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Exploration of the Implementation Paths of Integrating Labor Education into Mathematics Teaching in Local Ethnic Colleges

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Abstract: *It is of great significance to integrate mathematics teaching into labor education in ethnic minority colleges. However, in the current mathematics classroom teaching in most ethnic minority areas, the separation of mathematics education and labor education has become a very common phenomenon. How to infiltrate labor education into mathematics has become an urgent problem to be solved in the development process of mathematics education. This article explores and analyzes the implementation paths of integrating labor education into mathematics teaching from two aspects: teachers and students.*

Keywords: *Local Ethnic Colleges, Mathematics Education, Labor Education, Path Exploration*

1. Introduction

The "Dictionary of New Era and New Terminology" points out that the main content of labor education includes the following three points: establishing a correct labor perspective; Cultivate students' love for labor and the emotions of working people; Develop the habit of labor. Some researchers believe that when providing labor education to students, the goal should be to cultivate correct labor values and develop good labor literacy. Among them, labor values are the core connotation of labor literacy. The spirit of labor advocated in the new era reflects the fruitful results of the labor practice of the vast number of workers, inherits excellent cultural genes, and vividly interprets the socialist core values.

The Ministry of Education has pointed out that labor education should be made a compulsory course and combined with other disciplines to provide labor education for students. Among them, mathematics teaching and labor education have a close internal connection, and labor education should always be integrated into the classroom[1]. In recent years, although many colleges in ethnic minority areas have integrated labor education into mathematics classroom teaching, the research status is still not optimistic. We have reviewed a large amount of literature and summarized the implementation paths of integrating mathematics teaching into labor education from the perspectives of labor education, subject teaching and labor education, mathematics and labor education, and mathematics and labor education in ethnic minority areas. We have proposed some implementation paths for integrating mathematics teaching into labor education from both the teacher and student aspects. Therefore, this article mainly addresses the following two key issues.

1.1 Teacher aspects

Abandoning outdated concepts of labor education, labor education not only teaches students how to work, but also requires a profound understanding of the connotation and requirements of labor education in the new era.

Teachers should enrich their teaching methods, while using traditional teaching methods, pay special attention to the use of situational teaching methods, role model demonstration methods, practical experience methods, case analysis methods and other teaching methods.

To improve the evaluation method, in addition to traditional outcome evaluation, the concept of labor education should be fully integrated into process evaluation such as diagnostic evaluation and formative evaluation.

Enhancing awareness of the integration of labor education is crucial in mathematics. It is important to consciously incorporate labor education into teaching design during lesson preparation.

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1.2 Student aspects

Transforming students' limitations on labor cognition, guiding them that labor is not only physical labor, but also requires a profound understanding of the true connotation and significance of labor education. They are the main participants in classroom teaching, and only when there is no deviation in labor cognition can labor education be integrated into mathematics.

Students strive to eliminate negative attitudes towards labor emotions, encourage oneself to actively engage in labor, think about the relationship between labor and mathematics, and actively accept labor education. As long as students do not reject labor education, labor education can be integrated into mathematics, and effective labor education can be provided to students.

By enhancing students' labor ability, they can efficiently participate in mathematical practice activities, thereby eliminating obstacles that arise when mathematics teachers integrate mathematics and labor education in mathematical practice activities.

1.3 Significance of the study

The solution to the above problems will have profound significance in this teaching exploration.

There are more prominent innovative practical teaching cases in labor education. By carefully exploring the interesting elements of labor education in mathematics and conducting scenario based case innovative teaching, students can receive labor education in the classroom.

Our exploration aims to promote the development of mathematics in ethnic minority areas through the integration of labor education. According to the "Guidelines for Labor Education in Primary, Secondary, and Tertiary Schools (Trial)", mathematics should focus on cultivating students' scientific attitudes, efficiency concepts, and innovative spirit towards labor. Integrating mathematics into labor education in ethnic minority areas and promoting the deep integration of mathematics and labor education is not only an effective way to successfully provide labor education for students, but also of great significance for promoting the further development of mathematics in ethnic minority areas.

The infiltration of mathematics into labor education can drive the integration of other disciplines into labor education. We propose innovative teaching strategies that integrate mathematics into labor education. This not only identifies the problems in the current implementation of labor education and the integration with mathematics teaching, but also radiates this teaching strategy to other disciplines.

This research can assist in the reform and innovation of colleges and universities in ethnic regions. Colleges and universities in ethnic regions emphasize the cultivation of laborers who serve society. Due to the uniqueness of the region, this is more closely related to labor education compared to other types of schools. Researching how to integrate labor education into mathematics classrooms in ethnic region colleges and universities is of great significance for school reform and innovation.

2. Theoretical and Paths Framework

"Economic and Philosophic Manuscripts of 1844" elaborated on the connection between labor and the comprehensive development of human beings, and proposed that labor is the foundation of comprehensive human development. The theory of comprehensive human development explains in detail the nature, tasks, and important role of labor education in human development, which is the basis for many scholars' subsequent research on labor education. With the advent of the era of machine driven industrial production, there has been a significant phenomenon in society where education is disconnected from productive labor. Against this backdrop, the educational philosophy of combining education with labor has emerged, especially in schools where education and teaching must be integrated with modern productive labor[2,3].

Colleges in ethnic regions emphasize the cultivation of laborers who serve society. Due to the uniqueness of the region, this is more closely related to labor education compared to other types of schools. Researching how to integrate labor education into mathematics classrooms in ethnic minority areas is of great significance for the reform and innovation of colleges[4,5]. The following Figure 1 reveals the framework of exploring the paths of integrating labor education into mathematics teaching in this article.

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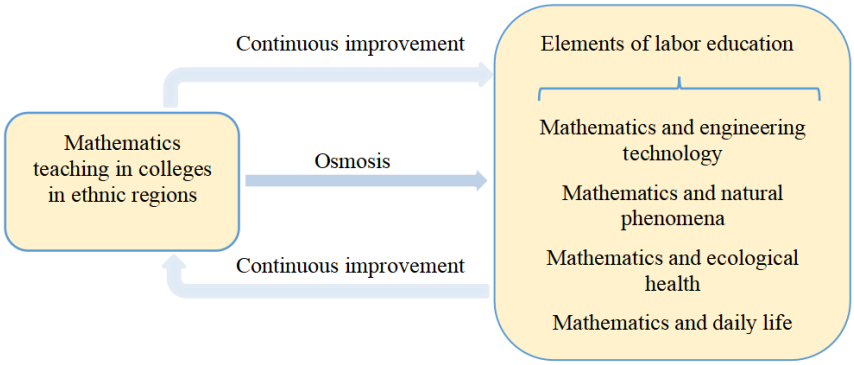

Figure 1: Exploring the path of integrating labor education into mathematics teaching

3. Research object and existing problems

This study focuses on Sichuan Minzu College, which currently offers 35 undergraduate majors covering nine disciplines including economics, law, education, literature, science, engineering, agriculture, management, and art. The college also provides ethnic preparatory education. About 50% of the majors involve mathematics teaching. In the process of regular mathematics education and teaching, the infiltration of labor education into mathematics teaching is still very weak. After years of education and research interviews, we have learned that there are several main problems.

Some teachers have outdated labor education concepts and relatively monotonous teaching methods. They believe that labor education is limited to teaching students how to perform labor, and they are not familiar with the connotation and requirements of labor education in the new era. In mathematics classrooms, they tend to rely on lecture-based teaching methods.

The evaluation method is not perfect, and the awareness of labor education infiltration is not high. Apart from conducting traditional outcome evaluations, there is not much infiltration of labor education in other process evaluations, and it is even considered unnecessary to incorporate labor education into mathematics teaching, which will not be integrated into teaching design.

Students have misconceptions about labor and negative emotions towards labor. Some students believe that labor only refers to physical labor, without realizing the true connotation and significance of labor education, resulting in a one-sided understanding of labor, which makes it difficult for teachers to integrate labor education into mathematics classroom teaching. Some students are unwilling to engage in labor and think about the relationship between labor and mathematics. Even if labor education is integrated into the classroom, it cannot achieve the expected effect on students' labor education.

Students have insufficient labor ability. Some students have low labor ability and are unable to participate in mathematical practice activities, which hinders the integration of mathematics and labor education for mathematics teachers in mathematical practice activities.

4. Implementation paths adopted

Based on the problems of integrating labor education into mathematics teaching at Sichuan Minzu College, and using Figure 1 as the exploration approach, after years of teaching experience and continuous improvement, we now propose the following measures to solve the problems.

4.1 Teacher's Paths

Teachers must promote the study of labor theory and enhance the noble concept of labor. We can help themselves establish a noble concept of labor through learning various labor theories and participating in various labor training. As long as teachers recognize that labor is noble, they can effectively infuse it into the classroom.

In the classroom, more labor problem scenarios should be created to allow students to experience the high charm of labor. We can combine students' professional characteristics to mathematically model labor problems in real life, find the joy of labor in the process of solving problems, and then provide labor education to students; Alternatively, by introducing the history of mathematics, students can understand

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that mathematicians create through the spirit of perseverance and striving for excellence, and infuse labor education into the true stories of mathematical history.

We should strive to improve the teaching evaluation mechanism and reflect on the integration of teaching and labor in the teaching process. We need to change the outdated evaluation methods, timely affirm and evaluate students' labor performance in mathematics classes, and enhance their willingness to work. After class teaching reflection, identify the shortcomings of labor education infiltration in class, in order to make improvements in the future.

In teaching, we should strengthen the cultivation of students' labor concept and use mathematical beauty to perceive the beauty of labor. Both colleges and teachers should take effective measures to strengthen the cultivation of students' labor concept, so that students can appreciate the beauty of labor in mathematics. Guide students to update their labor concept by actively thinking about the intrinsic connection between mathematics and labor, actively applying mathematics to practical life, and actively reflecting on the labor education infiltrated by teachers in mathematics classes, in order to promote the penetration of labor education in mathematics classrooms.

Teachers should fully explore the labor elements of mathematical content in the classroom and expand the integration of labor education. We can carefully compare the national standards for mathematics teaching quality in the "National Standards for Undergraduate Professional Teaching Quality in Ordinary Higher Education Institutions" and study textbooks to explore the labor elements in mathematics content, and combine the characteristics of mathematics learning for students in ethnic minority areas to find the integration point between mathematics and labor, in order to facilitate the penetration of labor education in education and teaching.

For example: Case study of n-dimensional vector infiltration in labor education.

Teacher: Yak from Garze Tibetan Autonomous Prefecture, Sichuan Province, China is a unique local breed found in the Qinghai Tibet Plateau and adjacent high-altitude regions. It has the characteristics of good meat performance, high plush production, large body size, and strong carrying capacity. The central production area is located in the southern part of Jiulong County and Kangding City, with a total inventory of 41.07% of the province, showcasing the labor achievements of high-quality yak breeding and output. Assuming there are four types of yaks, A, B, C, D, and E, calculate their total profit, cost, selling price, and annual sales volume for one year as shown in the following Table 1:

Table 1: Annual yak sales table

Yak	A	B	C	D	E
Cost (yuan/kg)	x_1	x_2	x_3	x_4	x_5
Selling price (yuan/kg)	y_1	y_2	y_3	y_4	y_5
Sales volume (kg)	z_1	z_2	z_3	z_4	z_5

Student: Based on the information provided in Table 1, we should first calculate the profit of each type of yak: Subtract the cost from the selling price, multiply by the sales volume, and then add them up.

Teacher: Very good! How to calculate when there are many types of yaks? At this point, the knowledge of n-dimensional vectors in advanced mathematics can be used to solve the problem. First, sequentially number all types of yaks:

$$x = (x_1, x_2, ..., x_n), y= (y_1, y_2, ... , y_n), z = (z_1, z_2, ... , z_n),$$

Here x, y, and z represent cost, selling price, and sales, respectively, so the total profit of n types of yaks is

$$w=(y-x)\cdot z.$$

Labor elements: In the era of rapid economic development, many jobs require labor to be done bit by bit, actively innovate, and improve labor efficiency. This case combines labor education with mathematics organically, which to some extent changes students' traditional views on labor and conveys the labor requirements of the new era.

4.2 Student's Paths

Students should actively apply their learned knowledge in practical life, truly comprehend the essence of mathematics, and experience the joy of labor in the process of practice. They are able to actively engage in practice, regardless of whether the teacher is present or not. For example, after students have learned about probability, they can be asked to design a lottery plan and appreciate the practical beauty

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of mathematics during the design process.

If students can actively think and reflect on the connection between mathematics and labor in mathematics classrooms and labor processes, they can achieve better penetration effects. They summarize their shortcomings in using mathematical knowledge to solve labor problems, how to effectively integrate mathematical knowledge with labor, and whether the labor activities they engage in are related to other mathematical knowledge.

5. Conclusions

Integrating labor education into mathematics teaching can not only promote the improvement of students' professional skills, cultivate their correct labor values, and understand the connotation of mathematics courses, but also enrich teachers' evaluation methods of mathematics courses. This is an innovation and practice of integrating mathematics into labor education.

Firstly, teachers should strengthen their theoretical learning of labor education in the new era and establish the concept of the nobility of labor.

Secondly, teachers have a deep understanding of the subjects they teach, explore labor education elements in mathematical content, find more penetration points, and adopt various teaching methods and approaches to infiltrate labor education.

Then, teaching can be carried out by developing school-based courses that combine mathematics and labor education.

Finally, teachers help students develop an awareness of the relationship between mathematics and labor, enabling them to actively apply mathematical knowledge to practical life and reflect on problems that arise in practice, in order to facilitate effective infiltration.

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