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Research on the Reform Path of E-commerce Innovation and Entrepreneurship Practical Teaching in Xing'an League Urban-Rural Consortium Based on the Six Sigma DMAIC Model

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Abstract: Against the backdrop of the digital economy, e-commerce serves as the core engine for Xing'an League to activate regional characteristic industries, boost rural revitalization, and promote the construction of the China-Mongolia-Russia Economic Corridor. The superposition of national vocational education reform and digital economy policy dividends provides strategic guidance for regional e-commerce talent training. However, the practical bottleneck of the shortage of high-quality innovation and entrepreneurship (double innovation) talents severely restricts industrial transformation and upgrading. As an important carrier for regional resource integration, the urban-rural consortium has unique advantages in the reform of e-commerce double innovation practical teaching. Taking the Network Marketing and Live Streaming major of Xing'an Vocational and Technical University as the core research object, this paper introduces the Six Sigma DMAIC model, combines national and Inner Mongolia policy orientations, and bases itself on the development characteristics of Xing'an League and the school's training foundation. From the five stages of Define, Measure, Analyze, Improve, and Control, it analyzes the practical status, advantages, and shortcomings of the model's application in core courses, and constructs a reform path of "government-enterprise-school collaboration, deep integration of production and education, and distinct regional characteristics". This study provides theoretical support and practical reference for improving the quality of talent training and empowering the high-quality development of local industries.

Keywords: Six sigma; DMAIC model; Urban-rural consortium; E-commerce; Innovation and entrepreneurship practical teaching

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1. Introduction

Under the background of the development of the digital economy and "double innovation", live streaming e-commerce has become the key to activating county economies and promoting the upgrading of characteristic industries [1]. As an important agricultural and livestock product production area in eastern Inner Mongolia, Xing'an League has explored the "courtyard economy + live streaming e-commerce" model. During the "14th Five-Year Plan" period, the annual growth

rate of online retail sales reached 6%, which has become the core channel for the upward movement of agricultural and livestock products and the expansion of cross-border trade. Currently, the total number of double innovation talents in regional live streaming e-commerce is insufficient, their practical capabilities are weak, and their data-driven operation literacy is lacking, which restricts industrial development. With Xing'an Vocational and Technical University as the core, the Xing'an League Urban-Rural Consortium introduces Six Sigma management methods to optimize professional core courses, constructs a talent training system integrating production and education, and helps the high-quality development of the e-commerce industry.

2. Theoretical basis

Relevant studies have shown that the connection points between the Six Sigma model and practical courses in vocational education focus on three dimensions: "target precision, process datafication, and continuous improvement". For the Live Streaming E-commerce major of Xing'an Vocational and Technical University: at the policy level, the "process evaluation" emphasized in the "National Vocational Education Reform Implementation Plan" is highly consistent with the "Measure-Control" logic of DMAIC; at the regional level, Xing'an League's characteristic model of "courtyard economy + live streaming e-commerce" provides specific scenarios for the "Define-Improve" stages of the model; at the course level, the characteristics of live streaming e-commerce, such as "practicality, datafication, and strong iteration", are naturally compatible with the core logic of Six Sigma of "data-driven and problem-oriented", providing feasibility for the implementation of the model.

3. Current situation diagnosis of the application of six sigma management in live streaming e-commerce professional courses

3.1. Define stage: Anchoring the needs of the live streaming e-commerce industry

Combined with Xing'an League's live streaming e-commerce industry policies (the "Xing'an League 14th Five-Year Plan for E-commerce Development") and enterprise needs, the core goal of applying Six Sigma to live streaming e-commerce courses is to cultivate regional talents who "understand the industry, can live stream, are proficient in data, and can start businesses". The courses need to focus on three core needs: adapting to the selection and script design for live streaming of Xing'an's characteristic products (beef and mutton, miscellaneous grains, dairy products), meeting the multilingual communication and compliant operation requirements for Sino-Mongolian-Russian cross-border live streaming, and possessing the ability to analyze and optimize live streaming data (conversion rate, repurchase rate, fan growth).

3.2. Measure stage: Quantifying key indicators for course application

Based on the core of Six Sigma's "data-driven" approach and combined with the vocational education course evaluation index system from CNKI, key quality characteristics (CTQ) for the application of Six Sigma in live streaming e-commerce courses are set [2]. Through questionnaire surveys (37 regional e-commerce enterprises, more than 200 students) and practical training data statistics, the results are as follows:

(1) Course relevance

In core courses such as "Practical Live Streaming Sales", the content integrating live streaming cases of Xing'an's characteristic products accounts for 55%, an increase of 40% compared with traditional courses. However, modules such as cross-border live streaming compliance and in-depth analysis of live streaming data account for less than 20%.

(2) Practical training effect

45% of students participate in real live streaming projects of Xing'an's characteristic products, with an average live streaming conversion rate of 3.2% (the industry entry-level standard is 2%). However, the fan retention rate is

less than 15%, which is lower than the average of top regional live streaming teams.

(3) Teachers' competence

30% of "double-qualified" teachers have practical experience in live streaming e-commerce, among which only 12% can use Six Sigma methods to carry out teaching.

(4) Talent quality

58% of graduates are engaged in live streaming e-commerce-related work, and 38% stay to work locally in Xing'an League, an increase of 13% compared with previous graduates who did not apply Six Sigma.

4. Advantages of applying six sigma management in live streaming e-commerce professional courses

4.1. Teaching objectives accurately anchored to regional needs

The "Define" stage of Six Sigma promotes courses to focus on the fields of live streaming of agricultural and livestock products in Xing'an League and Sino-Mongolian-Russian cross-border live streaming, solving the problem of traditional courses being "extensive but not specialized"[3]. For example, "E-commerce Operation of Xing'an's Characteristic Products" designs core modules around the live streaming of grassland beef and mutton. According to CNKI literature, such designs have increased the talent supply-demand matching degree by more than 35%, and the local employment rate of students in this course is 18% higher than that of other e-commerce courses [4].

4.2. Data-driven practical training for continuous optimization

Relying on the closed loop of "Measure-Analyze-Improve-Control" in Six Sigma, 12 core practical training indicators are quantified to identify problems and dynamically optimize modules. A total of 48 teaching cases have been updated and 12 practical training projects have been adjusted, with the average live streaming conversion rate of the courses increasing from 2.1% to 3.2% [5].

4.3. Collaborative talent training activates resource efficiency

Practicing the concept of cross-border collaboration, it has jointly built a talent training system with local e-commerce cloud warehouses and 10 leading live streaming enterprises, with enterprises participating in indicator setting and evaluation [6]. For example, "Cross-border Live Streaming Practice" connects with Sino-Mongolian-Russian orders, promoting the participation rate of enterprises in teaching from 30% to 55%.

5. Shortcomings of applying six sigma management in live streaming e-commerce professional courses

5.1. Imperfect data support system restricts the efficiency of core links

Live streaming e-commerce data is real-time, fragmented, and heterogeneous across multiple platforms, and inconsistent interfaces lead to difficulties in statistical analysis; teachers and students lack sufficient statistical and modeling capabilities to dig deep into the causal relationships of data, resulting in the "Measure-Analyze" stages being superficial. Regional enterprises refuse to provide core data due to commercial secrets, and practical training mostly uses test or simulated data, which is disconnected from real scenarios, weakening the practical training effect and the pertinence of improvement [7].

5.2. Imbalance between teaching and industrial adaptation affects the depth and quality of application

Only 12% of teachers have both Six Sigma and live streaming e-commerce capabilities, leading to a disconnect between

teaching theory and practice. The rigid process of Six Sigma is difficult to adapt to the rapid iteration characteristics of live streaming e-commerce, and there is a significant deviation between the practical training indicators of the courses and the actual industrial situation.

6. The promoting role of six sigma management in the development of the live streaming e-commerce major

Six Sigma management promotes the development of the live streaming e-commerce major in multiple dimensions, constructs a "data-driven–precise improvement–continuous optimization" talent training model, and improves students' core literacy [8]. In the past three years, the major has won 5 awards in Inner Mongolia Autonomous Region e-commerce skills competitions, driven the live streaming sales of Xing'an League's characteristic products to exceed 5 million yuan, and the local employment rate of graduates is 38%, 15% higher than that of similar majors, forming a regional brand effect. At the same time, the major has reconstructed the curriculum system, with industrial projects accounting for 45% of core courses; deepened the integration of production and education, co-built practical training centers with enterprises, and enterprises participated in teaching throughout the whole process [9]. The trained talents have helped the development of local "courtyard economy" and Sino-Mongolian-Russian cross-border live streaming, forming a virtuous cycle of "talent training–industrial upgrading" [10].

7. Conclusion and outlook

This paper focuses on the core courses of the Network Marketing and Live Streaming E-commerce major of Xing'an Vocational and Technical University, and analyzes the practical application of the Six Sigma DMAIC model. Its advantages are reflected in the precision of teaching objectives and the dataization of practical training, which effectively improve the quality of talent training and industrial adaptation. However, there are also problems such as difficulty in data integration and shortage of compound teachers. Overall, the model has significantly promoted professional upgrading and constructed a collaborative ecology of "major–industry–region". In the future, it is necessary to rely on its continuous improvement characteristics to optimize the path, deepen cooperation, and provide reference for the development of regional e-commerce and the reform of similar colleges and universities.

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