translation, and writing are the main parts the test covers. However, in Convention practice, listening and speaking are of great importance and require sufficient training for those taking this course, as they are the weakest areas for most students. Under the motivation from the school's systematic reform, the teacher advocated role-play videos as a way of assessment. Students are required to comprehensively show what they have learned from this course and fully present the look of a professional through their performance. Role-play is a useful method in situational teaching, which can create a sound language environment, boost interaction in English, and improve the creativity of English teaching, all combined to stimulate the interest in learning and improve the study effect [8].

The amended assessment will list the requirements the students should meet, including the theme, the word numbers, dress codes, props, eye contact, body language, camera language, etc., and all videos will

be accomplished within group work. A real exhibition scene imitation will be expected in the videos with professional performance and fluent English in their dialogues. The plan and its implementation are based on a common phenomenon: role-play and cooperation are increasingly adopted in the teaching process. In group work, there are five key features as follows: Positive interdependence; Small group and individual accountability; Face-to-face promotive interaction; Small group skills; Group processing [9]. Pair learning helps develop competencies required in the future work environment, such as improved communication, growing independence, and responsibility. In application-oriented universities, this new form of assessment contributes to the cultivation of market-ready talent. After the reform was implemented, most of the videos submitted showed students' achievements in the course and highlighted their creativity. It's a step forward toward their desired careers.

6. Advantages and challenges of the amendment

Just as mentioned before, the video assessment is helpful in the following aspects: Firstly, it can stimulate students' interest and passion for this course learning. Unlike traditional teaching, this reform brings students more chances to practice their oral English and realize self-teaching through role-playing. Instead of passive learning, this course highlights active learning and constructive learning. Just as Ji Qinghua pointed out, the effects of different learning modes vary with C(constructive) > A(active) > P(passive) [10]. The educators' choice of reform also well reflects the principle of the OBE idea. In video production, the knowledge students have learned is processed from books to memory, application, and transfer, becoming deeply ingrained over time.

Secondly, it can develop students' professional qualities. The video is oriented toward exhibition events where the students will act as exhibitors, buyers, or reporters. To have an impressive performance, they will learn some etiquette and role-play as a real employee, which means that they will pay attention to some business activities, such as how to communicate and bring their guests a nice experience. With such a role, they will better understand the job they may take in the future.

Thirdly, the arrangement of the new assessment form allows the students to challenge themselves. Some of them are timid to show themselves in the classroom. However nowadays, with the advance of business activities, a lot of English major students will devote themselves to foreign trade or other commercial work. In this case, it is important for them to express themselves well. The paired task allows them to learn from each other, debate, and eventually produce a satisfying video end product.

In the implementation of the new form of assessment, it is found that there are some challenges in need of solving. For example, some students are still not confident enough to freely conduct the role-play. It deserves the lecturer's attention to encourage these students and praise their progress in self-expression. Such students need more opportunities to build their confidence. According to Rajib Ahmed Faisal, extraversion character has a statistical relationship with English learners' performance [11]. In a successful classroom presentation, the presenter should be confident and poised, full of enthusiasm, have a loud and clear voice, exhibit natural deportment, and conduct appropriate interaction and eye contact with the audience [12]. To achieve active adjustment in their presentation, it is helpful to set up model pairs and analyze with other students why the work is successful. Former exercises and presentations are considered as the preparation for the final videos. Undoubtedly, all students can achieve good marks if they prepare enough for the survey and polish their work again and again. The process will witness the students' improvement to be independent problem solvers and

satisfy the talent market needs.

7. Conclusion

This article shares a case of curriculum assessment reform in Guangdong Technology College of China about replacing written tests with video shooting for the Convention and Exhibition English course. With the guidance of the OBE idea, the situational teaching method brings the students a good opportunity to active learning with the final video task as a production of their learning. The performances in their works can better consolidate the knowledge they have accessed to in this course. This paper intends to bring some inspiration for other curriculum reformers and attract more attention to ESP teaching for potential improvements. In the exploring exhibition talent cultivation, the teachers need to participate in more practical projects so that they can provide real meaningful instruction and reform which is eagerly needed for application-oriented universities.

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A Study on the Effectiveness of English Debate Competitions as a Language Learning Aid

Xiaochao Yao*

Hainan Vocational University of Science and Technology, Haikou 571126, Hainan Province, China

***Corresponding author:** Xiaochao Yao, mamalin8483@163.com

Abstract: English debate competitions have gained widespread attention as an innovative language learning tool in recent years. This study explores the impact of English debate on learners' listening, speaking, reading, and writing skills, as well as their critical thinking and teamwork abilities. Using empirical research methods such as surveys, interviews, and performance evaluations, this study finds that participation in English debates not only improves students' English proficiency but also significantly enhances their ability to think critically and collaborate effectively. By integrating recent literature, the research further examines the actual impact of English debate competitions on language learning and their application in educational contexts.

Keywords: English debate; Language learning; Critical thinking; Empirical study; Language proficiency

1. Introduction

With the rapid pace of globalization, the importance of English as a global lingua franca has been increasingly emphasized. In the field of English education, the challenge of how to effectively improve learners' language abilities has been a central concern for educators. In recent years, English debate competitions have emerged as a comprehensive language practice activity, gaining traction both in classrooms and as extracurricular programs. Debate requires participants to not only express their opinions fluently but also respond quickly, apply logical reasoning, and work collaboratively. As such, investigating the effectiveness of English debate competitions as a language learning aid carries significant theoretical and practical implications.

2. Literature review

Numerous studies have highlighted the role of English debate competitions in improving language skills. Smith and Johnson argued that debate enhances students' oral proficiency and critical thinking by providing opportunities for real-time language production [1]. Students must quickly analyze information, respond to

counterarguments, and organize coherent responses, all of which improve their ability to apply language dynamically. Li conducted a study on university students and concluded that those participating in English debates showed remarkable improvement in listening comprehension, reading, and writing skills [2]. This was attributed to the extensive language input and output during the preparation and competition phases. Brown and Green also pointed out that debate activities increase student engagement, which promotes language retention. Based on these and other recent studies, it is evident that English debates have significant potential as an auxiliary tool for language learning [3]. Zhang explored the effectiveness of English debates in improving English as a Foreign Language (EFL) learners' performance. His study concluded that students who participated in debates showed marked improvements in both their linguistic and critical thinking abilities. The findings highlight the role of debates in facilitating active language use and critical engagement in the classroom setting [4].

3. Research design

3.1. Participants

The study was conducted at a university with 120 undergraduate students majoring in English. These students were randomly divided into two groups: an experimental group (60 students) and a control group (60 students). The experimental group engaged in an English debate competition training program for one semester, while the control group followed the standard curriculum without debate activities.

3.2. Research methods

To investigate the effectiveness of English debates, the following research methods were employed:
 (1) Pre and post-test assessments: Both groups took pre-tests and post-tests that measured their abilities in speaking, listening, reading, and writing. These tests were designed using standard language proficiency exams to ensure reliability.
 (2) Questionnaire surveys: Both groups were asked to complete surveys before and after the experiment, evaluating their confidence in language skills, critical thinking abilities, and attitudes toward teamwork.
 (3) Semi-structured interviews: 15 students from the experimental group were selected for follow-up interviews to provide deeper insights into their personal experiences and perceived benefits from debate participation.
 (4) Performance comparison: The scores from both groups in speaking, writing, and listening tests were compared, along with critical thinking evaluation tests designed based on Bloom's Taxonomy.

3.3. Data analysis

Statistical Package for the Social Sciences (SPSS) statistical software was used for quantitative analysis of the data collected. An independent-sample t-test was applied to compare the differences between the pre and post-test results of both groups. Descriptive statistics and qualitative analysis were also used to interpret the survey and interview data.

4. Results and discussion

4.1. Impact on speaking ability

The most significant improvement was observed in the speaking abilities of students who participated in the

debate training. The experimental group demonstrated a substantial increase in fluency, pronunciation, and the ability to construct logical arguments, as reflected in their post-test scores.

Table 1. Speaking skills test scores (mean)

Group	Pre-test (mean)	Post-test (mean)	Improvement (%)
Experimental	70.4	86.1	22.2
Control	69.8	75.5	8.2

The *t*-test revealed a significant difference ($P < 0.01$) between the experimental and control groups' post-test results.
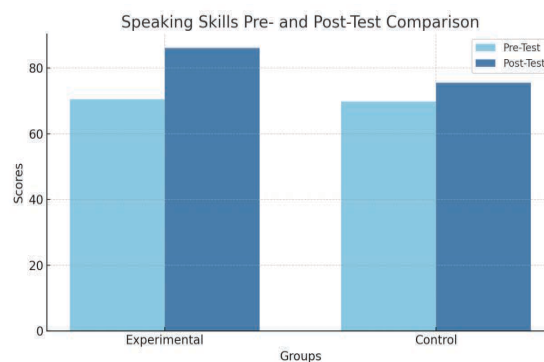
Figure 1. Speaking skills pre and post-test comparison

In addition to improved fluency, students in the experimental group reported greater confidence when speaking English. They highlighted the structured nature of the debate, which requires them to organize and articulate their thoughts quickly under pressure, as being instrumental in enhancing their public speaking and impromptu speaking skills.

4.2. Impact on critical thinking skills

The development of critical thinking was another significant outcome of the English debate competition. Students in the experimental group showed an improved ability to analyze arguments, identify logical fallacies, and construct counterarguments.

Table 2. Critical thinking assessment scores (mean)

Group	Pre-test (mean)	Post-test (mean)	Improvement (%)
Experimental	70.4	86.1	22.2
Control	69.8	75.5	8.2

The qualitative data from the interviews supported these findings, with many students mentioning that debate forced them to evaluate multiple perspectives critically and structure their arguments logically.

4.3. Impact on writing and listening skills

While speaking and critical thinking were the primary skills targeted in the debate competitions, students in the experimental group also experienced gains in writing and listening. The necessity to gather evidence, read extensively for argument preparation, and comprehend opposing arguments during debates led to a moderate improvement in these areas.

Table 3. Writing and listening skills test scores (mean)

Skill	Group	Pre-test (mean)	Post-test (mean)	Improvement (%)
Writing	Experimental	68.2	77.5	13.6
Writing	Control	67.9	70.5	3.8
Listening	Experimental	72.1	81.6	13.2
Listening	Control	71.5	74.2	3.8

The qualitative data revealed that debate participants engaged in a significant amount of reading and writing while preparing for competitions. They not only needed to write coherent arguments but also anticipate and counter opposing viewpoints, enhancing their ability to write persuasively and critically.

4.4. Students' feedback

From the interviews, students in the experimental group expressed overwhelmingly positive feedback about their participation in English debate competitions. They emphasized the value of debate in helping them think quickly, argue persuasively, and collaborate with their peers effectively.

Table 4. Students' perceptions of debate benefits (%)

Benefit	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Improved speaking skills	65	30	5	0	0
Enhanced critical thinking	60	35	5	0	0
Better teamwork skills	50	40	10	0	0

5. Conclusion and recommendations

The findings of this study indicate that English debate competitions significantly enhance language learning by improving students' speaking abilities, critical thinking skills, and to a lesser degree, their writing and listening skills. Debate provides a dynamic, interactive learning environment that encourages active participation and real-world language application, making it an effective tool for language educators.

Future research could expand to investigate the long-term effects of debate on language proficiency, as well as how debate might benefit learners with different language backgrounds. For educators, it is recommended to integrate debate activities into the curriculum, ensuring that debate topics are tailored to student's proficiency levels and interests to maximize engagement and learning outcomes.

Disclosure statement

The author declares no conflict of interest.

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Application of Intelligent Collaboration Technology in Skill Training and Job Docking of Data Tagger

Wenwen Wang*, Ning Chen

Shandong Vocational and Technical College of Labor, Jinan 250300, China

*Corresponding author: Wenwen Wang, wenwen_wang_182@163.com

Abstract: With the rapid development of artificial intelligence and machine learning technology, the role of data tagger has become more and more important, responsible for providing high-quality annotated data for training algorithms, but traditional skills training and job docking methods cannot meet the needs of the rapid development of the industry. This paper studies the application of intelligent collaboration technology in improving the skill training efficiency of data taggers and promoting its effective docking with the post. By using the literature review method, in-depth interview method, and case analysis method, this paper analyzes the current challenges faced by data taggers, including skill gaps, insufficient training resources, and rapid changes in market demand. The results show that the application of intelligent collaboration technology can not only improve the skill training efficiency of data taggers but also promote effective docking between them and their positions, bringing a positive impact to the data tagging industry.

Keywords: Intelligent cooperation technology; Data tagger; Skill development; Post-docking

1. Job demand analysis for data taggers

In today's digital era, data has become a crucial element driving the development of artificial intelligence and machine learning. Data taggers, as an indispensable role in this process, are responsible for providing labeled data that machines can learn from. With technological advancements, Intelligent Collaboration Technologies (ICT) have begun to transform traditional data labeling processes, enhancing the quality and efficiency of data annotation through automated tools and algorithms [1]. Nevertheless, the skill development and job alignment of data taggers still face challenges, particularly amidst the rapidly evolving technologies and market demands [2]. This study aims to explore how ICT can be applied to the skill development and job alignment of data taggers, thereby improving their work efficiency and ensuring their effective adaptation to the ever-changing job requirements [3].

2. Enhancing skill cultivation efficiency of data taggers through intelligent collaboration technologies

2.1. Analysis of technical tools and platforms

2.1.1. Automated and assisted annotation

Automation and assisted annotation have significantly improved the efficiency and accuracy of data labeling through the integration of advanced technologies such as reinforcement learning, self-supervised learning, transfer learning, semi-supervised learning, and joint models. Semi-supervised learning methods like MixMatch, UDA, and FixMatch have reduced the workload of fully manual annotation while ensuring labeling quality [4]. Furthermore, the innovative application of joint models has not only improved the accuracy of single-modal annotation but also effectively tackled complex multi-modal annotation tasks, further expanding the application scope of automated annotation. The comprehensive application of these technologies has brought revolutionary improvements to the field of data labeling, enabling data taggers to complete annotation tasks more efficiently and accurately, thereby meeting the urgent demand for high-quality labeled data in modern Artificial Intelligence (AI) development [5].

2.1.2. Real-time quality monitoring

Real-time quality monitoring systems play a pivotal role in intelligent collaboration technologies, significantly enhancing the efficiency and accuracy of data labeling. A continuous mindset of quality improvement fosters a positive cycle that continually elevates work standards and quality. Real-time monitoring also strengthens decision support, providing management with insights into team efficiency and problematic areas, thereby optimizing processes and resource allocation. In terms of teamwork, the sharing mechanism encourages members to jointly analyze errors, learn from best practices, and improve overall work efficiency and quality. Additionally, real-time monitoring serves as an incentive mechanism, maintaining taggers' work motivation and professional interest while reducing the risk costs associated with low-quality annotations.

2.1.3. Reinforcement learning tool

Reinforcement learning tools offer immersive experiences that simulate real-world work environments, enabling data taggers to rapidly master complex annotation skills through a practice-oriented approach. In this interactive and real-time feedback learning environment, taggers can instantly correct errors and engage in personalized learning through customized learning paths. This technological application not only accelerates the skill enhancement process but also enhances learning motivation and engagement through remote collaboration and gamification elements, significantly improving the efficiency of data tagger skill cultivation without incurring additional costs.

2.1.4. Personalized training plan

Personalized training programs leverage advanced artificial intelligence technologies to accurately assess the skill levels of data taggers, thereby designing customized learning paths for them. These learning paths take into account each individual's abilities, progress, and learning styles, providing targeted learning materials and real-time feedback mechanisms. This allows the learning process to dynamically adjust based on individual performance, avoiding the waste of time in areas of proficiency while ensuring focused support where assistance is needed. Furthermore, this personalized approach encourages self-directed learning, optimizes the allocation of educational resources, reduces training costs, enhances teamwork and communication, and continuously

improves the quality and effectiveness of training through ongoing tracking, evaluation, and feedback loops.

2.2. The change of training mode

2.2.1. How can intelligent collaboration technology change the training model and learning path of data taggers

Intelligent collaboration technology is completely changing the training mode of data taggers. By analyzing the learning history, abilities, and preferences of students, personalized learning paths are customized for each student to ensure that the learning methods meet individual needs to the greatest extent possible. This technology also provides real-time feedback and coaching, which can correct errors in real-time and guide students to deepen their learning. Additionally, through gamified learning and community interaction, intelligent collaboration technology enhances the fun and participation of learning and promotes knowledge sharing and collaborative learning. Finally, the automated evaluation and certification mechanism simplifies the evaluation process of learning outcomes, reduces costs, and accelerates the skill certification of learners, thereby promoting the efficiency and quality of talent cultivation in the data annotation industry.

Intelligent collaboration technology has played a key role in optimizing the learning path of data taggers. It not only guides beginners to gradually master advanced skills from basic knowledge and grow into experts in the field of data annotation but also helps students learn cross-disciplinary skills such as data privacy protection and data management by analyzing industry trends and job requirements, enhancing their market competitiveness [6,7]. Moreover, with the development of the industry, these technologies provide continuous resource updates and skill upgrades, supporting students' lifelong learning and career development, and ensuring that they can continuously adapt to the ever-changing data annotation industry.

3. Intelligent collaboration promotes the effective docking of data taggers and post

3.1. Job matching mechanism and career development support

3.1.1. Data analysis and matching

Intelligent collaboration technologies significantly enhance the effective alignment between data taggers and job positions through data analysis and matching, real-time feedback and adjustment, predictive talent management, enhanced communication and collaboration, automated process management, and continuous learning and development support. Firstly, by deeply analyzing individual skills and experience and matching them with corporate job requirements, it ensures optimal talent allocation. Simultaneously, the intelligent collaboration system provides real-time work feedback and performance evaluation, enabling data taggers to promptly adjust their work strategies and enhance productivity [8]. Furthermore, through predictive talent management, the system anticipates future talent demands, assisting data taggers in preparing and adapting to new work challenges ahead of time. Coupled with powerful communication and collaboration tools, along with personalized training plans, intelligent collaboration not only optimizes current workflows but also supports the continuous professional development of data taggers, thereby ensuring that enterprises maintain an efficient and highly skilled data labeling team over time.

3.1.2. Skills gap identification and training suggestions

Intelligent collaboration technologies demonstrate remarkable efficiency in skill assessment and demand comparison. Constructing a detailed skill map, not only provides enterprises with a comprehensive platform

to understand employees' skill status but also offers valuable insights for individual employees' career development. The real-time update and dynamic evaluation functions ensure that enterprises can promptly grasp employees' latest capabilities and adjust talent strategies and work assignments accordingly. Additionally, the industry benchmark comparison feature helps enterprises clarify their positioning and competitive advantages within the industry, enabling them to develop more targeted talent development strategies [9].

In terms of customized training recommendations, intelligent systems design personalized learning paths based on each employee's specific skill gaps and career development goals, integrating diverse learning resources and prioritizing them to help employees plan their study time effectively. The progress monitoring and effect evaluation functions are established through intelligent learning monitoring systems and feedback loops, providing strong support for continuously optimizing learning paths and recommendation algorithms [10].

Ultimately, intelligent collaboration technologies not only focus on employees' short-term skill enhancements but also strive to cultivate their autonomous learning habits and team collaboration abilities. By integrating corporate culture and values into learning content, these technologies align strategic objectives with talent strategies, providing solid support for enterprises' long-term development and the cultivation of high-potential talents.

3.1.3. Virtual practice and simulation

Intelligent collaboration systems integrate Virtual Reality (VR) and Augmented Reality (AR) technologies to provide data taggers with a highly simulated work environment for effective job alignment [11]. These systems mimic real-world work scenarios, offering interactive operational experiences and setting up specific scenario-based simulation training, such as emergency data processing and high-pressure decision-making, to enhance data taggers' work capabilities and mental resilience. During virtual internships, the system provides real-time feedback and guidance based on users' performance, dynamically adjusting learning paths to ensure that each user learns at their own pace and level.

Furthermore, the system supports cross-regional collaboration skill development, systematic enhancement of professional abilities, as well as psychological adaptation and emotion management. Through continuous education and updates, the system regularly refreshes simulation training content, ensuring that data taggers stay up-to-date with the latest industry knowledge and technologies [12]. Innovative thinking training, case studies, and analyses, along with problem-solving in teamwork, further cultivate data taggers' innovative thinking and problem-solving abilities.

3.1.4. Personalized career planning

Intelligent collaboration technology effectively promotes the efficient alignment of data taggers with job positions through personalized career planning services. This service not only takes into account individuals' professional interests and long-term career goals but also integrates market trends, offering customized career development paths for data taggers. In terms of personalized assessment, intelligent collaboration technology is capable of evaluating data taggers' professional interests, ensuring that they are matched with personally appealing work content.

Concurrently, by analyzing the development trends in the AI industry, intelligent collaboration technology can guide data taggers toward rapidly growing areas of demand, such as autonomous driving, smart security, and others [13]. This approach not only enhances their job satisfaction but also positions them at the forefront of

emerging technologies, maximizing their potential for professional growth and success.

3.1.5. Online interview and assessment

Intelligent collaboration technology significantly enhances corporate recruitment efficiency through online interviews and automated assessment tools. It enables the simultaneous conduct of online interviews for hundreds of thousands of candidates, thereby shortening the recruitment cycle, improving attendance rates, reducing human resource costs, and eliminating repetitive tasks and communications. This technology also conducts multi-dimensional evaluations of candidates based on an enterprise's personalized recruitment requirements, achieving a scientific and accurate quantitative assessment with an accuracy rate of up to 95% [14,15].

Furthermore, by showcasing corporate culture and work environments through videos, intelligent collaboration technology boosts candidates' enthusiasm and enhances their overall experience. Candidates receive immediate feedback after undergoing automated assessments, allowing them to understand their performance and identify areas for improvement.

In the context of the digital economy, intelligent collaboration technology provides a wealth of talent data information, enabling enterprises to accumulate a video-based talent pool and offer digital assessment reports for a better understanding and management of human resources. Whether for campus recruitment, social recruitment, or large-scale hiring for entry-level positions, intelligent collaboration technology enhances the efficiency and precision of interviews, giving companies a competitive edge in the fierce talent market.

4. Challenges encountered in the implementation of intelligent collaboration technologies

When implementing intelligent collaboration technology, enterprises face multifaceted challenges. On the technical side, ensuring data integrity and quality, developing accurate and reliable algorithms, and maintaining model scalability are fundamental. Additionally, social and ethical issues such as privacy protection, employment impacts, and ethical norms cannot be overlooked.

In terms of human-computer interaction, optimizing user experience and fostering human-machine collaboration is crucial. Within organizations, change management and cross-departmental collaboration are key factors, while technology adaptation and integration pose challenges to existing systems. Economically, cost-benefit analysis and the need for long-term investments test corporate financial decision-making. Compliance with legal regulations is also a mandatory standard for enterprises to adhere to.

Lastly, the technology and talent gap is one of the challenges that businesses need to proactively address. Bridging this gap requires investments in training and upskilling current workforces, as well as attracting and retaining skilled professionals who can effectively leverage intelligent collaboration technologies.

To overcome these challenges, enterprises must adopt a holistic approach, involving stakeholders across all levels and functions. This includes developing robust data governance policies, enhancing technical capabilities through R&D investments, fostering a culture of continuous learning and adaptation, and ensuring ethical and legal compliance throughout the implementation process. By doing so, enterprises can harness the full potential of intelligent collaboration technology while mitigating associated risks and challenges.

5. Future research direction

The research into explainable AI and model transparency aims to enhance user trust in intelligent systems by providing clarity and understanding of how these systems make decisions. Meanwhile, the establishment of ethical AI principles and moral decision-making frameworks ensures that technology is applied in a morally responsible manner. These efforts are crucial for fostering public trust and confidence in AI-driven solutions.

Parallel to this, research on education and skills retraining is focused on bridging the digital divide, assessing the impact of AI on employment, and preparing workers for technological shifts. This includes initiatives to upskill and reskill the workforce, ensuring that individuals have the necessary competencies to thrive in an AI-augmented world.

Furthermore, new approaches to data security and privacy protection are being explored to safeguard individual privacy and uphold data governance standards. These advancements are essential for fostering a secure and trustworthy environment for AI applications.

In terms of emerging technologies, research spans enhanced reality (AR/VR), Internet of Things (IoT) integration, machine learning optimization, advancements in Natural Language Processing (NLP), and blockchain technology applications. AR/VR collaboration platforms and virtual environments are poised to revolutionize remote work experiences, while IoT and edge computing integrations will drive more intelligent data processing. Adaptive learning systems and deep learning optimizations will enhance the adaptability of AI systems, while NLP's advancements in semantic understanding will improve human-machine interactions.

Blockchain technology, with its ability to strengthen data security and collaboration protocols, will be leveraged to enhance automation through smart contracts. These technological advancements will collectively propel the development of intelligent collaboration technologies, making them more efficient, equitable, and sustainable.

Overall, this research agenda underscores the importance of addressing both the technical and societal aspects of AI to ensure its beneficial and responsible integration into our lives and work.

6. Conclusion

Intelligent collaborative technology has played a significant role in enhancing the efficiency of skill development for data annotators and facilitating their effective alignment with job positions. With continuous advancements in technology and the expansion of application scenarios, intelligent collaborative technology is expected to bring even more positive impacts to the data annotation industry, driving the sustained development of artificial intelligence and machine learning technologies.

Disclosure statement

The authors declare no conflict of interest.

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The Development Potential and Challenges of One-Click Generative Artificial Intelligence in Cross-Border E-Commerce

Shanshan He*, Rongjun Wang

Urumqi Vocational University, Urumqi 830002, China

*Corresponding author: Shanshan He, m18980131130@163.com

Abstract: This paper explores the development potential and challenges of one-click generative artificial intelligence (AI) in cross-border e-commerce. With the rapid growth of the Internet, cross-border e-commerce has seen significant market expansion, and the integration of AI technology presents new opportunities for the industry. This study analyzes the potential of one-click generative AI in cross-border e-commerce and its challenges. Reviewing relevant academic literature, the paper outlines key application scenarios of one-click generative AI, such as automatic product description generation and intelligent customer service assistants. Additionally, the study highlights the challenges associated with the technology, including issues related to semantic understanding and technological immaturity. The findings indicate that while one-click generative AI holds great potential for cross-border e-commerce, both technical and legal challenges must be addressed for its successful implementation.

Keywords: Cross-border e-commerce; Artificial intelligence; One-click generation; Potential; Challenge

1. Introduction

In recent years, with the rapid development of the Internet, the cross-border e-commerce industry is facing broad market opportunities and challenges. As an emerging technical means, artificial intelligence has brought unprecedented development possibilities to the field of cross-border e-commerce. In this context, this paper aims to explore the potential and challenges of one-click generative artificial intelligence (AI) in the cross-border e-commerce profession. By discussing the basic concept of one-click generative AI as well as the status quo and development trend of the cross-border e-commerce industry, this paper aims to provide valuable references for the development of the cross-border e-commerce industry and the application of artificial intelligence technology in this field.

2. Basic concept of one-click generative artificial intelligence

2.1. Definition of one-click generative artificial intelligence

One-click generative artificial intelligence refers to an artificial intelligence system that automatically generates text, images, audio, and other content through the learning and analysis of large-scale data by using technologies such as machine learning and natural language processing [1]. This kind of system can automatically produce the output content conforming to the grammar and semantic rules according to the given input information, with high accuracy and efficiency. The core technologies of artificial intelligence include language models, generative models, and reinforcement learning. A language model is a probability distribution model used to predict the next word or character, and by learning linguistic rules in historical data, it can generate text that conforms to grammatical and semantic rules. A generative model is a model used to generate samples that meet a given condition and can generate the corresponding content based on input information. Reinforcement learning is a machine learning method that learns optimal policies by interacting with the environment and can be used to optimize the performance of the generated model [2].

2.2. One-click generative AI operation mechanism

As a new technology, one-click generative artificial intelligence is developing rapidly and showing great potential in various fields. The operation mechanism of one-click generative AI is primarily based on deep learning and generative models that learn large amounts of data to capture its inherent patterns and structures and can generate new, similar data based on these patterns and structures. The following are the main steps of how one-click generative AI works.

2.2.1. Data collection and preprocessing

Collect a large amount of data related to the task, such as text, images, audio, etc. Preprocess the data, such as text cleaning, image normalization, etc., to ensure data quality and convert it into a format acceptable to the model.

2.2.2. Model selection and training

Select a suitable generative model, such as a Generative Adversarial Network (GAN), Variational Autoencoder (VAE), Transformer, etc. The model is trained using the pre-processed data. During training, the model learns the inherent patterns and structure of the data and tries to minimize the error between the predicted value and the actual value [3].

2.2.3. Generation process

After the model training is completed, the generation process can be triggered by inputting some seed data (such as random noise, initial text fragments, etc.). The model generates entirely new, similar data based on the data patterns and structures learned during training, as well as the input seed data.

2.2.4. Evaluation and optimization

The generated data is evaluated to measure its quality, diversity, and the degree to which it meets specific needs. Evaluation methods can include manual evaluation, automated evaluation indicators, etc. According to the evaluation results, the model is optimized, including adjusting the model parameters, changing the model structure, adding training data, etc., to improve the quality and efficiency of the generated data.

2.2.5. One-click generation

In practical applications, one-click generative AI systems usually integrate the above steps into an easy-to-use interface, and users can trigger the generation process with a simple action (such as clicking a button) and get the required generated data.

It should be noted that the performance and effect of a one-click generative AI system depends on several factors, including the choice of model and the quality of training, the quality and quantity of data, and the control and optimization of the generation process. Therefore, when designing and developing a one-click generative AI system, these factors need to be taken into account comprehensively to ensure the reliability and effectiveness of the system [4].

2.3. Application fields of one-click generative AI

One-click generative AI has shown wide application potential in many fields. The following are a few main application areas:

(1) text generation;

(2) artistic creation;

(3) audio generation;

(4) video generation;

(5) game development;

(6) code generation;

(7) education.

The application field of one-click generative artificial intelligence is still expanding and deepening. With the continuous progress and innovation of technology, more application scenarios will be explored and realized in the future.

3. The status quo and development trend of cross-border e-commerce

3.1. Definition and mode of cross-border e-commerce

Cross-border e-commerce refers to a new e-commerce application model in which trading entities belonging to different customs realize various activities of commodity trading through e-commerce platforms and realize the flow of goods from sellers to buyers and other related activities through cross-border logistics [5]. It is a commercial behavior that realizes the flow of goods, services, and capital between national borders.

It is an international trade activity based on e-commerce and carried out using information technology. With the acceleration of globalization and the continuous development of Internet technology, cross-border e-commerce has become an important part of international trade [6]. The modes of cross-border e-commerce mainly include the following:

(1) B2B mode (Business-to-Business);

(2) B2C model (Business-to-Consumer);

(3) B2B2C model;

(4) independent station mode;

(5) cross-border e-commerce market distribution center mode

(6) overseas warehouse mode [6].

These modes have their own characteristics and meet the needs of different participants.

3.2. Development status and future development trend of the cross-border e-commerce market

The development status and future development trend of the cross-border e-commerce market can be summarized from the following aspects.

3.2.1. Development status

(1) Market scale continues to expand: As a new e-commerce application model, the market scale of cross-border e-commerce has continued to expand in recent years. According to the statistics of China Customs, the import and export scale of cross-border e-commerce in China will reach 2.1 trillion yuan in 2022, an increase of 7.1% over 2021. By 2023, China's cross-border e-commerce imports and exports will reach 2.38 trillion yuan, an increase of 15.6%. Among them, exports reached 1.83 trillion yuan, an increase of 19.6%, with a considerable growth rate. This shows that cross-border e-commerce is playing an increasingly important role in China's and the world's trade.

(2) Changing consumer behavior: The increasing acceptance of online shopping by global consumers is driving the growth of the cross-border e-commerce market [7]. Consumers are increasingly paying attention to quality, brand, and service, and the demand for cross-border e-commerce is also increasing [8].

(3) Increase in the number of comprehensive pilot zones for cross-border e-commerce: To promote the development of cross-border e-commerce, the Chinese government has set up comprehensive pilot zones for cross-border e-commerce in several cities and regions (referred to as "comprehensive pilot zones"). By November 2022, the number of comprehensive pilot zones for cross-border e-commerce in China has reached 165, covering 31 provinces. These comprehensive pilot zones have played an important leading and demonstration role in the development of cross-border e-commerce [9].

(4) Changes in consumer behavior: As consumers' requirements for product quality and services continue to improve, their purchasing behavior is also changing. More and more consumers tend to make purchases through cross-border e-commerce platforms, as these platforms can offer more choices of goods and better prices. Additionally, consumers are also paying more attention to the comparison and selection of brands, quality, prices, and services.

(5) Strengthening of policy support and supervision: Governments around the world have introduced policies to support the development of cross-border e-commerce, such as setting up comprehensive pilot zones for cross-border e-commerce and providing tax incentives. Simultaneously, the supervision of cross-border e-commerce is also being strengthened to ensure fair competition in the market and the rights and interests of consumers.

(6) Technological progress to promote development: The rapid development of Internet technology, especially the application of mobile payment, big data analysis, cloud computing, and other technologies, has reduced the operating costs of cross-border e-commerce and improved transaction efficiency. The application of technologies such as artificial intelligence and machine learning has also played an important role in enhancing user experience and personalized services.

3.2.2. Future development trends

(1) Market competition intensifies: With the continuous expansion of the cross-border e-commerce market, more and more enterprises enter this field, and the market competition will become more and more

fierce [10]. Enterprises need to establish differentiated competitive advantages and expand the market globally through brand acquisition, global cooperation, and other means.

(2) Service localization needs become the key: With the diversification and personalization of consumer needs, cross-border e-commerce platforms, brands, and sellers need to pay more attention to localization and refined operations to meet the needs of consumers in different countries and regions [11,12].

(3) Compliance operation has become the primary issue: With the rapid development of the cross-border e-commerce market, the differences in laws and regulations in various countries have brought challenges to the operation of enterprises. Enterprises need to strictly abide by the laws and regulations of various countries, strengthen compliance operations, and avoid legal disputes and losses caused by illegal operations [13].

(4) The full trusteeship model will gradually become popular: With the promotion and practice of mainstream platforms, the full trusteeship model will appear in more emerging platforms. This model will provide enterprises with a more convenient and efficient operation mode, and reduce the operating costs and time costs of enterprises [14].

(5) Short video dividends help brands expand globally: With the rise of short video platforms, many new brands may emerge in the global market. Enterprises should seize this opportunity to leverage new media formats, such as short videos, for brand promotion and marketing.

(6) Omni-channel marketing becomes an inevitable choice: As online and offline channels continue to integrate, omni-channel marketing will become essential for enterprises expanding globally. Businesses must combine both online and offline resources to promote their brands and drive sales across multiple platforms.

In short, the cross-border e-commerce market will continue to maintain rapid growth in the future, but it also faces challenges such as fierce market competition and compliance management. Enterprises need to constantly innovate and optimize their operation methods and establish differentiated competitive advantages to cope with market changes and challenges.

4. The potential and challenges of one-click generative AI in cross-border e-commerce

In the context of the rapid development of the current cross-border e-commerce industry, the application of one-click generative artificial intelligence technology is gradually showing great potential, and its application is also an irreversible trend in the market now, but its application in the field of cross-border e-commerce marketing is also facing some challenges. Some of the application potentials are as follows:

(1) improve operational efficiency;

(2) personalized recommendation;

(3) intelligent customer service;

(4) data analysis and prediction.

Following that, some future challenges are as listed:

(1) data quality issues;

(2) cultural differences and language barriers;

(3) technological update and iteration;

(4) laws and regulations and compliance issues;

(5) user acceptance and privacy issues.

In response to the above challenges, this paper puts forward the following solutions. Firstly, strengthen the protection of copyright and intellectual property rights. By establishing a sound copyright protection mechanism and laws and regulations, the legitimate rights and interests of cross-border e-commerce enterprises and AI technology providers are guaranteed. Secondly, improve the accuracy of AI technology [15]. Through continuous optimization of algorithms and models, AI's ability to understand and generate human language is improved, and misunderstandings and ambiguities are reduced. Finally, strengthen the security of AI technology. By strengthening security protection and vulnerability repair work, the security and stability of AI technology will be improved to prevent hacker attacks and damage.

5. Conclusion

To sum up, to give full play to its advantages and overcome challenges, cross-border e-commerce enterprises need to actively explore and practice, constantly optimize algorithms and models, and improve data quality and technical level. Concurrently, it is also necessary to strengthen cooperation and exchanges with other countries and regions to jointly promote the development of cross-border e-commerce. We should pay close attention to the development trend and application status of AI technology, actively guide students to master relevant knowledge and skills, and cultivate more outstanding talents for the development of the cross-border e-commerce industry. Simultaneously, we should also strengthen the supervision and management of AI technology to ensure its healthy development and bring more value to society.

Disclosure statement

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The Practice Model and Effectiveness Evaluation of Digital Transformation in Folk Art Education in Guangzhou Universities

Ruiji Shengchuan*

School of Music and Dance, Guangzhou University, Guangzhou 510006, China

***Corresponding author:** Ruiji Shengchuan, S33c99rj-4@gzhu.edu.cn

Abstract: This article briefly expounds on the connotation of digital transformation in folk art education in universities, as well as the application value of Guangzhou folk art in ideological and political education in universities. Subsequently, it elaborates on the practical models and effectiveness evaluation strategies of digital transformation in folk art education in Guangzhou universities, aiming to enrich research outcomes in this field and enhance the quality of folk art education.

Keywords: Folk art education; Digital transformation; University education

1. The connotation of digital transformation in folk art education in universities

With the rapid development of information technology, the internet, artificial intelligence, and big data, digital technology has gradually penetrated various industries, including the field of education. Digital technology has become a new tool and platform for the development and dissemination of educational resources, driving the transformation of educational models from traditional face-to-face teaching to diversified and flexible directions [1]. As time progresses, China's rich folk art culture is gradually facing the risk of being lost. Universities have an important position in cultural inheritance and bear the responsibility of promoting and protecting cultural heritage [2]. Additionally, modern education needs continuous innovation to respond to students' diversified learning needs, and digital means can provide a richer learning experience, helping students intuitively understand historical and cultural backgrounds as well as folk art and crafts [3].

The digital transformation of folk art education in universities has profound implications. Firstly, it enhances education quality. Teachers can apply multimedia technology and interactive teaching methods to make folk art education more vivid and interesting, thereby increasing students' interest in learning and

enhancing their participation. Smart evaluation and personalized learning recommendation systems can provide real-time feedback to teachers and students, helping students optimize their learning paths and improve learning outcomes. Secondly, it protects and inherits folk art. Digital means can preserve and record folk art as videos, audio, pictures, and three-dimensional models, achieving permanent preservation of cultural heritage. Through the internet and digital platforms, folk art can be widely disseminated and promoted, allowing more people to understand and appreciate it.

Thirdly, it facilitates resource sharing and collaboration. Digital transformation can promote the sharing of teaching resources, enabling different universities to exchange and share high-quality educational resources. It can also drive interdisciplinary and cross-field cooperation, integrate knowledge and technology from different fields, and promote innovative development in folk art education. Lastly, it improves students' comprehensive literacy. Folk art education based on digital transformation can comprehensively enhance students' thinking levels and strengthen information literacy, enabling them to better adapt to the development needs of modern society. Interdisciplinary learning and project practice can also improve students' comprehensive literacy, strengthen their innovative abilities, and help them acquire knowledge and skills in multiple areas [4].

2. The application value of Guangzhou folk art in ideological and political education in universities

2.1. Enhancing cultural identity and forming a sense of historical responsibility

Guangzhou folk arts, such as Guangdong Han Opera and Guangfu Boat Lights, carry rich historical and cultural accumulations and regional characteristics. Integrating such folk arts into ideological and political education in universities can help students gain a deeper understanding of the origins and development of regional culture, enhance their sense of national cultural identity, and foster a sense of pride in national culture. Folk arts, while witnessing the historical changes of Guangzhou, are also an important component of Chinese culture. Conducting folk art education in universities can make students aware of the responsibility and mission to protect and inherit folk arts, contributing to the cultivation of students' sense of historical responsibility [5].

2.2. Improving the attractiveness of ideological and political education

Traditional ideological and political education often focuses on theoretical teaching, which can be dull and difficult to captivate students' interest [6]. Folk art, with its vivid and interesting forms of expression, can effectively enhance the enjoyability of ideological and political education [7]. For example, integrating Guangdong Han Opera into ideological and political teaching can provide students with a novel perspective to understand historical events and figures. Participating in the appreciation and production of Guangfu Boat Lights can also gradually enhance students' patriotism and foster a spirit of craftsmanship. Thus, ideological and political education activities based on folk art can not only enrich teaching methods but also make the content of ideological and political education more specific, vivid, and accessible, thereby improving its attractiveness and ultimately enhancing its effectiveness.

2.3. Promoting students' comprehensive quality

The diversity and complexity of Guangzhou folk art provide a multi-dimensional educational platform for ideological and political education in universities. Based on multidisciplinary crossover and integrated application, students can not only acquire cultural knowledge but also gradually improve their aesthetic abilities

and hands-on skills, and develop an innovative spirit during the learning process. For instance, organizing students to design and create Guang embroidery works requires them to understand traditional craftsmanship techniques and innovate by incorporating contemporary features. The entire teaching process not only helps cultivate students' practical abilities but also allows them to appreciate the value and significance of cultural inheritance through specific creative processes.

2.4. Inheriting and promoting Chinese traditional culture

As an important heritage of Chinese traditional culture, Guangzhou's folk art serves not only as an educational tool in ideological and political education but also as a significant carrier for disseminating and promoting Chinese excellent traditional culture. By participating in various folk art activities and ideological and political courses that integrate folk art, students can better understand and appreciate the profoundness of Chinese culture [8]. Universities can organize folk art exhibitions, lectures, and practical courses to enable students to interact with traditional folk art, which helps enhance their awareness of inheriting Chinese culture and consciously promotes Chinese excellent culture in their daily lives and studies.

2.5. Building a harmonious campus cultural atmosphere

Guangzhou folk art can provide valuable resources for universities to build a campus culture with regional characteristics and cultural connotations. Universities can hold folk art festivals and cultural salons to create a platform for multicultural exchange, stimulate students' cultural enthusiasm, enhance their sense of participation, and foster a harmonious, open, and inclusive campus cultural atmosphere [9]. This promotes interaction between teachers and students and cultivates students' teamwork spirit and social responsibility awareness. In a campus environment filled with a cultural atmosphere, students can more deeply understand and identify with socialist core values, and subconsciously internalize them into their own behavioral norms [10].

3. Feasible practice models for the digital transformation of folk art education in Guangzhou universities

3.1. Designing teaching objectives based on the connotation of folk art education

Teaching objectives that combine theory and practice: Based on the rich folk art resources in Guangzhou, teaching objectives should cover the dual cultivation of theoretical knowledge and practical skills. The theoretical part should include in-depth study of the historical background, cultural value, and craft characteristics of Guangzhou folk art. The practical part should involve specific folk art skill training to help students fully understand the connotation and extension of folk art and increase their interest in traditional culture.

Multi-level and staged teaching objectives: Teaching objectives should be designed in stages according to students' different levels and learning progress. The initial stage focuses on basic knowledge and skill learning, the intermediate stage involves in-depth research and creation combined with specific projects, and the advanced stage encourages students to engage in innovative practices.

Teaching objectives for comprehensive quality cultivation: Folk art education should not only impart professional skills but also focus on cultivating students' comprehensive qualities. Through folk art learning, students should achieve improvements in aesthetic ability, innovative spirit, and teamwork skills. Incorporating students' cultural confidence and social responsibility into teaching objectives enables them to actively

participate in social and cultural construction while inheriting culture.

3.2. Constructing specific teaching plans incorporating Guangzhou folk art

Designing digital courses based on Guangzhou's unique folk art resources: Courses should include multimedia courseware, online videos, and virtual reality experiences to vividly and intuitively showcase Guangzhou folk art. University teachers can create teaching videos on folk arts such as Guangdong Han Opera and Guangfu Boat Lights, along with detailed explanations and demonstrations, to enable students to learn and master folk art more intuitively.

Introducing a project-driven practical teaching model into the teaching plan: This involves guiding students' practical exercises through project tasks, such as participating in the Guangdong Han Opera arrangement and attempting to make Guangfu Boat Lights. This approach enables students to master skills and enhance their comprehensive abilities through practical operations. Project tasks should be combined with actual social needs, such as assigning tasks like "designing cultural products for Guangzhou tourist attractions" or "participating in community cultural activities" to enhance students' social practice abilities and help them develop a service mindset.

Building a digital resource-sharing platform: This platform allows for the sharing of course resources, teaching videos, and practical project cases, as well as online interactive communication with students. Universities can establish on-campus digital museums for folk art, utilizing high-precision images and videos to display local Guangzhou folk art for students to observe and learn online. The platform can also provide functions such as online discussion forums, expert lectures, and work exhibitions, offering students a comprehensive learning and communication environment.

3.3. Promoting the integration of folk art education into ideological and political education

Introducing folk art content into ideological and political courses: This enables students to experience the charm of traditional culture while learning political theories. For example, when teaching about Chinese excellent traditional culture, presenting and explaining Cantonese culture and Guangzhou folk art can provide students with a deeper understanding of the profoundness of Chinese culture. Folk art courses should also integrate the content of ideological and political education, teaching patriotic feelings and national spirit in folk art to enhance students' cultural identity and confidence.

Promoting the integration of folk art education into ideological and political education through interdisciplinary cooperation: This involves designing comprehensive courses that combine knowledge from multiple disciplines such as history, cultural studies, and political science. For instance, courses like "Cantonese Opera and Social Change" or "Guang Embroidery Art and Cultural Inheritance" can be offered to provide students with a comprehensive understanding of the cultural value and social significance of folk art through multi-angle and multi-level learning.

Facilitating the integration of folk art education and ideological and political education through school-enterprise cooperation and joint projects: Universities can collaborate with cultural enterprises and intangible cultural heritage inheritors in Guangzhou to jointly develop and promote folk art courses and projects. This approach not only helps students learn and master folk art skills but also provides them with ideological and political education, enhancing their sense of social responsibility and mission.

4. Paths for effectiveness evaluation of the digital transformation of folk art education in Guangzhou universities

4.1. Combining process and summative evaluation

In terms of process evaluation, firstly, a continuous feedback mechanism should be established. Digital platforms, such as online learning management systems, can be utilized to regularly collect students' learning data, including online course viewing records, completion of after-class exercises, interactive discussions, and online test scores. This allows a timely understanding of student's learning progress and mastery of the course content, enabling timely adjustments and guidance.

Secondly, various learning tasks and projects should be set up in stages, with periodic evaluations conducted at key points. For example, in a Guang embroidery course, three stages can be established: basic stitching practice, small-work production, and large-scale creation. At the end of each stage, students can submit their work online, participate in evaluations, and write learning logs to assess their learning achievements. This helps students clarify their own learning effectiveness and encourages them to continuously summarize, reflect, and improve their self-learning abilities.

Thirdly, a self-evaluation and peer review mechanism should be introduced, allowing students to reflect on and evaluate their own learning processes and outcomes through digital platforms. Simultaneously, online discussion forums and evaluation systems enable students to provide feedback and suggestions on peers' works, fostering interactive feedback, promoting student collaboration and exchange, and enhancing students' aesthetic cognition.

The summative evaluation mainly focuses on comprehensive assessments conducted at the end of the course to fully evaluate students' learning effectiveness. This includes theoretical knowledge tests, practical skill assessments, and comprehensive project evaluations. For instance, online exams can test students' mastery of the historical background, cultural value, and basic skills of folk art. Submitting works and live demonstrations can assess students' practical abilities. Project presentations and defenses evaluate students' comprehensive application abilities and innovation levels. After completion, teachers need to summarize and reflect on the teaching process and students' learning situation, writing a teaching report. The teaching report should include an evaluation of teaching goal achievement, an analysis of the effectiveness of teaching methods and tools, and a comprehensive assessment of students' learning outcomes, providing a scientific basis for subsequent course improvement and optimization.

4.2. Focusing on evaluating students' ideology

Firstly, an evaluation index system for ideology should be constructed. This assesses whether students have enhanced their value identification with Guangzhou folk art and Chinese traditional culture during the learning process. Through questionnaires, interviews, and learning logs, students' cultural identity and value changes in the course can be understood, such as whether they have become more respectful and appreciative of traditional culture and whether they practice and promote these cultures in their daily lives. It also evaluates whether students have strengthened their sense of social and historical responsibility during the learning process. In course projects, whether students demonstrate a willingness to actively participate in community cultural inheritance activities, utilize their learned knowledge and skills to serve society, and recognize the importance of protecting and inheriting intangible cultural heritage is assessed.

Secondly, ideological and political education should be integrated into the evaluation. A joint evaluation

mechanism should be introduced in ideological and political courses and folk art courses, conducting cross-curricular joint project activities to evaluate students' ideology and behavior in practice. For example, organizing students to create folk art with red historical themes and evaluating their patriotic feelings and social responsibility based on their performance and the ideological content of their works during the creation process. Both ideological and political teachers and professional teachers of folk art courses should participate in the evaluation, observing students' classroom performance, interactive discussions, project creations, etc., to comprehensively evaluate students' ideology and moral quality.

Thirdly, students' self-reflection and changes in mindset should be recorded. Students are required to regularly write self-reflections and learning experiences during the learning process, allowing understanding of their changes in mindset, value transformations, and ideological improvements in the course. For instance, after completing a folk art project, students can write about their insights and record their perceptions during the learning process, serving as an important basis for ideological evaluation. Digital tools can also be utilized to periodically conduct surveys on students' psychological and ideological states, understand their psychological experiences and ideological changes during the learning process, identify ideological confusion encountered by students, and provide timely guidance to promote their healthy growth.

5. Conclusion

In summary, the digital transformation of folk art education in universities carries significant meaning, while Guangzhou folk art in ideological and political education in universities can enhance cultural identity, foster a sense of historical responsibility, increase the attractiveness of ideological and political education, promote students' comprehensive qualities, inherit and promote Chinese traditional culture, and build a harmonious campus cultural atmosphere. To this end, universities need to design teaching objectives based on the connotation of folk art education, construct specific teaching plans incorporating Guangzhou folk art, and promote the integration of folk art education and ideological and political education. In the process of effect evaluation, universities also need to combine process and summative evaluations, with a focus on evaluating students' ideology.

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Schema Representation, Semantic Network Construction and Construal of the English Direction Preposition "To" and "Toward(s)"

Haiying Zhan*

School of Humanities and Foreign Languages, Xi'an University of Technology, Xi'an 710000, Shaanxi Province, China

*Corresponding author: Haiying Zhan, 3174816103@qq.com

Abstract: For a long time, prepositions have been a class of words that have attracted the attention of scholars. However, from the perspectives of Structural Linguistics, Transformational-generative Linguistics, and Functional Linguistics, different scholars have emphasized the collocation of prepositions with other parts of speech to form a conventional linguistic unit, but have not studied the prepositions themselves. So far, most studies on English prepositions from the perspective of cognitive linguistics have focused on the prepositions with obvious spatial conceptual meaning. Still, there has not been sufficient cognitive research for some prepositions without spatial conceptual meaning. Therefore, this article selects the direction prepositions "to" and "toward(s)," from the perspective of cognitive linguistics, using category theory, schema theory, and construal theory, and combining the metaphor and metonymy to extend the meaning, to analyze and distinguish, finally construct schema representation, semantic network and construal of the English direction preposition "to" and "toward(s)".

Keywords: Direction preposition "to" "toward(s)"; Schema; Semantic network; Construal; Category; Metaphor; Metonymy

1. Introduction

People and objects exist in space and time. In space, there are two states of motion and movement. How does language construct spatial relationships? In English, prepositions are the most spatial relation words. Cognitive linguists have made great progress in the field of prepositions. The concept of space is considered to be the most closely integrated concept with human cognition, and the spatial meaning contained in English prepositions is also the first cognition and the most original meaning of the prepositions. So far, most studies on English prepositions from the perspective of cognitive linguistics have focused on spatial prepositions with obvious spatial conceptual meanings, such as in, over, on, at, up, down, etc. However, there has not been

sufficient cognitive research on some prepositions that do not contain obvious spatial concepts in their existing meanings. Therefore, this paper chooses the directional prepositions "to" and "toward(s)" and attempts to study the meaning of the English directional prepositions "to" and "toward(s)" from the perspective of cognitive linguistics and within the framework of category, schema and construal theory, and analyzes and distinguishes the meanings of the prepositions "to" and "toward(s)" by combining metaphorical and metonymic extension. It provides a new approach to the study and teaching of prepositions in English.

Cognitive linguists believe that semantics is a psychological phenomenon and a product of the process of conceptualization of the human brain. The formation of concepts is mainly based on the classification of the objective world, and the process of semantic formation is equivalent to the process of conceptualization. Human beings form basic image schemas based on physical experience in the real world, and then we use these basic image schemas to organize more abstract thinking, thus gradually forming our semantic structure [1]. The development of cognitive linguistics provides a new perspective for the study of foreign language teaching. The prototype category theory holds that the semantic structure of polysemic prepositions is a category centered on the prototype meaning, with prototype and marginal meanings. Archetypal sense is regarded as the most representative sense in the semantic category. It is the first one that people recognize and the first one that prepositions acquire. Other meanings are based on archetypal meanings as cognitive reference points, using schematics, metonymic, and metaphorical cognitive patterns to extend the family similarity to form a semantic web. Based on the network of preposition polysemy, this paper studies the polysemy of prepositions from a cognitive point of view using schematology, conceptual metaphor, and metonymy theoretical systems, which can help reveal the internal cognitive mechanism of the generation of a certain sense, enable language learners to have a deeper understanding of the polysemic structure of prepositions, and help students grasp the semantic extension of polysemic prepositions.

2. Theoretical basis

In the 1930s, British psychologist F.C. Bartlett proposed schema theory to expound the role of background knowledge in language understanding. He defined schema as "the structure of previously acquired background knowledge." Concepts are not stored in memory in isolation but are interconnected, forming cognitive structural schemata that reflect interconnected things in reality. Schema is formed based on a human's physical experience and perception of the objective world and connects its abstract concept with the concrete image structure. Image schema plays an important role in category construction, concept formation, metaphor analysis, meaning understanding, and logical reasoning. We can use the rich experience network and conceptual structure formed by an image schema or multiple image schemas to understand the interrelation between multiple meanings of prepositions and deduce their extended meaning based on the core meaning [2–4]. Image schema enables learners to better understand the internal structure of meanings of prepositions, especially how metaphorical meanings are derived from their archetypal meanings.

Construal plays a key role in the form and meaning of language expression. Langacker introduced the concept of "construal" in 1997, defining it as "the multidimensional ability of people to conceive and describe the same situation in different ways" [5]. The meaning of a language expression is not only the conceptual content it evokes but also how that content is interpreted [2]. Langacker proposed four dimensions of specificity: level of specificity, focusing, salience, and perspective. Prominence is an analytic dimension closely related to detail and focus. Generally speaking, the more detailed the conceptual content represented by semantics or the

more foreground position it is placed in the conceptual cognitive domain, the more prominent it is. Langacker discussed the prominence dimension from two aspects: profile and base, trajectory and landmark [6]. The projectile and the boundary mark can distinguish the difference in the status of each participant in the highlighted side relationship, that is, the degree of prominence between different participants in the highlighted relationship is also different. The most prominent participant is defined as the projectile, which is the main focus of the side relationship, while the other participants as the secondary focus the boundary mark.

3. Construal of semantic network for schematic representation of English directional preposition "to"

Based on the definition of the Oxford Advanced English-Chinese Double-Interpretation Dictionary of the corpus, this study extracts the meaning of the preposition "to" and analyzes its prototypical meaning and semantic extension mapped to the time domain, the state domain, the object domain, the emotion domain, the objective domain, the comparison domain, and the degree domain from a cognitive perspective, to construct the cognitive semantic network schema of the preposition "to."
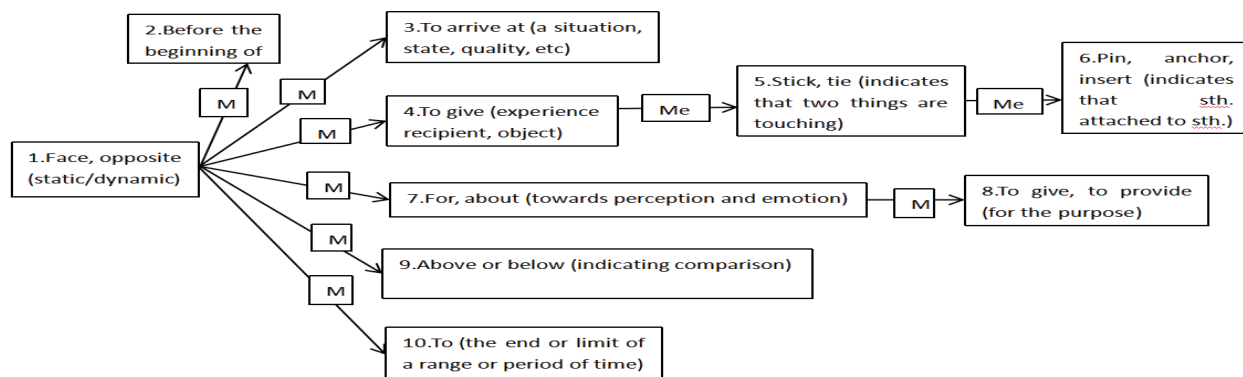
Figure 1. Cognitive semantic network schema of the preposition "to" (M stands for metaphor; Me stands for metonymy)

The archetypal meaning of the preposition "to" is "toward or against (a direction or place)." The cognitive semantic network schema of "to" shows that it derives atypical and marginal meanings from this typical sense through radiative and chained extensions, forming a complex network structure. The ambiguity of "to" is rooted in its directional feature and results from the continuous semantic extension generated by metaphorical and metonymic cognitive mechanisms.

4. Construal of semantic network for a schematic representation of English directional preposition "toward(s)"

Based on the definition of the Oxford Advanced English-Chinese Double-Interpretive Dictionary of the corpus, this study extracts the meaning and examples of the preposition "toward(s)" and analyzes the prototypical meaning and its semantic extension to the object domain, time domain, emotion domain, outcome domain, and destination domain mainly from a cognitive perspective. The cognitive semantic network schema with the preposition "toward(s)" is constructed.
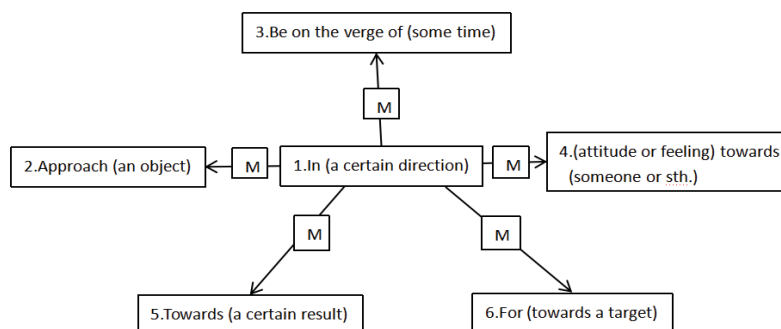
Figure 2. Cognitive semantic network schema of preposition "toward(s)" (M stands for metaphor)

The archetypal meaning of the preposition "toward(s)" is "to move closer in a certain direction (infinitely closer, but not touching)." According to the cognitive semantic network schema, "toward(s)" extends from this prototypical meaning to atypical and marginal senses, forming a radiative network. Its polysemy is rooted in the directional feature of "getting closer to a certain direction" as the cognitive reference point and results from the metaphorical cognitive mechanism's semantic extensions. These derived meanings remain closely related to the archetypal semantics. When the prototypical meaning of "toward(s)" is mapped onto other domains, new meanings arise, all based on and connected to its original sense.

5. Contrast of the construal of prepositions "to" and "toward(s)"

The semantic differences between prepositions to and "toward(s)" are compared according to their cognitive semantic network schema, as shown in **Figure 3** below.

meaning	to	toward (s)
prototypical meaning	To, towards, against (a certain direction or place)	Getting closer and closer in one direction, but not touching
Time domain	Before the beginning of	Be on the verge of (some time)
State domain	To arrive at (a situation, state, quality, etc)	/
Object domain	To give (experience recipient, object); Stick, tie (indicates that two things are in contact); Pin, anchor, insert (indicates that sth. attached to sth.)	Approach (an object)
Affective domain	For, about (towards perception and emotion)	(attitude or feeling) towards (someone or sth.)
Destination domain	To give, to provide	For (towards a target)
Comparison domain	Above or below (indicating comparison)	/
Degree domain	To what extent	/
Result domain	/	Towards (a certain result)

Figure 3. The semantic differences between prepositions "to" and "toward(s)"

From **Figure 3**, the following conclusions can be drawn:

(1) The archetypal meaning of the preposition "to" is that it moves in a certain direction or place, and the projectile can have a distance from the boundary mark, contact with the boundary mark, or enter the range of the boundary mark. The preposition "toward(s)" means that the projectile is moving closer and closer in one direction without making contact with the boundary.

(2) The prepositions "to" and "toward(s)" can both be mapped from the archetypal meaning to the time domain. The preposition "to" indicates the time difference from the boundary mark, while the preposition "toward(s)" emphasizes the time left for the projectile to approach the boundary mark. They express similar meanings but different perspectives. The preposition "toward(s)" takes the projectile as a reference.

(3) The preposition "to" can be mapped from its archetypal meaning to the state domain, indicating the meaning of "to (a situation, state, property, etc.)" while the preposition "toward(s)" cannot be mapped to the state domain.

(4) The prepositions "to" and "toward(s)" can both be mapped from the archetypal meaning to the object domain. The preposition "to" represents the meaning of "to (an object)" and on the basis of this meaning, the meaning of contact is metonymically extended, that is, "stick, tie (indicating that two things touch)." Based on the meaning of contact, the meaning of attachment is extended in a metonymic way, that is, "nail, anchor, and embed." The preposition "toward(s)" means close to (an object). Both can be mapped to object domains, but the preposition "to" has a richer meaning.

(5) The prepositions "to" and "toward(s)" can both be mapped from the archetypal meaning to the target domain. The preposition "to" indicates the meaning of "to provide" and emphasizes contact with the boundary. The preposition "toward(s)" means "used toward (a target)."

(6) The preposition "to" can be mapped from the archetypal meaning to the domain of comparison, and is used to compare the characteristics, performance, quantity, value, and other attributes of two things or people, while the preposition "toward(s)" has no such meaning.

(7) The preposition "to" can be mapped from the archetypal meaning to the degree domain, indicating "to what extent." The preposition "toward(s)" does not have that meaning.

(8) The preposition "toward(s)" can be mapped from its archetypal meaning to the resulting domain, meaning "toward, close to (a result)," whereas the preposition "to" has no such meaning.

6. Conclusion

This paper first analyzes the semantics of English directional prepositions "to" and "toward(s)" from the perspective of prototype category theory, and finds that these semantics are based on their prototype meanings. The semantic structure of the prepositions expands in a radial and chained manner around its prototypical sense, and finally forms a semantic network of "to" and "toward(s)." Although the semantic network of "to" and "toward(s)" is very large, its semantic expansion mechanism is the same, and it is extended based on its archetypal sense, by extracting the features of archetypal sense, and through cognitive thinking modes such as metaphor and metonymy. In the process of semantic radiation, the way of construal plays a crucial role. The process of semantic radiation "to" and "toward(s)" is the process of understanding different target domains, highlighting the influence of boundary markers on the projectile in the schema and highlighting the influence of the projectile

on the boundary markers by taking its prototype meaning schema as the source domain. This study constructs a schematic representation semantic network of the two English directional prepositions and represents the semantic difference between them utilizing the target-boundary identification solution. The cognitive research on the polysemy of the two English directional prepositions not only helps learners to learn many meanings of them but also provides an effective path for learners to learn polysemous words.

Disclosure statement

The author declares no conflict of interest.

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Application of Case-based Learning in Respiratory Medicine Nursing Education

Junying Nie, Ying Li*, Xiangli Zhang, Ying Gao

Shaanxi Provincial People's Hospital, Xi'an 710068, Shaanxi Province, China

*Corresponding author: Ying Li, 13474368590@163.com

Abstract: *Objective:* To explore the application effects of case-based learning in respiratory medicine nursing education. *Methods:* 60 nursing interns in the respiratory medicine department of our hospital from January 2023 to December 2023 were selected and randomly divided into a control group and an observation group, with 30 students in each group. The control group adopted traditional teaching methods, while the observation group adopted case-based learning based on traditional teaching methods. The differences in theoretical knowledge, operational skills, clinical thinking ability, and learning interest between the two groups were compared. *Results:* The scores of theoretical knowledge, operational skills, clinical thinking ability, and learning interest of the observation group were significantly higher than those of the control group, and the differences were statistically significant ($P < 0.05$). The satisfaction score of the observation group was significantly higher than that of the control group, with a significant difference ($P < 0.05$). *Conclusion:* Case-based learning can effectively improve the teaching effect of respiratory medicine nursing, cultivate students' comprehensive abilities, and is worthy of promotion and application.

Keywords: Case-based learning; Respiratory medicine; Nursing education

1. Introduction

The Respiratory Medicine department deals with a wide range of diseases, including infectious diseases, chronic diseases, acute exacerbations, and more. The clinical manifestations of each disease vary greatly, from common symptoms like cough, expectoration, and dyspnea to critical conditions such as respiratory failure and consciousness disorders, requiring nursing staff to have keen observation and judgment skills [1]. Additionally, there are numerous diagnostic and therapeutic techniques in Respiratory Medicine, including non-invasive ventilators, invasive ventilators, respiratory function monitoring, endotracheal intubation, tracheotomy care, closed thoracic drainage, and others. These technical operations are complex and demand a high level of professional skill and emergency response capabilities from operators [2].

Most nursing interns, even if they have mastered theoretical knowledge, may still make mistakes when

providing patient care due to a lack of practical experience. For example, they may not observe changes in the patient's condition promptly, adjust ventilator parameters inaccurately, or handle operational complications improperly. These oversights can easily lead to conflicts between nurses and patients and even affect the patient's treatment effectiveness. Case-based learning, as a student-centered teaching method, emphasizes introducing actual cases into the classroom. By analyzing and discussing real cases, it helps students integrate theoretical knowledge with clinical practice and improves their ability to analyze and handle complex clinical situations [3]. Case-based learning can effectively enhance students' interest in learning, clinical thinking skills, and problem-solving abilities, making it widely used in medical education.

2. Materials and methods

2.1. General information

60 nursing interns from the Respiratory Medicine department of our hospital were selected from January 2023 to December 2023. They were randomly divided into a control group and an observation group using a random number table, with 30 students in each group. There were no statistically significant differences in gender, age, or education level between the two groups (P > 0.05), ensuring comparability.

2.2. Methods

2.2.1. Control group

The control group received traditional teaching methods, including classroom lectures, demonstrations, and operational training. In traditional teaching, classroom lectures build a theoretical framework of respiratory medicine nursing for students. Teachers systematically impart professional knowledge to students through detailed explanations, enabling them to develop a preliminary understanding of the basic concepts, principles, and methods of respiratory medicine nursing. The demonstration session provides a more intuitive showcase of the specific procedures and norms of nursing operations, allowing students to witness correct operating methods and laying a foundation for their future practice. Operational training gives students hands-on opportunities to improve their nursing skills through repeated practice.

2.2.2. Observation group

The case-based teaching method was introduced on the foundation of traditional teaching methods. The specific implementation steps are as follows:

(1) Case selection: Carefully selecting typical cases closely related to respiratory medicine nursing is a crucial starting point for the case-based teaching method. These cases must possess authenticity, as only cases derived from real clinical situations or reliable sources can enable students to experience the challenges and complexities of practical work. Integrity is also a key element, where a complete case should include the patient's basic information, disease progression, nursing measures, and their effects, allowing students to comprehensively understand each aspect of the nursing process. Representativeness ensures that the cases cover common issues and critical points in respiratory medicine nursing, enabling students to grasp solutions to a category of problems by analyzing one case. Simultaneously, it is essential to consider the difficulty level of the cases concerning the student's learning abilities. If the cases are too simple, they may not stimulate students' thinking and exploration desires, while overly complex cases may leave students feeling overwhelmed and discourage their

learning enthusiasm. Cases can be sourced from textbooks, professional journals, online resources, or actual clinical cases, providing students with a wealth of learning materials.

(2) Case analysis: Students are grouped, kicking off the exciting process of case analysis. Group discussions allow students to fully exchange ideas and perspectives, sparking intellectual collisions. In this process, they conduct in-depth analysis and discussions on the cases, ranging from patients' symptoms to diagnostic basis and the formulation of corresponding nursing measures. Each step requires students to apply their knowledge to think and make judgments. Teachers play a vital guiding role in case analysis, promptly answering students' questions and helping them clarify their thoughts when they encounter confusion. Additionally, teachers provide objective evaluations of students' performances, highlighting their strengths and weaknesses to guide their further learning.

(3) Case summary: After the case analysis, the teacher provides a comprehensive summary of the case. This step not only reviews the case itself but also systematically summarizes and expands on relevant knowledge points. The teacher organizes the key issues and knowledge points in the case, helping students deepen their understanding and mastery of the knowledge. Through the summary, students can more clearly recognize their shortcomings in the case analysis process and integrate the knowledge they have learned to form a more complete knowledge system.

(4) Case application: Encouraging students to apply case analysis methods to solve practical problems during clinical internships is a crucial step in integrating theoretical knowledge with practice. When facing real patients and complex clinical situations, students can utilize the learned case analysis methods to quickly make judgments and develop reasonable nursing plans. Guiding students in reflection and summary helps them continuously improve their practical abilities and overall qualities. Through reflection, students can identify their problems and deficiencies in practice, learn from their experiences, and prepare for future work.

2.3. Observation indicators

2.3.1. Theoretical knowledge

Assessment is conducted using a self-designed theoretical knowledge test paper, which is comprehensive and professional. With a full score of 100, the content covers the etiology, pathology, clinical manifestations, nursing assessment, treatment principles, and nursing measures of respiratory diseases. The examination of etiology encourages students to deeply understand the root causes of diseases. The pathology aspect helps students comprehend the underlying mechanisms of disease development. The assessment of clinical manifestations enables students to accurately identify external symptoms of different diseases. The nursing assessment section cultivates students' ability to accurately judge patients' conditions. Mastering treatment principles guides subsequent nursing measures, while the assessment of nursing measures ensures students' ability to respond in practical operations.

2.3.2. Operational skills

Operational skills are evaluated using standardized patients or simulators, also with a full score of 100. The assessment includes respiratory nursing, oxygen therapy, nebulization inhalation, mechanical ventilation, and other operational skills. Respiratory nursing operations ensure the patency and cleanliness of patients' respiratory tracts. The oxygen therapy assessment evaluates students' ability to reasonably adjust oxygen supply for patients

with different conditions. Nebulization inhalation requires students to accurately master drug usage methods and dosages. Mechanical ventilation tests students' proficiency in operating complex equipment during emergencies.

2.3.3. Clinical thinking ability

Assessment is conducted using case analysis with a full score of 100. Evaluation indicators include problem identification ability, information collection ability, analytical judgment ability, and plan formulation ability. Problem identification requires students to quickly identify key issues from complex cases. Information collection examines students' ability to comprehensively obtain patient condition information. Analytical judgment prompts students to accurately analyze and judge the collected information. Plan formulation tests whether students can develop reasonable and effective nursing plans based on analysis results.

2.3.4. Learning interest

A self-designed questionnaire is used for investigation, with a full score of 100. It covers aspects such as learning motivation, learning attitude, and learning participation. Learning motivation explores students' intrinsic drive for learning. Learning attitude reflects students' level of seriousness towards learning. Learning participation demonstrates students' active initiative in the learning process.

2.3.5. Satisfaction score

A self-made satisfaction scoring survey questionnaire from our hospital is adopted, with a total score of 10. It is used to understand students' overall satisfaction with the teaching process and teaching effectiveness.

2.4. Statistical methods

Statistical Package for Social Sciences (SPSS) 27.0 statistical software is used for data analysis. Measurement data are expressed as mean ± standard deviation ($\bar{x} \pm s$). The t-test is used for comparison between groups, and $P <$ 0.05 is considered statistically significant.

3. Results

3.1. Comparison of theoretical knowledge, operational skills, clinical thinking ability, and learning interest scores between the two groups

The observation group significantly outperforms the control group in theoretical knowledge, operational skills, clinical thinking ability, and learning interest, with P-values all less than 0.001, indicating significant differences, as shown in **Table 1**.

Table 1. Comparison of theoretical knowledge, operational skills, clinical thinking ability, and learning interest scores between the two groups ($\bar{x} \pm s$, points)

Groups	Theoretical knowledge	Operational skills	Clinical thinking ability	Interest in learning
Control group (n = 30)	78.53 ± 6.12	82.17 ± 5.95	75.43 ± 6.89	72.83 ± 7.14
Observation group (n = 30)	85.45 ± 5.67	88.51 ± 5.58	83.31 ± 6.45	80.87 ± 6.44
t-value	4.543	4.257	4.573	4.580
P-value	< 0.001	< 0.001	< 0.001	< 0.001

3.2. Comparison of teaching satisfaction scores between the two groups of students

The satisfaction score of the observation group was significantly higher than that of the control group, with a significant difference ($t = 3.213$, $P = 0.002 < 0.05$), as shown in **Table 2**.

Table 2. Comparison of teaching satisfaction scores between the two groups of students ($\bar{x} \pm s$, points)

Groups	n	Satisfaction score
Control group	30	7.62 ± 0.74
Observation group	30	8.29 ± 0.87
t-value		3.213
P-value		0.002

4. Discussion

The case-based teaching method abandons the boring theoretical indoctrination model of traditional classrooms. Introducing real clinical cases combines abstract and obscure theoretical knowledge with specific clinical situations, bringing knowledge to life. This approach enables students to intuitively understand and grasp knowledge, effectively enhancing their interest and initiative in learning [4,5]. In case-based teaching classrooms, students are no longer passive recipients of knowledge but active participants in the learning process. Teachers and students interact through cases. Students analyze cases, solve problems, and draw conclusions independently, gaining deeper understanding and stronger memories. Additionally, the case-based teaching method emphasizes students' analysis and discussion of cases rather than rote memorization, fostering critical thinking and problem-solving abilities [6].

During case analysis, students need to flexibly apply theoretical knowledge learned, and consider specific information provided by the case, such as patient symptoms, signs, and examination results, to identify patients' nursing problems, formulate reasonable nursing plans, and evaluate nursing effectiveness. This series of thinking, analysis, and decision-making processes can effectively improve students' clinical thinking and decision-making abilities, helping them better cope with various challenges in future clinical work. The case-based teaching method not only focuses on the combination of theory and practice but also often incorporates teaching methods such as simulation operations and role-playing, providing students with a learning experience closer to the real clinical environment. Through practical operations in simulated hospital rooms, such as respiratory care, oxygen therapy operations, ventilator application and care, students can apply theoretical knowledge to practice, improving their practical skills and emergency response capabilities, laying a solid foundation for future clinical work [7].

The results of this study showed that the observation group's scores for theoretical knowledge, operational skills, clinical thinking ability, and learning interest were significantly higher than those of the control group, with statistically significant differences ($P < 0.05$). Furthermore, the satisfaction score of the observation group was also significantly higher than that of the control group ($P < 0.05$). The reasons for this are likely as follows:

(1) The case-based teaching method emphasizes students' subject status and focuses on connecting theory with practice. Unlike the traditional teacher-centered teaching model, the case-based teaching method places students at the center of learning, encouraging them to actively participate in case analysis and discussion. This teaching model can effectively stimulate students' interest in learning and enhance

their enthusiasm and initiative. In contrast, the control group adopted a traditional teaching model where students passively received knowledge, resulting in relatively lower learning interest and initiative [8].

(2) The case-based teaching method helps students apply theoretical knowledge to clinical practice. By selecting real clinical cases, the method combines abstract theoretical knowledge with specific clinical situations, assisting students in better understanding and mastering knowledge and applying it to clinical practice. Through case analysis, students learn how to identify patients' nursing problems, develop reasonable nursing plans, and evaluate nursing effectiveness [9]. Students in the control group lacked opportunities to combine theoretical knowledge with practice, leading to relatively weak clinical thinking ability and operational skills.

(3) The case-based teaching method contributes to improving students' clinical thinking ability and problem-solving skills. It emphasizes students' analysis and discussion of cases, cultivating critical thinking and problem-solving abilities. In the process of analyzing cases, students need to apply their knowledge, identify patients' nursing problems, and formulate corresponding nursing measures. This process of analysis and problem-solving can effectively enhance students' clinical thinking ability and decision-making skills. Students in the control group lacked such training, resulting in relatively weaker clinical thinking abilities and problem-solving skills.

(4) The case-based teaching method aids in increasing students' learning satisfaction. It transforms boring theoretical knowledge into lively and interesting cases, utilizing interactive teaching methods to enhance student's interest and participation [10]. This teaching model is closer to students' actual needs, effectively boosting their learning satisfaction. In contrast, students in the control group lacked a sense of participation and accomplishment during the learning process, leading to relatively lower learning satisfaction.

5. Conclusion

In summary, the case-based learning method is an effective nursing teaching approach that can enhance students' interest in learning, clinical thinking skills, and practical abilities. To fully leverage the advantages of this method and improve the quality of nursing education, it is essential to carefully design cases and focus on case analysis and discussion when applying it in respiratory medicine nursing instruction.

Disclosure statement

The authors declare no conflict of interest.

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Research on Methods for Integrating Craftsmanship Spirit into Vocational Education

Aiai Yang*

Hainan Vocational University of Science and Technology, Haikou 571126, Hainan Province, China

***Corresponding author:** Aiai Yang, 13876381831@163.com

Abstract: This paper explores effective methods to integrate the concept of craftsmanship spirit into vocational education. By analyzing the principles of craftsmanship—such as dedication, precision, and innovation—this research highlights the importance of fostering these values among vocational students. Drawing on both theoretical frameworks and practical examples, the paper proposes several strategies for embedding craftsmanship values into the curriculum, including the enhancement of practical training, mentoring programs, and industry partnerships. The integration of craftsmanship spirit is crucial for the professional growth of students and the development of high-quality, skilled labor forces in today's economy.

Keywords: Craftsmanship spirit; Vocational education; Practical training; Professional development; Industry partnerships

1. Introduction

The concept of "craftsmanship spirit" has deep roots in Chinese culture and has been central to the development of high-quality, skilled labor throughout history. It emphasizes values such as dedication, patience, attention to detail, and a commitment to excellence in one's craft. In modern times, with the rapid development of industries and the increasing demand for specialized skills, there has been a renewed focus on the importance of craftsmanship spirit in the educational field, particularly in vocational education. Vocational education, which plays a crucial role in preparing students for the labor market, is ideally positioned to incorporate these values and foster a workforce that not only possesses technical proficiency but also exhibits a strong sense of professionalism and pride in their work.

However, integrating craftsmanship spirit into vocational education presents several challenges. As modern economies become increasingly focused on efficiency and output, the emphasis on speed and productivity often overshadows the importance of quality and attention to detail. Moreover, vocational education, traditionally

viewed as more utilitarian and skill-based, has sometimes been criticized for focusing too narrowly on technical skills while neglecting the cultivation of ethical values and personal development.

2. Literature review

2.1. The evolution of craftsmanship spirit

Craftsmanship spirit is not a new concept, but its formal application in education, particularly in vocational training, has gained increasing attention. Historically, craftsmanship spirit was seen as a set of personal traits—such as patience, resilience, and dedication—embodied by master craftsmen.

In the context of contemporary education, the values of craftsmanship have been reinterpreted to emphasize the development of both technical skills and personal ethics. In today's highly competitive job market, craftsmanship spirit equips students with not only the hard skills needed for their professions but also the soft skills, such as problem-solving, critical thinking, and an ethical approach to work. Their research shows that craftsmanship spirit can be a differentiating factor that helps vocational students stand out in a crowded labor market [1].

2.2. Vocational education and its role in promoting craftsmanship

Vocational education has traditionally focused on the acquisition of technical skills required for specific trades or professions. However, in recent years, educators and policymakers have recognized the need for a more holistic approach that includes the cultivation of values such as craftsmanship spirit. This shift is reflected in policy changes and curriculum reforms in many countries, including China.

For example, the Chinese government has actively promoted the concept of craftsmanship spirit in vocational education through national policies such as the Made in China 2025 initiative, which emphasizes the importance of high-quality manufacturing and innovation. Research by Zhao and Zhang indicates that integrating craftsmanship spirit into vocational education is seen as a crucial step in producing a workforce capable of supporting China's transition from a manufacturing-driven economy to one based on innovation and quality. In their study, they found that vocational schools that successfully embedded these values produced more motivated students, took greater pride in their work, and demonstrated higher levels of job satisfaction [2].

Similarly, international studies highlight how craftsmanship values are integrated into vocational education systems in countries with strong apprenticeship traditions, such as Germany and Japan. The dual system of vocational training in Germany, which combines classroom instruction with hands-on apprenticeships, has been lauded as a successful model for instilling craftsmanship values. A study by Rauner and Maclean found that German apprentices who were exposed to real-world craftsmanship environments during their training developed stronger work ethics and a greater commitment to quality [3].

2.3. Integration of soft skills and ethics in vocational education

The relationship between vocational education and soft skills, including ethics and craftsmanship, has also been extensively studied. Scholars like Wu argue that while technical skills are fundamental, the integration of ethical education—such as craftsmanship spirit—is vital for long-term professional success [4]. Vocational students, especially those in technical fields, benefit from a dual focus on skill proficiency and moral development. Craftsmanship spirit, when combined with technical competence, helps students form a professional identity that includes responsibility, dedication, and continuous self-improvement [5].

Other research supports this view by highlighting the benefits of project-based learning (PBL) and problem-based learning in fostering a craftsmanship spirit. A study by Thomas and Brown showed that when vocational students are involved in hands-on projects that require critical thinking and iterative improvement, they not only refine their technical skills but also develop a mindset focused on precision, perseverance, and pride in their work [6]. The application of these teaching methods aligns with the core tenets of craftsmanship spirit by encouraging students to take ownership of their learning and embrace the challenges inherent in their chosen trades.

2.4. Challenges in integrating craftsmanship spirit into vocational education

Despite the growing recognition of the importance of craftsmanship spirit, its integration into vocational education faces several challenges. The first challenge is the traditional perception of vocational education itself. In many countries, vocational training is seen as a secondary option, often chosen by students who do not excel academically. This perception can hinder efforts to promote the values of craftsmanship, as students may enter vocational programs with low expectations for their future careers, viewing their education as a means to an end rather than an opportunity to develop a deeper connection with their work [7].

Additionally, there are practical challenges related to teacher training and curriculum development. Many vocational educators come from industry backgrounds and may not have formal training in teaching soft skills or fostering values like craftsmanship spirit. Research by Cheng and Han highlights the need for vocational educators to undergo professional development that equips them with the skills to integrate ethical and craftsmanship values into their instruction [5]. Without proper training, teachers may focus exclusively on technical competencies, neglecting the broader goal of developing students' professional identities and work ethics [8].

3. Methods for integrating craftsmanship spirit

This section is the core of the paper, where various strategies to integrate craftsmanship spirit into vocational education are discussed. The methods are as follows.

3.1. Enhancing practical training

Discuss how practical, hands-on training aligns with craftsmanship values like precision and dedication. The focus should be on creating high-quality work and developing a sense of pride in what students produce.

3.2. Mentorship programs

Explore how apprenticeship and mentorship can transmit craftsmanship values from experienced professionals to students, highlighting real-world applications and personal development.

3.3. Curriculum integration

Suggest integrating theoretical knowledge with practical projects that emphasize craftsmanship. The curriculum should teach not only technical skills but also instill values like persistence, patience, and creativity.

3.4. Industry partnerships

Analyze how collaborations with industries can provide students with real-world experiences that reflect the

demands of the job market. Partnering with industries known for high standards of craftsmanship can help bridge the gap between education and professional expectations.

3.5. Cultural and ethical education

Incorporate elements of traditional craftsmanship ethics into the moral and cultural education of students, promoting respect for hard work, quality, and social responsibility.

4. Case studies and examples: Tianjin Technical College

4.1. Overview

Tianjin Technical College, a leading vocational institution specializing in precision manufacturing, was selected for this case study due to its established industry partnerships and emphasis on craftsmanship in its curriculum. The college collaborates closely with local manufacturers, many of which produce high-precision machinery for export.

4.2. Method of integration

At Tianjin Technical College, craftsmanship spirit is embedded in the curriculum through a combination of rigorous practical training and mentorship programs. Students are paired with experienced professionals from partner companies, who act as mentors throughout their academic careers. These mentors guide students not only in technical skills but also in developing a meticulous approach to their work, emphasizing quality over quantity.

The school has also adopted a "master-apprentice" system, where senior students mentor incoming students under the guidance of experienced faculty members. This fosters a culture of precision, patience, and continuous improvement, reflecting traditional craftsmanship values.

4.3. Findings

In a survey of 150 students and 10 instructors, 85% of the students reported that the mentorship program helped them develop a deeper appreciation for precision and attention to detail. They felt that their work was evaluated not only for technical accuracy but also for craftsmanship qualities such as neatness and durability. Additionally, 78% of students expressed a stronger sense of pride in their work after completing mentorship assignments, compared to earlier stages of their education.

Interviews with instructors revealed that students who participated in the mentorship program showed higher levels of commitment to their projects, often staying after class to perfect their assignments. These students also performed better in industry assessments, with partner companies praising their work for exceeding typical industry standards.

4.4. Impact

The integration of craftsmanship spirit through mentorship and practical training has led to a significant increase in student engagement and the overall quality of their output. Partner companies have reported higher rates of employment offers extended to graduates, citing their meticulous work ethic as a primary reason.

5. Conclusion

The in-depth case study of Tianjin Technical College highlighted the practical application of these principles. By incorporating mentorship programs, industry collaborations, and hands-on workshops, the college successfully fostered a culture of craftsmanship among its students. Quantitative and qualitative data from surveys and interviews with students, instructors, and industry mentors demonstrated significant improvements in student engagement, skill development, and employability. The findings revealed that students not only acquired technical proficiency but also internalized craftsmanship values, leading to better job performance and higher satisfaction among employers.

However, the integration of craftsmanship spirit into vocational education does not come without challenges. Balancing the time required for skill mastery with other academic demands and scaling the mentorship model to accommodate more students are critical areas that need further development. Addressing these challenges will be essential for the sustainable growth of such programs.

In conclusion, embedding craftsmanship spirit in vocational education offers profound benefits, not only for the students and their future employers but also for society as a whole. By cultivating these values in vocational education, institutions can play a pivotal role in shaping a workforce that is not only highly skilled but also driven by a commitment to excellence, ethical practices, and continuous improvement. Future research and practice should focus on refining these models, ensuring that craftsmanship spirit becomes a fundamental component of vocational education globally.

Disclosure statement

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Cultivation of Postgraduate Abilities from the Perspective of Enterprise Needs

Minna Sun[1], Lei Qin[1], Yuanfei Xue[2]*

[1]Beijing Key Laboratory for Sensors, Beijing Information Science & Technology University, Beijing 100192, China
[2]Shenzhen Polytechnic University, Shenzhen 518055, Guangdong Province, China

*Corresponding author: Yuanfei Xue, xueyuanfei@szpu.edu.cn

Abstract: When cultivating the comprehensive abilities of postgraduates in universities, to prevent disconnection from the market and ensure the effectiveness of talent output, it is necessary to innovate and reform the methods of postgraduate ability cultivation from the perspective of enterprise talent demand. This study first clarifies the research approach, followed by a detailed examination of specific strategies for cultivating postgraduate abilities. It is hoped that the research findings can provide valuable insights for relevant stakeholders, highlighting the significance and value of the study.

Keywords: Enterprise demand; Postgraduate cultivation; Cultivation strategy; School-enterprise cooperation; Quality evaluation of cultivation

1. Introduction

In September 2020, the Academic Degrees Committee of the State Council and the Ministry of Education jointly issued the "Development Plan for Professional Degree Postgraduate Education (2020-2025)," emphasizing the imperative of developing professional degree postgraduate education to meet the needs of high-quality economic and social development. In this context, the author conducted this research to explore how to closely align with enterprise talent demands and cultivate excellent postgraduate talents. The main contents of the research are summarized below.

2. Overview of research approach

To enable postgraduate talents to become catalysts for the high-quality development of Chinese enterprises, universities should consider how to better cultivate their comprehensive abilities from the perspective of enterprise talent demand. Firstly, we identify the specific talent needs of enterprises. Based on these needs, we

then define the direction of postgraduate ability cultivation. Finally, we pinpoint the talent cultivation vehicles for school-enterprise cooperation to achieve the expected goals of reform and innovation in postgraduate education. **Figure 1** illustrates the author's research approach to this topic.
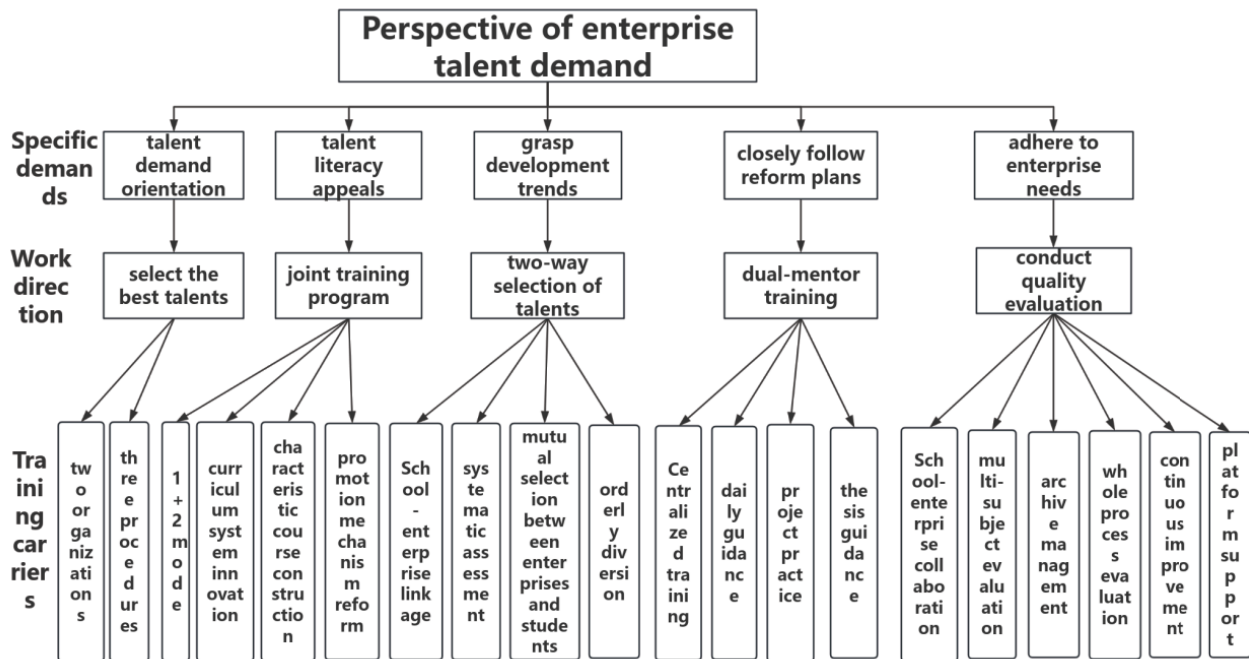

Figure 1. Schematic diagram of the research approach for postgraduate ability development paths from the perspective of enterprise talent demand

3. Exploring strategies for postgraduate ability development from the perspective of enterprise demand

3.1. Based on enterprise talent demand orientation, school-enterprise collaboration to select the best talents

The postgraduate population represents high-level, precision, and cutting-edge industry talent. When cultivating postgraduates' abilities, institutions should be guided by enterprise talent demands and collaborate with enterprises to select the best talents for targeted talent output. How to achieve "selecting the best from the excellent" and identify the most suitable talents from the postgraduate population for enterprise needs, providing a basis for precise cultivation through school-enterprise collaboration? To this end, we can approach it from the perspective of person-job fit in enterprise management, creating a talent selection mechanism of "two organizations and three procedures."

The "two organizations" refer to the establishment of a talent selection working group and an interview expert assessment team. The selection team can consist of administrative staff from both the school and the enterprise, such as the vice president, deputy secretary, the director of the graduate school office from the university, and the human resources minister from the enterprise. They are responsible for promoting the implementation of tasks such as postgraduate selection, organization of registrations, material review, and assessment evaluations. The interview expert team is primarily composed of enterprise experts, supported by

on-campus mentors, to conduct a comprehensive evaluation of postgraduate abilities.

During the "three procedures" selection process, the focus is on three key aspects: qualification screening, comprehensive testing, and interviews. In the qualification screening phase, specific requirements for qualification review are proposed by the enterprise, and students must meet all requirements to proceed to the next selection stage. The comprehensive testing phase involves assessments conducted by the enterprise on areas such as professional knowledge structure and foreign language expression ability. In the final interview phase, a jointly created expert assessment team from the school and enterprise conducts individual assessments, comprehensively evaluating postgraduates' potential for scientific research and innovation, logical thinking ability, and team organization skills to determine the best candidates for training based on enterprise talent demands [1].

3.2. Closely align with enterprise talent quality requirements to optimize joint school-enterprise training programs

In cultivating graduate students' abilities in the new era, universities and colleges need not only to emphasize the cultivation of students' professional abilities but also to focus on the development of their compound abilities. To this end, when optimizing joint school-enterprise training programs, it is essential to closely align with the quality requirements of enterprises when recruiting top talents and carrying out systematic reforms from multiple aspects.

Firstly, in cultivating graduate students, a "1+2" model can be adopted. This model involves students completing elective courses, professional basic courses, and degree courses in the first academic year to consolidate their professional knowledge structure. In the second and third academic years, students mainly engage in specialized course learning in enterprises, carry out professional practices, conduct research projects, and write dissertations, which helps to enhance their comprehensive quality and strength and better integrate into the enterprise culture.

For example, when cultivating top talents, Shenzhen Vocational and Technical University adheres to the talent demand orientation of partner enterprises and promotes collaborative talent cultivation between schools and enterprises. The university actively cooperates with Huawei Technologies Co., Ltd., accurately identifies the talent needs of the enterprise, and cooperates with relevant universities based on this to screen outstanding talents for targeted cultivation. This approach fully leverages the advantages of the "1+2" joint graduate cultivation model.

Secondly, innovation in the curriculum cultivation system is crucial. When enriching the content of graduate cultivation courses, universities and colleges should not only incorporate the core courses for professional degree graduate students organized and compiled by the Academic Degrees Office of the State Council but also have deep exchanges with enterprises. Based on the strategic plan for top talents in enterprises, the demands for talent quality should be integrated into the curriculum.

For instance, in teaching computer science and technology at Beijing Information Science and Technology University, to deepen the school-enterprise cooperation model and promote the cultivation of talents in this field, the university actively cooperates with Inspur Computer Technology Co., Ltd. and signs a strategic cooperation agreement. This not only provides students with rich practical opportunities and accelerates the close integration of the computer industry and academia but also supports the innovation of the graduate cultivation curriculum system in this major [2].

Furthermore, considering the different directions of school-enterprise cooperation and the differences in enterprises' main business, to ensure the cultivation of graduate students and meet the talent needs of enterprises, universities and colleges should timely optimize joint school-enterprise training programs and set up remedial courses for graduate student cultivation.

Finally, to prevent graduate students from becoming complacent and affecting their comprehensive ability improvement, universities and colleges can take joint school-enterprise cultivation as an entry point for reform. They can set up processes such as weekly meetings, monthly summaries, phased reporting, and thematic discussions to effectively motivate students.

3.3. Grasping the trend of enterprise innovation and development, and implementing two-way talent selection through school-enterprise collaboration

The stratified cultivation of graduate students has always been a pain point in school-enterprise cooperation. Due to inadequate implementation of mid-term assessment systems, scientific stratified guidance based on the potential of graduate students has not been achieved. Therefore, when cultivating graduate students' abilities through school-enterprise collaboration, emphasis should be placed on two-way talent selection. By grasping the trend of enterprise innovation and development, and approaching from the perspectives of school-enterprise collaboration, systematic assessment, mutual selection between enterprises and students, and orderly stratification, the expected goals of mid-term assessments for graduate students can be achieved [3].

Firstly, school-enterprise collaboration. When conducting mid-term assessments for graduate students, the traditional single-subject assessment model of universities can be broken, and a new mid-term assessment method of school-enterprise collaboration can be created, allowing relevant personnel involved in the graduate student training stage to participate.

Secondly, systematic assessment. Under the premise of mid-term assessment for graduate students, a comprehensive and systematic evaluation should be conducted from the perspective of enterprise employment, focusing on students' national identity, technical application, social responsibility, information awareness, self-discipline, problem-solving, teamwork, and collective cognition.

Thirdly, mutual selection between enterprises and students. From the perspective of school-enterprise joint education, the graduate student recruitment process mainly focuses on the initial intention selection between enterprises and students, while the mid-term assessment for graduate students is the second intention selection between enterprises and students. At this time, enterprises and students can reach a unified cooperation goal and sign an employment intention letter, which can enhance the mutual trust between enterprises and students, facilitate graduate students' participation in the core technology research and development projects of enterprises, and provide materials for students to write their dissertation.

Fourthly, orderly stratification. Based on the final results of mid-term assessments and systematic evaluations, if some graduate students fail to meet the minimum requirements of the school-enterprise joint training program, the corresponding students need to withdraw from the program and re-select their degree direction. For some students who meet the requirements but are unwilling to work in the corresponding enterprises, they can apply to return to their alma mater for further study or choose their careers, achieving orderly and scientific stratification of graduate students.

For example, Shenzhen Vocational and Technical University has actively signed joint training agreements with many prestigious universities. When carrying out joint training of graduate students, it adopts a scientific

and orderly stratification plan, actively cooperates with high-quality leading enterprises and industrial parks in Shenzhen, and provides many internship opportunities for jointly trained graduate students. As of the end of 2022, 989 master's students and 78 doctoral students have been jointly trained, among which nearly 30% of students have achieved employment in the Greater Bay Area, fully demonstrating the significance and value of carrying out scientific stratification work [4].

3.4. Close integration with enterprise innovation and reform plans for dual-mentor training through school-enterprise collaboration

The cultivation of professional degree graduate students requires the implementation of a dual-mentor system, enabling students to simultaneously learn professional theories and practical skills. To avoid the dual-mentor training system becoming a mere formality, educational institutions need to closely align with enterprise innovation and reform plans, refining the key points of dual-mentor training through school-enterprise collaboration.

Firstly, centralized course training. Apart from the basic educational teaching curriculum jointly developed by the school and enterprise, enterprise mentors should encourage students to utilize their free time to learn relevant micro-courses based on the needs of the research topic, gaining more information about the research, such as enterprise systems, corporate culture, business courses, and research methods. When students conduct research projects in the enterprise, enterprise mentors can organize centralized training to provide support for subsequent research projects.

For example, Shenzhen Vocational and Technical University has continuously deepened the school-enterprise dual-mentor training program. While enhancing the effectiveness of centralized course training, it has actively collaborated with relevant enterprises to establish practical training bases. Through partnerships with BGI, ZTE, and China Mobile, they have co-built the "BGI Biotechnology Training Base," "ZTE Communication Technology Training Base," and "China Mobile Information Technology Training Base." These not only create an environment for centralized training but also provide support for students' practical learning.

Secondly, professional daily guidance. Under the dual-mentor training mechanism, the enterprise mentor team focuses on knowledge within the relevant discipline or professional field. Combining this with the student's chosen topics, they selectively impart guidance content, implementing daily guidance on professional content to ensure the overall progress of students' research projects.

Thirdly, scientific research project practice. Enterprise mentors organize students to participate in specific scientific research projects, integrating graduate students into the enterprise's research and development (R&D) team. This encourages active communication and exchange with scientific researchers, allowing students to acquire more scientific ideas and research experience through project practice, comprehensively enhancing their learning abilities.

For instance, when cultivating graduate students in computer science and technology at Beijing Information Science and Technology University, to ensure the effectiveness of related scientific research projects under the school-enterprise cooperation perspective, the university and Nantian Information Company jointly established a research center. This center conducts scientific research collaborations on cutting-edge technologies such as intelligent systems and data processing, providing scientific research project support for graduate student training and achieving the expected results of dual-mentor cultivation [5].

Fourthly, dissertation guidance. Graduate students need to rely on the R&D projects jointly undertaken by

their school mentors and enterprise mentors to determine their dissertation research topics and directions. To improve the effectiveness of dissertation guidance for graduate students, a full-process dual-mentor guidance model and project-driven management strategy can be adopted during school-enterprise joint training. This approach starts from topic discussion, proposal defense, periodic inspections, dissertation pre-defense, and dissertation defense, fully leveraging the advantages of the school-enterprise linked dual-mentor training model to achieve graduate student ability training goals from the perspective of enterprise needs.

3.5. Adhering to talent cultivation based on enterprise demands, and conducting quality evaluation through school-enterprise collaboration

To determine whether the final quality of graduate students' ability training meets the expected goals of school-enterprise collaboration, scientific and effective quality evaluation is necessary. To ensure the objectivity and accuracy of quality evaluation for graduate student training, it is important to consistently adhere to the talent cultivation philosophy based on enterprise demands and establish a comprehensive quality management evaluation system. To ensure the effectiveness of quality evaluation, the evaluation system can be structured from multiple perspectives, such as school-enterprise collaboration, multi-stakeholder evaluation, big data archives, comprehensive process evaluation, continuous improvement, and platform support.

Firstly, school-enterprise collaboration refers to deep cooperation between universities and enterprises. They negotiate on the quality evaluation subjects, evaluation indicators, indicator weights, and evaluation criteria for different stages of the graduate training plan, thereby forming a quality evaluation scheme for each stage and aspect of joint training.

Secondly, multi-stakeholder evaluation involves relevant personnel participating in the graduate training plan. They actively engage in the quality evaluation process to ensure that evaluation results are more objective, fair, accurate, and comprehensive. This facilitates the timely identification of deviations in the implementation of the graduate training plan and prompt response measures.

Thirdly, big data archive management involves comprehensively collecting graduate students' basic information, examination results, learning points, project reports, monthly evaluations from mentors, project quality assessments, and work situations during the graduate training process. This is done from the stages of basic training, intensive training, project practice, and summary evaluation, to generate exclusive digital archives for graduate students and provide a basis for subsequent quantitative evaluation.

Fourthly, comprehensive process evaluation aims to refine the joint training evaluation work for graduate students, making the feedback from quality evaluation precise and timely. For example, during the basic training stage, students' academic performance and norms are the focus of assessment. In the intensive training stage, emphasis is placed on evaluating project reports, monthly evaluations from mentors, and project quality assessments. During the project practice stage, the focus is on two aspects: monthly evaluations from project leaders and scientific research defense evaluations.

Fifthly, continuous improvement highlights evaluating the actual situation of jointly trained graduate students at the end of each semester and providing feedback to both school and enterprise mentors. Objective and fair semester evaluations can help graduate students identify gaps and clarify details that need improvement in subsequent scientific research practices, enabling them to continuously address their shortcomings [6].

Sixthly, platform support refers to the establishment of a comprehensive evaluation system by universities and enterprises from the perspective of joint education. This system, empowered by digital information

technology, enables the entire process of graduate student learning to be monitored and quality evaluated.

4. Conclusion

In the educational context of expanding graduate enrollment, ensuring the quality of enrollment, teaching, and talent output has become an urgent issue to be addressed in graduate training. In this article, the author approaches the topic from the perspective of enterprise talent demands, explaining how to cultivate graduate students' comprehensive abilities from multiple aspects. The viewpoints presented are supported by relevant case studies, fully illustrating the urgency and necessity of reforming and innovating China's graduate talent cultivation model from the perspective of enterprise demands. In the future, when cultivating graduate students' abilities, it is essential to continuously extend the reach of school-enterprise collaboration, closely align with China's market economic development trends, create a new ecosystem for industry-education-research talent cultivation, and gradually address the imbalance between the supply and demand of high-level talents in the market.

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Research on the Legal Risks of Digital Currency in the Big Data Environment

Chengkun Liu*

School of Computer and Artificial Intelligence, Beijing Technology and Business University, Beijing 102445, China

***Corresponding author:** Chengkun Liu, 18953586589@163.com

Abstract: With the widespread application and growth of blockchain technology, cloud computing, and big data analytics in the financial industry, digital currencies have emerged. However, relevant regulations specifically targeting digital currencies have not been officially promulgated yet. In the process of promoting digital currencies, legal risks such as unclear boundaries of compensation liability, unclear ownership, potential privacy breaches, and financial regulatory challenges still need to be overcome. Therefore, it is essential to prioritize the prevention and management of legal risks associated with digital currencies in the big data environment, ensuring the smooth circulation and use of digital legal currencies across regions and promoting the internationalization and legalization of China's digital legal currencies.

Keywords: Big data; Digital currency; Legal risk

1. Introduction

As the economic system continues to evolve, the existence of currency is gradually changing. In recent years, the global economy has gradually moved towards digitization and technology, and digital currency has attracted widespread attention from global finance and the economy [1]. The rapid growth of digital currencies has led to the active involvement of a large number of institutions and investors. However, different regions have different regulations on digital currencies, so it is necessary to appropriately control digital currencies and avoid their legal risks.

2. Legal risks of digital currency in the big data environment

2.1. Information security risks

In the development of digital currencies, there are multi-faceted information security risks [2]. Apart from the leakage of personal account data, it also includes potential security challenges faced by various software

applications and underlying network architectures during data manipulation and information transmission, leading to a plethora of risk factors such as potential poor performance of hardware and software, weaknesses at system integration points, and negligence in information security management during the advancement of information technology [3]. Driven by both network technology and blockchain technology, the issuance of digital currency and other related steps require a decentralized accounting method, but the technology is still in its infancy. Meanwhile, the regulatory rules for digital currencies are not comprehensive, resulting in a lack of rigor in transaction verification processes [4]. Technical vulnerabilities such as the instability of the trading system and the possibility of individual data breaches may cause financial losses. Owing to the diversity among different exchanges and network enterprises, various cryptocurrencies also exhibit distinct security risks.

2.2. Circulation environment risks

As digital currencies continue to evolve, market chaos also emerges. Digital currencies, being a new form of currency, may bring changes to the traditional "central bank - commercial bank" financial landscape. In this process, network infrastructure and telecommunication service providers play a crucial role in the widespread circulation of digital currencies [5]. Due to the lack of a stable value benchmark, digital currencies can easily be used as a medium to implement Ponzi schemes. Private digital currencies, such as Bitcoin, are highly volatile, have unstable value, and lack transparency in relevant information, which can easily trigger speculative behavior among market participants and become a means for speculators to profit [6]. The risks of digital asset investment mainly come from two factors: one is the speculative attitude of investors towards digital currencies [5]. For instance, Bitcoin, due to its extremely complex generation algorithm and limited total supply, is expected to gain value and thus accumulate holdings, resulting in reduced market circulation and pushed-up prices. If inadequately regulated, traders may disturb market patterns, potentially leading to a contraction in currency supply and the disappearance of digital currencies from the market, severely infringing on investors' interests. The second factor is that the value fluctuation of digital currencies is controlled by multiple elements. Some investors exploit current regulatory deficiencies and lax supervision to manipulate the virtual currency market maliciously. If the digital currency trading ecology is unhealthy, it not only triggers illegal speculative habits but may also facilitate tax evasion, money laundering, and other illegal activities [6].

2.3. Risks of insufficient supporting laws

Before the legal system catches up with the development of digital currencies, the challenges of information security management for digital currencies are both complex and severe, lacking a professional regulatory framework. China has not yet established a corresponding comprehensive legal text and supervisory entity, making it difficult to control and audit digital currency trading platforms. The existing legal system is primarily established for traditional currencies and does not explicitly include digital currencies within its legal regulatory scope, resulting in legal gaps in the issuance, application, circulation, and regulation of digital currencies [7].

3. Legal risk prevention strategies for digital currencies in the big data environment

3.1. Continuously strengthen information technology research and development

Firstly, it is necessary to continuously enhance technological upgrading and actively build information systems. Relevant departments need to strengthen research and development work, implement blockchain technology

and encryption methods for digital currencies, and enhance advanced planning for information system structures. In the process of building a digital currency data system, it is necessary to deeply consider the stability and scalability of the system. Taking into account the system's need for instant transaction processing capabilities, the current digital currency system built using distributed ledger technology still faces technical difficulties in parallel processing efficiency that have not been effectively solved [8]. Therefore, in terms of design, we can refer to Libra's multi-layer hybrid technology strategy, integrate the system structure of domestic third-party payment platforms, and achieve breakthroughs in computing power growth limitations in the technical dimension.

Secondly, it is necessary to further enhance information security. Based on system-level communication protection, information protection, data guardianship, transaction prevention, and terminal authentication security, we will continue to promote technological improvements, adopt multiple strategies to strengthen the encryption technology architecture according to distributed ledger technology and ensure the security and ease of operation of digital currency production and reception systems. Besides that, strengthen the cleaning action of cyberspace to effectively prevent cybersecurity risks. Relevant departments should improve the network supervision structure, combine technical means to implement disciplinary actions against individuals and groups engaged in network attacks, carry out specific tasks such as investigating hacker activities and eliminating network viruses, strengthen monitoring and preventive measures, and ensure the stability and security of the network environment.

3.2. Accelerate the construction of digital currency financial systems

Firstly, it is necessary to improve the legal framework for digital currencies. The introduction and circulation of digital currencies require a complete legal framework and a solid institutional foundation. To ensure the steady growth of the national economy and minimize the impact of digital currency issuance on financial markets, the legality of digital currencies needs to be established. Relevant departments should revise legal provisions, including defining digital currencies as part of formal currencies, clearly stipulating key elements such as the issuer and method of digital currencies, and addressing issues related to legal payment and ownership transfer. It is proposed to enhance the integrity of legal systems such as anti-counterfeiting currencies and anti-money laundering, develop and implement specific regulations for digital currency counterfeiting and money laundering, and strengthen supervision structures. Simultaneously, the competent authorities should formulate specific management regulations for digital currencies to ensure that the legal environment for digital currency issuance and circulation is optimized. As digital currencies are put into market operation, it is necessary to adjust existing laws based on actual conditions to adapt to possible challenges.

Secondly, it is necessary to improve the digital currency regulatory system. As an innovative form of currency, digital currencies have many new attributes beyond traditional currencies, so it is necessary to upgrade the existing digital currency regulatory framework to prevent potential risks [9]. A regulatory system should be established to clarify the respective responsibilities and collaboration content of different agencies. By allowing the People's Bank of China to take on a leading and coordinating role, establish a digital currency monitoring and analysis unit, and use modern technological means such as big data to analyze the impact of central bank digital currencies on China's credit currency production, the replacement of traditional currencies, and the efficiency of financial system operations. This will provide data support for the management of digital currencies and decision-making by national macro-regulatory departments, and mitigate the adverse effects that central bank digital currencies may have on the real economy and financial system. Additionally, to address

the challenges that may be encountered during the issuance and circulation of digital currencies, it is necessary to maintain the flexibility and transparency of supervision, accurately identify potential dangers, build a robust digital currency transaction ecology, and reduce risks caused by inadequate supervision or regulatory gaps. Finally, the People's Bank of China needs to supervise the innovative business structures potentially triggered by digital currencies, ensure the business continuity of digital currency brokers and supporting service providers, and prevent and eliminate systemic risks.

3.3. Promote the construction of a digital currency circulation environment

Firstly, it is necessary to provide strong policy support and funding. Relevant departments need to establish a cross-departmental collaboration team for digital currency promotion, define the responsibilities of different departments, design a coordination framework, and develop relevant regulations to ensure the smooth issuance of digital currency. By introducing tax incentives, tax relief can be provided to enterprises and individuals who widely use digital currency for business transactions. Fiscal preferential measures targeting the high-tech industry will also be launched, and companies implementing smart mobile device popularization in remote areas will receive government financial assistance [10]. Moreover, communication service providers are encouraged to improve their service levels and expand network coverage of infrastructure. Administrative regulations applicable to government agencies and public institutions should be established to build dedicated and convenient digital currency payment channels, facilitating fund transactions for the public. Furthermore, the widespread use of digital currency is expected to increase the operating costs of traditional banks, corresponding financial institutions, and telecommunication service providers, including expenses for the installation and maintenance of software and hardware facilities, staff training, and the construction of suitable environments. Therefore, financial support should be provided in terms of funding.

Secondly, it is essential to develop supporting digital currency terminal markets and application scenarios. Following the principle of gradual advancement, the stability and security features of the digital currency system should be fully tested before selecting locations for pilot implementation. Monitoring local residents' acceptance and usage of the emerging digital currency, gradually expanding the trial area, continuously accumulating relevant experience, and continuously optimizing and upgrading the system will enable widespread application across the country. Additionally, significant attention should be given to digital currency promotion activities, introducing its usage processes and risk prevention strategies through various communication channels and methods that are easy for the public to understand. Initially, promotion points can be set up in major banks and financial institutions, and periodic knowledge lectures and training on digital currency can be organized to educate the public about its convenience and superiority. Special emphasis should be placed on increasing publicity efforts targeting marginalized groups such as those with lower education levels, the elderly, and individuals with disabilities, to avoid social differentiation issues caused by the digital divide. Lastly, it is crucial to ensure smooth consumer rights protection pathways, addressing incidents that cause consumer fund losses due to system issues, forgotten passwords, or telecommunication fraud, and eliminating public concerns about the security of digital currency funds.

4. Conclusion

In conclusion, with the rapid advancement of big data technology, particularly its deep integration into the

financial sector, digital currency has embraced a rapid growth opportunity. However, in recent years, as a new form of currency, digital currency has been associated with numerous illegal activities, which not only harm society but also pose challenges to the security and stability of the financial system. Due to the legal risks of digital currency, although simple approaches may effectively address issues in the short term, it is necessary to actively promote targeted regulatory solutions and implement precise governance in the future to ensure that digital currency develops along the right track and maintains financial security. Therefore, it is imperative to establish a regulatory framework and clear legal regulatory policies tailored to digital currency to standardize transaction activities, guide its healthy growth, and safeguard the stability of the financial system.

Disclosure statement

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Part-time Graduate Enrollment Measures and Effectiveness — Taking the Enrollment of Applied Statistics Major at China University of Geosciences (Beijing) as an Example

Engang Hou*, Yuxin Wang, Hairong Lian

China University of Geosciences (Beijing), Beijing 100083, China

Corresponding author: Engang Hou, houengang@cugb.edu.cn

Abstract: This article analyzes the current situation and problems of part-time graduate enrollment, taking the enrollment of the Applied Statistics major at China University of Geosciences (Beijing) as an example. It introduces the enrollment measures and their effects on expanding enrollment publicity, standardizing education and teaching management, strengthening teacher, textbook, and course construction, enhancing the construction of joint training bases outside the university, and strengthening cooperation with advantageous disciplines of the university.

Keywords: Part-time graduate students; Enrollment measures; Application statistics

1. Introduction

In recent years, part-time graduate education has gradually received social attention. Pursuing a part-time graduate degree has become an important way for many working professionals to improve their education and enhance their professional competitiveness. However, the enrollment of part-time graduate students in universities faces many problems and challenges. This article first analyzes the current enrollment status and existing problems of part-time graduate students. Then, taking the enrollment of the Applied Statistics major at China University of Geosciences (Beijing) as an example, it explores corresponding solutions and introduces the measures and effectiveness of part-time graduate student enrollment, to provide a reference for relevant universities and enrollment units.

2. Challenges in part-time graduate enrollment

2.1. Insufficient number of students and unreasonable structure

In September 2016, the General Office of the Ministry of Education issued the "Notice on Coordinating the Management of Full-time and Part-time Graduate Students" (Teaching and Research Department [2016] No. 2). This document accurately defines the concept of part-time graduate students and stipulates that part-time and full-time graduate students have the same enrollment and examination policies, and adhere to the same quality standards in their training. Their academic degree certificates have the same legal status and effectiveness. These policies have played an important role in promoting the coordinated development of full-time and part-time graduate education, ensuring the improvement of training quality, and perfecting training mechanisms.

However, part-time graduate students are generally recruited as on-the-job-oriented employment personnel. During the process of reviewing and preparing for exams, employees need to balance work, study, and life, and their study time is relatively tight. Under the unified examination policy for part-time and full-time candidates, which sets the same score line, the initial exam scores of employed personnel are generally low, making it difficult for them to enter the interview.

This leads to the following phenomenon: many enrollment units are unable to complete their enrollment plans in the first-choice admission process, and there is a large shortage of enrollment, resulting in a shortage of students. To complete the enrollment plan, many schools have to transfer full-time candidates to part-time graduate students, resulting in an unreasonable student source structure and an excessive proportion of fresh undergraduate students. Although some universities can complete the task of part-time graduate enrollment, most of the admitted students are not from the first choice, and the proportion of transfer students is significantly higher.

Taking China University of Geosciences (Beijing) as an example, the enrollment ratio in the past three years has been 12:1, 10:1, and 6:1 respectively, which is much higher than the national master's student enrollment ratio of 3.5:1. In addition, in our part-time postgraduate enrollment in recent three years, the proportion of transfer students has exceeded 50%, and the proportion of fresh undergraduates has reached 13%. These data highlight the difficulty of the entrance examination for part-time graduate students and the high proportion of transfer students and fresh undergraduate students (see **Table 1**).

Table 1. Statistics of part-time graduate enrollment at China University of Geosciences (Beijing) from 2022 to 2024

Year	Enrollment plan	Number of applicants	Number of online users	Number of transfers	Number of fresh graduates
2022	230	962	78	143	37
2023	230	713	74	147	25
2024	230	692	110	111	31

Source: Internal information from the Graduate School of China University of Geosciences (Beijing)

2.2. Uneven enrollment of majors and limited development of disciplines

Influenced by the employment situation, enrollment units often favor popular majors, such as business administration and accounting, in professional settings and the allocation of enrollment quotas for part-time

graduate students. However, some basic disciplines, and even some advantageous disciplines and majors in schools, face enrollment difficulties. This not only affects the balanced development of disciplines but also deviates from the original idea of part-time graduate education.

For example, China University of Geosciences (Beijing) is a research-oriented university with geology, resources, and environment as its main characteristics. Geology, geological resources, and geological engineering are two disciplines under the national "Double First Class" construction. Unfortunately, taking 2024 as an example, the proportion of part-time graduate students admitted by the school in geology and related majors is less than 8%. The enrollment majors are mainly concentrated in business administration, public administration, applied statistics, sports, and accounting, with these popular majors accounting for over 80% of the enrollment (see **Table 2**).

Table 2. Statistics of Part-Time Graduate Enrollment by Major at China University of Geosciences (Beijing) in 2024

Major	Number of enrollments
Business administration	80
Public administration	35
Applied statistics	33
Sports	22
Accounting	15
Finance	9
Geological Engineering	8
Law (Jurisprudence)	5
Public Administration	3
Resources and Environment	2
Surveying and Mapping Engineering	2
Civil engineering	2
Marxist theory	1
Safety engineering	1
Business Administration	1
Computer technology	1
Environmental Engineering	1

Source: Internal information from the Graduate School of China University of Geosciences (Beijing)

2.3. Candidates have concerns about part-time education

Candidates have certain concerns about the drawbacks of part-time graduate education. For example, the tuition fees for part-time graduate students are usually significantly higher than those for full-time graduate students, and most schools do not provide scholarships and accommodation to part-time students, resulting in heavy living pressure and financial burden for students. Part-time classes are generally not on working days, and students are concerned that the school may not place enough emphasis on them, resulting in lower teaching quality compared to full-time classes.

They also do not provide supporting online course resources, which may lead to academic difficulties. Some companies have lower recognition of part-time education than full-time education, and students are concerned that the practical benefits of part-time education are limited, and the time, energy, and financial resources spent may not receive the expected returns.

Candidates have the above concerns about the shortcomings of part-time education, which leads to a lack of attractiveness in the enrollment process of part-time graduate education and makes it difficult to attract high-quality students.

3. Measures for part-time graduate enrollment and their effectiveness

In response to the above issues, especially the doubts and concerns of candidates when applying for part-time graduate programs, universities should timely improve their enrollment and training strategies for part-time graduate students, and develop reasonable enrollment plans to cope with the challenges faced by part-time enrollment. Next, this article will take the experience of China University of Geosciences (Beijing) in applying statistical enrollment and education as an example to explain the enrollment measures and their effectiveness for part-time graduate students.

3.1. Expand enrollment promotion in various forms to enhance social influence

Universities should increase their publicity efforts for part-time graduate education, by organizing lectures, summer camps, and other activities to introduce the enrollment policies for part-time graduate students, so that candidates can understand the characteristics and advantages of part-time graduate education. Simultaneously, enrollment promotional videos can be recorded to expand the scope of publicity through media and online platforms, making society more accepting and recognizing part-time graduate students, and improving the coverage and influence of enrollment information.

Taking the Applied Statistics major at China University of Geosciences (Beijing) as an example, the school sends graduate supervisors and teachers responsible for graduate enrollment to participate in national graduate enrollment on-site consultation meetings every year. Concurrently, each discipline will send graduate supervisors to Hebei, Henan, Shandong, Shanxi, Liaoning, Jilin, and other provinces to conduct graduate enrollment lectures and promote graduate enrollment policies both online and offline. The college lecture will introduce both full-time graduate enrollment and part-time enrollment policies.

The college annually produces promotional videos for graduate enrollment across various disciplines, highlighting the strengths of each discipline and providing the latest enrollment information for both full-time and part-time students. During the enrollment period, these videos are published on the college's official social media accounts. Many teachers and students actively share the videos and related content, increasing the visibility of the programs and enhancing the effectiveness of enrollment efforts on online platforms.

The college hosts an annual national summer camp for outstanding college students and graduate enrollment lectures. Master's and doctoral supervisors from various disciplines are invited to give academic presentations, introduce their research directions, and invite distinguished alumni to share insights on graduate life. By combining subject-specific lectures, enrollment presentations, and the selection of outstanding recommended students, the college has enhanced the visibility and influence of its programs, receiving widespread attention and praise from students across universities nationwide.

Additionally, the college has established connections with schools that have admitted a large number of students in previous years, strengthened intercollegiate promotion and cooperation, and encouraged previous students to spontaneously promote full-time and part-time graduate enrollment policies to undergraduate graduates, as well as their working classmates and colleagues. This has played an important role in stabilizing and developing high-quality student sources.

3.2. Standardize and strengthen education and teaching management to improve dissertation quality

Universities should enhance the management and oversight of the entire part-time graduate education and teaching process to ensure high-quality instruction and thesis writing. The Graduate School and teaching units should hold regular joint symposiums to facilitate communication and collaboration on graduate training programs, maintaining a unified high standard for the quality of theses across both part-time and full-time graduate students.

Using the Applied Statistics major at China University of Geosciences (Beijing) as an example, the college places significant emphasis on key stages, including coursework, thesis proposals, mid-term reports, and thesis defenses, while consistently standardizing and strengthening teaching management. Mentors provide thorough guidance on topic selection, research, and writing, supporting students in completing their theses and raising overall thesis quality. At each stage, students submit applications and corresponding documents online, which are strictly reviewed and approved by the supervisor and support team to ensure clarity and compliance with standards. Before and after the thesis defense, the mentor and support team conduct one-on-one sessions with students to understand and address their progress and challenges, ensuring timely solutions and guiding them through all tasks needed for graduation.

In summary, the training process strictly adheres to the policy of maintaining equal standards for both part-time and full-time students, ensuring the quality of training for part-time students. This approach has gradually built a positive reputation for part-time graduate programs and has had a favorable impact on part-time graduate student enrollment.

3.3. Strengthen the construction of teaching staff, textbooks, courses, and teaching platforms to ensure quality education

The teaching staff, graduate courses, and textbooks are essential resources in graduate education, playing a crucial role in building knowledge systems, enhancing research capabilities, deepening professional expertise, and cultivating innovative thinking and practical skills. Universities should prioritize strengthening their teaching staff, developing high-quality graduate courses and textbooks, establishing effective teaching management systems and quality evaluation mechanisms, and regularly inspecting and assessing teaching quality.

Using the China University of Geosciences (Beijing) as an example, the college has comprehensively planned the teaching approach for both full-time and part-time graduate students in applied statistics after extensive practice and research. To accommodate part-time students who are working while studying, the college utilizes weekends to schedule courses in applied statistical theory and practice. It also leverages the "China University of Geosciences Network Teaching Platform" to provide online resources. Important subjects offer online course videos and accompanying exercises to meet the needs of part-time students,

allowing them to conveniently review and preview material after class and stay on track with their studies.

Moreover, the college prioritizes textbook development. A mentor with extensive teaching experience in applied statistics has created textbooks, such as "Statistical Calculation," which integrate decades of teaching experience with the latest advancements in the field. This enables students to more effectively grasp contemporary research methods and trends in the information age and big data era, significantly enhancing their practical skills.

3.4. Provide policy support, strengthening off-campus joint training bases, and addressing students' concerns about their future

Universities should strengthen the construction of off-campus joint training bases and enterprise internship bases, and build a non-full-time graduate talent training practice system that deeply integrates schools and enterprises. Taking China University of Geosciences (Beijing) as an example, the school's applied statistics major has established a long-term and stable cooperative relationship with the Chinese Academy of Sciences Aerospace Information Innovation Institute, the Institute of High Energy Physics, the Institute of Atmospheric Physics, the Academy of Agricultural Sciences and other scientific research institutes. Before candidates apply, the college conducts extensive publicity to make them aware of relevant policies. After part-time students enroll, the college arranges for them to meet with on-campus and off-campus supervisors. Students learn about various research directions in the field of applied statistics, as well as the research tasks and related arrangements of the base. Supervisors gain a deep understanding of students' ideas and needs and complete a two-way selection process.

Some part-time students who are temporarily unemployed choose to stay at the base, study under external mentors, and participate in research projects, quickly entering the research state. Off-campus bases provide students with salaries and dormitories, which greatly alleviate their financial pressure and enable them to study in Beijing with peace of mind and actively engage in scientific research work.

In the construction of enterprise internship bases, the school has established cooperative relationships with well-known enterprises to jointly develop training programs and teaching plans for students' practical activities. The enterprise provides data professional training courses, and the school sends students to the enterprise to complete practical and research-based learning during the summer semester. Experienced lecturers in the enterprise use vivid cases to introduce the processes of various projects in the enterprise to students.

Through on-site explanations and online practice system exercises, students have gained a deep understanding of the application of statistical and data science knowledge in the industry. Students have strengthened their communication and interaction with enterprises during the learning process. The practical experience in enterprises has broadened students' horizons, enabling them to no longer be limited to textbook knowledge and understand the needs and expectations of enterprises for talents. After the practice is completed, students have a two-way choice with the company. Students who perform well can further communicate with the company in depth and have the opportunity to stay and work in the company.

Furthermore, in response to the difficulties faced by part-time graduate students in their daily lives, the school provides a series of policy support, such as scholarships and grants, to solve students' household registration and file issues, and help them better complete their studies. Through the above measures, the training of part-time graduate students majoring in applied statistics in the college has gradually established

a good reputation. Students are willing to share their learning experiences and observations at school and base with their classmates and friends, and actively promote the school's policies, which further increases the enthusiasm of candidates to apply for part-time graduate programs at our school and forms a virtuous cycle.

3.5. Strengthen cooperation with the school's advantageous disciplines and build the overall brand image

Although some universities have strong strengths in key disciplines, they do not have an advantage in part-time graduate enrollment. Recruiting popular majors can make full use of the school's resources, strengthen exchanges with the school's advantageous disciplines, and achieve win-win cooperation. Taking China University of Geosciences (Beijing) as an example, the school focuses on geology as its main characteristic and advantageous discipline. Deep cooperation and integrated development between mathematics, statistics, and geology, deeply cultivating mathematical problems in earth science, achieving breakthroughs in the search for mineral resources, and continuously improving scientific research level.

The college guides some graduate students in applied statistics to collaborate with geosciences in conducting interdisciplinary scientific research, enabling students to proficiently master the basic knowledge of modern mathematical geology and apply statistical knowledge to geoscience research. Students have gained richer and more cutting-edge learning experiences. The relevant measures have played a positive role in building the overall brand image of the school and promoting the recruitment of high-quality students in various disciplines.

4. Conclusion

Part-time graduate education faces many challenges and problems in the enrollment process. However, by expanding enrollment publicity in various forms, standardizing education and teaching management, strengthening the construction of teaching staff, textbooks, and courses, providing policy support, strengthening the construction of external joint training bases, and enhancing cooperation with advantageous disciplines of the university, these problems can be gradually solved. High-quality students can be recruited, the development of part-time graduate education in universities can be promoted, and the original intention of reforming part-time graduate education can be achieved. With the continuous improvement of part-time graduate education in universities, society will increasingly recognize it, and part-time graduate education will become an important choice for more working professionals to enhance themselves and achieve career development.

Disclosure statement

The authors declare no conflict of interest.

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Integration of Indigenous Knowledge Systems and Practices (IKSPs) in the K to 12 Curriculum for Sama Bajaus: A Case Study

Rhina O. Ilagan*

OIC-Asst. Schools Division Superintendent, Department of Education–SDO Batangas Province, 4200 Batangas City, Philippines

*Corresponding author: Rhina O. Ilagan, rhina.silva@deped.gov.ph

Abstract: This study is concerned with mending the gap in department orders, specifically the policy framework on IPED known as DO No. 62, s. 2011, which was meant for indigenous groups. The study would concentrate on finding significant data to recommend a tailored policy framework that would answer the needs of Sama Bajaus. This study utilized a convergent mixed method with teachers, school heads, students, parents of students from pre-selected education institutions in Batangas, Sama Bajau elders, and local government and NCIP officials served as the participants. Based on the results and discussions presented in this study, it is concluded that the Indigenous Knowledge System and Practices (IKSPs) of the Sama Bajau community exhibit characteristics that align with curriculum integration, promoting cultural advancement, social inclusion, and the preservation of Indigenous heritage. Integration of Sama Bajau's IKSPs within the K to 12 Basic Education Curriculum has the potential to support Sama Bajau learners by offering increased learning opportunities that are culturally sensitive and inclusive. Furthermore, it can enhance the awareness and understanding of school personnel, particularly teachers and school heads, regarding the importance of localizing and indigenizing knowledge, skills, attitudes, and values (KSAV) in education. However, the study also revealed that challenges and issues are impeding the effective integration of IKSPs into the curriculum. These challenges include the availability of cultural learning resources and the overall responsiveness of the educational system. It was found that the extent of integration of Sama Bajau's IKSPs is significantly related to the problems and issues encountered. Therefore, a policy recommendation is suggested to address the gaps in localization and indigenization within the curriculum, ensuring that learners' needs are adequately met.

Keywords: Indigenous Knowledge System and Practices; Indigenous heritage; Cultural learning resources

I. Introduction

In today's interconnected world, the pursuit of inclusive education has become a global concern, one that seeks to provide equitable opportunities for all individuals, regardless of their cultural background or societal barriers. Within this broader context, it is crucial to shine a spotlight on the Sama Bajau community, an indigenous group that faces unique challenges in accessing quality education. By anchoring their educational journey on the principles of inclusive education and the empowerment of indigenous peoples (IPs), people can take significant strides towards fostering a more inclusive and equitable society. As Mandela believed that education is the most powerful weapon to change the world, this study aims to integrate the Indigenous Knowledge Systems and Practices (IKSPs) in the K–12 curriculum for the Sama Bajaus in Batangas City [1].

Preservation of their indigenous knowledge systems and practices is very important and integrating it into the curriculum will pave the way for them to love schooling and embrace education as a tool for their community's development. Further, inclusive education emphasizes the right of every individual to access quality education, regardless of social, economic, or ethnic background. It calls for the removal of barriers that hinder educational opportunities, ensuring that no one is left behind [1]. By promoting inclusive education, people acknowledge the inherent value of diversity and strive for educational systems that respect and embrace the cultural identities of all students.

The Sama Bajau people, also known as the "Sea Gypsies", have a rich cultural heritage that has withstood the test of time, despite facing marginalization and limited access to education [2]. Situated primarily in coastal areas of Southeast Asia, particularly the Philippines, Malaysia, and Indonesia, the Sama Bajau community has struggled with discrimination, poverty, language barriers, and a lack of adequate educational infrastructure. These challenges perpetuate a cycle of exclusion and hinder their overall development [3].

In the research locale, the Sama Bajau community in Barangays Malitam and Wawa, Batangas City, started with two families and has grown to over 200 families in the past two decades. They live near the Calumpang River, relying on fishing for their livelihood. Some Sama Bajaus have found employment, intermarried with locals, and adopted different religions. Despite being migrants from the southern Philippines, they are now considered "Batangueños." The Sama Bajaus face challenges in finding better opportunities and seeking basic necessities such as daily food, a safe community, and a stable place to live to avoid constant relocation. Education is seen as crucial not only for their well-being but also for preserving their culture.

Valle-Castillo highlights the contrasting literacy levels between younger and older generations of the Sama Bajau community in Batangas City, attributing this difference to the increased accessibility of basic education for the newer cohorts [1]. The implementation of the Indigenous People Education (IPEd) Program in 2016 has played a significant role in facilitating educational opportunities for school-aged Indigenous individuals, including the Sama Bajaus. Nonetheless, despite the government's efforts to ensure universal primary and secondary education, Bajau families continue to encounter a range of challenges, particularly concerning their children's educational pursuits. These challenges encompass the need for cultural adaptation within the school environment, in addition to economic and social barriers [2].

An investigation conducted by the Batangas City ENRO in July 2014 revealed that illiteracy remains one of the predominant issues among the Sama Bajau population. Respondents attribute their illiteracy to their inability to pursue education due to extreme poverty. Consequently, the financial limitations experienced by these families impede their ability to enroll the majority of their children in school. Frequently facing financial hardship, families struggle to meet their basic needs, relying on income-generating activities such as

pearl selling and begging. This scarcity of resources further obstructs the educational progress of those Sama Bajau children who manage to access schooling. Moreover, these children encounter bullying as a result of their distinct cultural backgrounds, further exacerbating the challenges they confront within the educational system.

Inclusive education assumes even greater significance when applied to the Sama Bajau and other indigenous communities. By championing inclusive education for the Sama Bajau and equipping Sama Bajau children and youth with quality education, people empower them to break free from the cycle of poverty, discrimination, and limited opportunities. Inclusive education opens doors to higher education, vocational training, and meaningful employment, enabling them to contribute meaningfully to their communities and society [3]. Moreover, inclusive education fosters social cohesion as it promotes understanding, acceptance, and respect among diverse cultural groups.

Hence, the global emphasis on inclusive education aligns seamlessly with the imperative of empowering indigenous communities, as exemplified by the Sama Bajau population. The Philippines recognizes that education plays a pivotal role in empowering individuals in various spheres of life, and the nation's progress is closely tied to the accessibility and quality of education provided to its people. To ensure quality education for all, including marginalized and indigenous communities, the Philippines has embraced the Education for All (EFA) initiative, which addresses the educational needs and demands of society. This commitment reflects the principle that no one should be left behind, in line with the United Nations' vision and the attainment of the Millennium Development Goal (MDG) of universal primary education and the Sustainable Development Goal (SDG) of inclusive and equitable quality education and lifelong learning opportunities for all. As globalization has emerged inevitably, the commitment to achieve the EFA has been deepened through the enactment of Republic Act 8372, the Indigenous Peoples' Rights Act (IPRA). The IPRA recognizes and promotes the rights of Indigenous cultural communities and Indigenous people within the framework of national unity and development; protects the rights to their ancestral domains; preserves and develops their culture, traditions, and institutions; guarantees enjoyment of human rights without discrimination; and assures maximum participation in education, health, and other services responsive to the needs of Indigenous people.

The Department of Education (DepEd), for its part, recognizes the need for a systematic and comprehensive response to the specific learning context of Indigenous communities by their educational vision and aspiration. Hence, DepEd, in collaboration with the National Commission on Indigenous Peoples and with the support of other government agencies and stakeholders, adopted the national Indigenous peoples' education policy framework through DepEd Order No. 62, 2011, aimed at promoting shared accountability, continuous dialogue, engagement, and partnership among government, Indigenous people (IP) communities, civil society, and other education stakeholders [4]. The framework guides schools and other education programs, both public and private, as they engage with indigenous communities in contextualizing and enhancing the K–12 curriculum anchored on peoples' educational and social settings for the attainment of quality education [5].

Moreover, this framework addresses different concerns that will improve the education system being implemented in the country. In this order, DepEd has a comprehensive approach to addressing the educational needs of IPs. DepEd's strategy encompasses several key components to ensure the provision of quality and relevant education services to all IPs. In addition, DepEd is committed to providing adequate and culturally appropriate learning resources and environments that meet the specific needs of IP learners [6–7]. This includes ensuring that the materials, facilities, and instructional approaches are respectful and responsive to their

cultural context. To support the implementation of the IP Education Program, DepEd emphasizes the hiring, deployment, and continuous development of qualified teachers and learning facilitators who are equipped to meet the diverse needs of IP students [8].

DepEd also recognizes the importance of establishing dedicated units within the department that are responsible for planning, implementing, and monitoring IP education interventions. These units play a vital role in coordinating efforts, tracking progress, and ensuring the effective implementation of policies and programs related to IP education [3]. Furthermore, DepEd actively seeks to strengthen partnerships with institutions and civil society organizations to enhance coordination, knowledge sharing, and the overall sustainability of the IP Education Program.

Lastly, DepEd is committed to implementing stronger affirmative action to eradicate all forms of discrimination against IPs in the entire Philippine education system. This includes promoting respect for Indigenous cultural expressions and values and fostering a more inclusive and equitable educational environment for Indigenous Peoples. By recognizing and addressing the unique educational needs and cultural contexts of IPs, DepEd aims to provide an education system that empowers and uplifts Indigenous communities across the Philippines.

2. Research objectives

In general, this study intended to develop Sama Bajaus educationally through the integration of Indigenous Knowledge Systems and Practices (IKSPs) in the K–12 curriculum. Specifically, it described the characteristics of the Indigenous Knowledge System and Practices (IKSPs) of Sama Bajaus in Batangas City and identified the issues and problems that confront IPEd teachers in integrating the IKSPs of Sama Bajaus into the K–12 curriculum. With this, the study specifically aimed to:

(1) Identify the characteristics of the Indigenous Knowledge System and Practices (IKSPs) of Sama Bajaus regarding: a) Objectives, b) Practicality, c) Cultural preservation, and d) Sustainable development.

(2) Determine the extent of integration of Indigenous Knowledge System and Practices (IKSPs) of Sama Bajaus in the K to 12 Basic Education Curriculum relative to a) Meeting the needs of every learner, b) Provision of clear goals and objectives, c) Building the learning experience, and offering integrative approaches.

(3) Identify the issues and problems confronting IPEd teachers in the integration of Indigenous Knowledge Systems and Practices (IKSPs) of Sama Bajaus.

(4) Propose a curriculum guide for the integration of Indigenous Knowledge Systems and Practices (IKSPs) of Sama Bajau.

3. Research methodology

The study attempted to describe the features of the K to 12 curriculum and likewise determined the responsiveness of the curriculum to the program goal of preserving the culture and rights of the Sama Bajau people in Batangas City. It also determined the issues and challenges in the preservation of Sama Bajaus' culture along with the implementation of the indigenous people's curriculum. This study used a convergent mixed method design to gather data and information about the topic at hand, wherein it involved collecting quantitative

and qualitative data and analyzed, then compared the analysis of the qualitative and quantitative data.

The research participants included teachers, school heads, students, parents of students from pre-selected education institutions in Batangas, Sama Bajau elders, and local government and NCIP officials. A purposeful sampling technique was utilized, wherein the participants were purposely selected because they were the ones who could provide the needed information through their knowledge and experience in Indigenous education. Yet, the participants joined voluntarily concerning the ethical considerations that this research honors.

The study made use of qualitative instruments in the form of focus group discussions and key informant interview guides and quantitative instruments in the form of a structured questionnaire. The next step was pre-testing. This was done to check for adequate reliability and validity of the procedures. Essentially, in this pre-testing step, the full implementation procedures (e.g., setting up interviews, the interview proper, callbacks, etc.) were tested. The study prioritized the validation of responses in the questionnaire through phone calls. However, should participants refuse or be unable to provide contact numbers, face-to-face validation would be done, pending approval of the conduct of face-to-face interviews from the local government unit. The obtained Cronbach's alpha coefficient was found to be 0.85, indicating a high level of internal consistency among the items [9]. As with the survey instrument, qualitative instruments in the form of FGD and KII guides were also developed through a literature review. In addition, an initial assessment or review of interviews from the pre-testing step was conducted. The findings that were generated from this assessment were used to develop the questions for the FGD and KII guides.

Given the ongoing COVID-19 pandemic and the restrictions on mobility, the study opted to conduct a self-administered survey among teachers, school heads, parents, and students, as well as key informant interviews through email and phone calls. The study conducted face-to-face focus group discussions with the group of Sama Bajau elders, following basic health protocols in accordance with the Inter-Agency Task Force's (IATF) guidelines [10]. A permit to conduct face-to-face focus group discussions was also secured from the local government unit.

3.1. Quantitative phase

A survey was the primary data collection method in the quantitative phase. The questionnaire for teachers and school heads included inquiries on teaching-related factors along with readiness, professional development activities received, and perceptions on the responsiveness of the K–12 program to the Indigenous Knowledge System and Practices (IKSPs) of Sama Bajaus. In addition, the questionnaire for students included queries on the student's level of comfort in using their native language and how well they understood the lessons and/or discussions, their enthusiasm and willingness to learn, their ability to interact and communicate with their peers without fear of being misinterpreted, their ability to recognize their native culture and traditions and incorporate them into their daily activities, and their learning preferences. Meanwhile, the questionnaire for parents included questions on their level of knowledge, awareness, and perception of the issues and challenges in the preservation of Sama Bajau's culture, along with the implementation of the Indigenous people's curriculum for educational development [11].

3.2. Qualitative phase

This phase involved a series of follow-up activities for quantitative results through focus group discussions and key informant interviews. The main tool of inquiry was a semi-structured interview guide. The guides

involved questions that were intended to aid in explaining and providing nuance to the quantitative results.

3.3. Integration phase

Convergent mixed methods is a research approach that involves the simultaneous collection and analysis of both qualitative and quantitative data. It aims to merge or converge these two types of data to gain a more comprehensive understanding of the research topic or question. In convergent mixed methods, equal emphasis is placed on both qualitative and quantitative data, and the results from each approach are combined during the analysis phase.

During the integration phase, the researcher brings together the results from both qualitative and quantitative analyses. This can be done by comparing the findings, identifying patterns or relationships between the data, or using one type of data to help interpret or validate the other. The goal is to provide a more comprehensive and nuanced understanding of the research topic by drawing on the strengths of both qualitative and quantitative approaches.

Convergent mixed methods can be particularly useful when the research question requires a comprehensive exploration of a complex phenomenon. By combining qualitative and quantitative data, researchers can gain a deeper understanding of the subject matter, uncovering both the what and the why behind the observed patterns or relationships.

Quantitative data from the survey were processed, encoded, and analyzed through different statistical software, such as Stata and R. Descriptive statistics were used to report the basic measures of the survey data. This included simple summaries such as frequencies, percentages, and measures of central tendency (mean, median, and mode).

Meanwhile, qualitative data were analyzed through thematic analysis. The analysis involved three phases: 1) familiarization with the data, 2) identifying themes and patterns, and 3) defining and naming themes. All interviews were repeatedly reviewed and transcribed to search for meaning and patterns. The transcriptions were in consistent structure in MS Word form. Using an Excel spreadsheet, raw data were logged and summarized with a unique identifier for the source, such as the participant code, to detail the team's progress in converting the raw data in such a way that themes could be easily identified.

The ethical issues of informed consent, risk of harm, confidentiality, anonymity, and conflict of interest were considered in the data gathering since the majority of the respondents were Sama Bajau, and the activities were done in their community.

Adherence to NCIP standards was pushed through NCIP Administrative Order No. 1 Series of 2012 [12]. The researcher requested approval of the study to be conducted from the NCIP IV-A Regional Office, and once approved, a team validated it in the community to see if all the provisions in the administrative order were complied with. Approval from the tribe leader was also sought by the researcher before any activity was done in the community. A Memorandum of Agreement between the researcher and the community, which contained the details of the obligations and commitments of both parties, was signed as a form of formal written agreement.

4. Results and discussion

4.1. Characteristics of Indigenous Knowledge System and Practices (IKSPs) of Bajaus

Local knowledge is included within Indigenous Knowledge Systems and Practices (IKSPs), which have evolved

through decades of trial and error and are transmitted verbally from one generation to the next. Owing to their tight linkages to resource management and conservation, they were determined to be a significant growth driver. As seen in the table, IPED programs equip teachers, school principals, and administrators, as well as all other staff at all levels of government, to administer culture-based education for IPs.

Respondents have interpreted this signal as representing the actual situation at the research locale. This indicates that the academic community in the study strongly considers the incorporation of IKSPs into teaching and learning content. In addition, several governments and local and international organizations have expressed concern about providing Indigenous Peoples with an education that is culturally grounded and relevant.

In terms of objectives, it is very true that the characteristics of the indigenous knowledge system and practices of Sama Bajaus focus on the objectives, as the 4.40 composite mean quantitatively signifies that the curriculum supports the learning of the said tribe. As aligned with the themes, namely curriculum inclining to relevant learning and cognitive advancement toward cultural and societal inclusion, the objectives crafted for the intention of inclusive education are justifiably achieved.

In connection to practicality, the curriculum's practicality helps Sama Bajaus IKSPs spread into the mainstream. Location-based, ancestor-derived Indigenous curricula with bodies of knowledge are intrinsically related to their environs, Indigenous bodies that foster them, and the circumstances in which they thrive. With a 2.89 general mean, this situation can make the Sama Bajau curriculum practical. Indigenous peoples and institutions are collecting indigenous materials and epistemologies for educational curricula, which most kids do not know about. Sustainability of natural resources, biodiversity, livelihoods, and climate change mitigation and adaptation require such knowledge. This is summed up with the themes of academic adaptation, coping mechanisms, and competent learning for cultural survival.

In line with cultural preservation, IP communities should improve while keeping their heritage. To promote culture-based education, the general mean of 3.14 signifies that DepEd is collaborating with IP communities to localize the K–12 core curriculum through the IPEd Program. This effort seeks to institutionalize contact and cooperation with IP elders and other community representatives to ensure that IP youth participate in and benefit from inclusive, culturally sensitive, and IP youth-oriented education programs. Intergenerational responsibility within and among Indigenous communities and oral modeling for comfortability and assurance were the themes of the cultural preservation aspect of IKSPs.

About sustainable development, IKSPs are always sustainable. Sustainable development in education gives everyone the knowledge, skills, attitudes, and values to construct a sustainable future. It also requires teaching and learning approaches that empower students to change their behavior and act for long-term development [13]. This is reflected in the 3.80 mean about sustainable development in general. Hence, sustainable development education promotes critical thinking, problem-solving, and collaboration as supported by the themes that emerged in the study which were culturally responsive education and comprehensive goals for cultural connections. Education for sustainable development requires significant changes in education, especially inclusive education.

4.2. Extent integration of Sama Bajau's Indigenous Knowledge System and Practices (IKSPs) in the K to 12 basic education curriculum

Indigenous Knowledge Systems and Practices (IKSPs) are local knowledge established by the ancestors who lived centuries ago and subjected to experimentation by succeeding generations. These are transferred

informally through oral communication of ideas from an older to a younger generation. These knowledge systems and practices have proven to be a substantial backbone for maintaining sustainable development among indigenous groups, linking the past, present, and future. Despite their importance, these knowledge, systems, and practices are deteriorating at an escalating rate due to consistent assimilation that resulted from the continuing loss of interest in these practices among young people.

In line with meeting the needs of every learner, garnering a weighted mean of 3.72, participants revealed that the Sama Bajau community validates that the K to 12 curriculum supports learners to be in school, thus preventing them from participating in the exploitative labor force. There are two themes generated that describe how the K to 12 curriculum meets the Sama Bajau learners' needs through integration: creation of learning opportunities in schools for Sama Bajau learners and increasing awareness of teachers on IPEd [14–15].

In connection to the provision of clear goals and objectives, results revealed that the curriculum optimistically impacts the IPs by prioritizing the core values of inclusivity, cultural sensitivity, and flexibility that support the localization and indigenization of the teaching and learning process. The weighted mean of 3.89 signified that the comprising educational institutions relevantly included in their priorities catering to learners with a different cultural orientation. Meanwhile, two themes were generated from qualitative data, which are School Heads' Promotion of IPEd and Teachers' Commitment to IPEd.

In terms of building the learning experience, the provision of basic education which focuses on promoting native culture and traditions is well-defined in their activities and strategies which signified the highest weighted mean of 4.37. Data also revealed that school activities which include their cultural diversity promulgate their culture and tradition, making it stand out as an entity of a culture-based curriculum. Accordingly, three themes were generated. These are Optimally Creative Pedagogies and Instructions, Culturally Sensitive Learning Facilities and Educational Resources, and Community Extension, Linkages and Partnership.

About offering integrative approaches, data presented revealed that the school has a formalized plan for what topics are to be taught in each grade level. These are designed to ensure educational continuity which reciprocates the needs of learners and teachers before the pandemic. It can also be noted that teachers have varied opportunities for professional development. The teacher's academic and professional development activities help to create engaging and effective lessons for Badjao learners. Based on the gathered information, three themes were extracted namely: Intertwining Content Knowledge and Pedagogical Skills, Associating Learners Conceptual Understanding to Multiple Representations Across Curriculum, and Linking Professional Development to Students Learning [16–17].

Based on the two types of data gathered by the researcher, it can be concluded that offering integrative approaches in the integration of IKSPs of Sama Bajaus into the K–12 curriculum is realized by the learners. Data revealed that teachers possessed content knowledge and pedagogical skills in the application of culture-based education for Sama Bajau learners [17]. In addition, they link their lessons across different subject matter to share effective techniques for differentiated, developmentally appropriate opportunities to address learners' individual differences and professional development for teachers to improve their skills to implement innovation and integration that are congruent with the content and performance standards established by DEP.

4.3. Issues and problems in the integration of Indigenous Knowledge System and Practices (IKSPs) of Sama Bajaus

Indigenous knowledge and learning systems have long been acknowledged as essential components of

Indigenous education. The incorporation of Indigenous knowledge into mainstream educational curricula is considered to increase Indigenous students' self-esteem and the relevance of curricular content. According to Victor and Yano, Indigenous tribes demand an education that focuses on the young generation's cultural well-being and personhood.

With time and student diversity, culture-related teachers face many obstacles that threaten IKSP's inclusion in the curriculum. The long school years of students are a problem [17]. Due to their scarcity, Sama Bajaus are not employed in technological facilities like libraries, computer labs, and others. Finally, Sama Bajau kids have a shortage of classrooms, teachers, and non-teaching staff. Problems and issues in the integration of Indigenous Knowledge Systems and Practices (IKSPs) of Sama Bajaus were compressed into these two topics that emerged from the qualitative research's findings. The themes at hand are cultural learning resources and the responsiveness of the educational system.

To address the specific needs of Sama Bajau students, teachers should receive training in teaching Indigenous learners. This training should equip them with the knowledge and skills necessary to understand the unique cultural and educational requirements of the Sama Bajau community. Teachers who are trained in working with Indigenous people, such as the Sama Bajaus, can better tailor their instructional methods and approaches to meet the student's needs and promote effective learning [1–2]. In addition to training, teachers need to develop and produce instructional materials that cater to the specific needs and experiences of the Sama Bajau students. These materials should be culturally relevant, engaging, and accessible, enabling the students to effectively engage in the teaching and learning process.

Overall, addressing the shortage of classrooms, teachers, and non-teaching personnel, along with providing appropriate training and Indigenous materials, can contribute to a more inclusive and supportive educational environment for Sama Bajau students, allowing them to thrive academically while maintaining their cultural identity. In this connection, many teacher education programs do not make preservice teachers aware of the cultural and linguistic differences they are likely to face in their future classrooms or give them the knowledge, strategies, and pedagogical skills they need to deal with these differences.

As teacher education moves away from preparing only Indigenous preservice teachers to work mostly in tribal or on-reserve schools and toward preparing all teacher candidates to teach all students about Indigenous histories and perspectives in line with international curriculum reform and changing standards for the profession by teacher regulating bodies, Indigenous teachers bring valuable knowledge and experience to the professional development of other educators. Indigenous educators should be careful about taking on the role of expert and being in charge of all parts of education because it can be a lot to handle [3–5]. Indigenous teachers can help their non-Indigenous colleagues by giving them support in the classroom, giving advice about Indigenous cultures and ways of knowing, and building and keeping home-school relationships.

5. Conclusion

Based on the results and discussions presented in this study, it can be concluded that the Indigenous Knowledge System and Practices (IKSPs) of the Sama Bajau community exhibit characteristics that align with curriculum integration, promoting cultural advancement, social inclusion, and the preservation of Indigenous heritage. Integration of Sama Bajau's IKSPs within the K to 12 Basic Education Curriculum has the potential to support Sama Bajau learners by offering increased learning opportunities that are culturally

sensitive and inclusive. Furthermore, it can enhance the awareness and understanding of school personnel, particularly teachers and school heads, regarding the importance of localizing and indigenizing knowledge, skills, attitudes, and values (KSAV) in education.

However, the study also revealed that challenges and issues are impeding the effective integration of IKSPs into the curriculum. These challenges include the availability of cultural learning resources and the overall responsiveness of the educational system. It was found that the extent of integration of Sama Bajau's IKSPs is significantly related to the problems and issues encountered. Therefore, a policy recommendation is suggested to address the gaps in localization and indigenization within the curriculum, ensuring that learners' needs are adequately met.

To facilitate the integration of Sama Bajaus Indigenous Knowledge System and Practices (IKSPs), the study proposes the development of a curriculum guide specifically tailored to this subject. This guide would provide educators with the necessary resources, strategies, and approaches to effectively incorporate IKSPs into the teaching and learning process, thereby promoting a more inclusive and culturally responsive education for Sama Bajau learners.

6. Recommendation

In the light of the core findings and concluding statements above, this paper recommends that:
   (1) The Department of Education may conduct an in-depth study on the characteristics of the Indigenous Knowledge System and Practices (IKSPs) of Sama Bajaus to explore the specific goals and aspirations embedded within Sama Bajau IKSPs, examining how they contribute to the cultural identity, community cohesion, and overall well-being of the Sama Bajau people.
   (2) A comprehensive assessment may be conducted to determine the extent of integration of Sama Bajau's Indigenous Knowledge System and Practices (IKSPs) within the K to 12 Basic Education Curriculum, focusing on meeting the needs of every learner, provision of clear goals and objectives, building the learning experience, and offering integrative approaches.
   (3) The division may conduct a qualitative study to explore the perspectives and experiences of Indigenous Peoples Education (IPEd) teachers regarding the integration of Sama Bajau's Indigenous Knowledge System and Practices (IKSPs), with a focus on identifying the underlying factors that hinder or facilitate successful integration.
   (4) The proposed curriculum guide may be adopted, utilized, and enhanced thereafter.

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Disclosure statement

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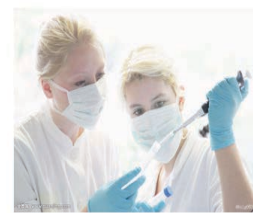
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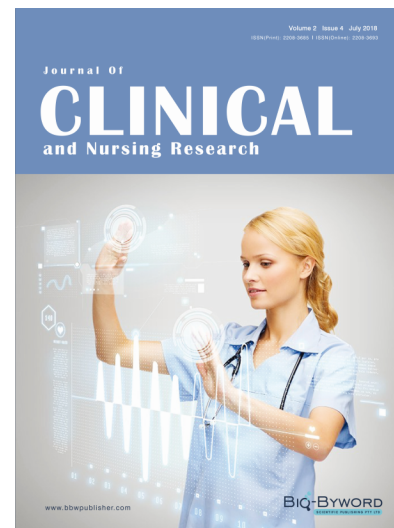
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