Research on the Enhancement of Professional Quality and Employment Ability of Vocational College Students in the Era of Artificial Intelligence

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Abstract: In response to the problems such as the lagging skills training of vocational college students in the era of artificial intelligence, the reduction of job positions due to AI substitution, etc., based on the theory of skill-biased technological progress, the iceberg model theory of ability and quality, as well as the labor process theory, combined with expert investigation methods and questionnaire surveys, this paper analyzes the current situation and causes of vocational skills of vocational college students. It proposes countermeasures such as strengthening the construction of intelligent system training rooms, promoting the "three teaching" reform, cultivating new qualities and new skills, and improving employment guarantees. Practice has proved that optimizing the vocational skills training system is of great significance for adapting to the demands of the era of artificial intelligence.

1. Introduction

AI substitution leads to a reduction in traditional jobs. The emergence of intelligent devices has changed the traditional working mode and employment methods. The intelligent era requires new skills and new innovative qualities. Higher vocational education should establish new educational goals and teaching methods based on the needs of the times. It is necessary to study the vocational qualities and employment methods of vocational college students in the era of artificial intelligence.

Rauner[1] proposed a human resource quality structure model, including knowledge, skills, attitudes, and other vocational qualities to describe the vocational qualities of employees; the new technological revolution centered on artificial intelligence has shaped new contents of human resource quality. Zhao Min and Wang Jinqiu [2] believe that in the era of artificial intelligence, the production process is deeply integrated with artificial intelligence technology, information physical systems, and big data technology, achieving a production mode that is independent of human control and fully automated. Sun Ao and Hou Yulin [3] believe that the new labor relations have undergone significant changes in the management methods of the labor process, the establishment of labor conditions, and the acquisition of labor remuneration compared to traditional labor processes. Qiu Zitong [4] believes that in the context of artificial intelligence application, labor division is developing from refinement to polarization, and the labor process is tending to achieve effective human-machine cooperation. This not only requires workers to have higher-level production skills but also requires corresponding quality skills, ultimately achieving the transformation of workers from de-skilling to re-skilling; it reduces the demand for middle and low-skilled workers and increases the demand for high-skilled workers. He Xiuxia [5] believes that vocational education needs to form a development thinking that adapts to artificial intelligence, applies artificial intelligence, and leads the development of artificial intelligence, and promotes the transformation of vocational education "artificial intelligenceization" from aspects such as professional setting, student training direction, and educational management.

However, vocational education lags behind the talent demand of the era of artificial intelligence. It is necessary to study the requirements of vocational qualities in the new era, change teaching

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methods, and enhance students' employment capabilities. This article analyzes the current situation of vocational qualities of vocational college students, constructs a structural model of vocational qualities of vocational college students in the era of artificial intelligence, and proposes training countermeasures.

2. Conceptualization and Theoretical Foundation

2.1 Artificial Intelligence

Artificial Intelligence (AI) is a branch of computer science that aims to develop technological systems capable of simulating, extending, or enhancing human intelligence. Its core objective is to enable machines to possess human-like capabilities such as perception, learning, reasoning, decision-making, and creation, thereby enabling them to complete complex tasks or solve real-world problems. Perception capabilities involve recognizing information such as images, speech, and text (e.g., face recognition, voice assistants). Learning capabilities involve self-optimization through data, such as recommendation systems adjusting content based on click behavior. Reasoning and decision-making involve analyzing information and making logical judgments, such as medical AI assisting in disease diagnosis. Autonomous actions involve performing tasks without human intervention, such as autonomous driving and industrial robots.

The industrial application has deepened, with intelligent manufacturing, industrial AI quality inspection covering leading manufacturing enterprises, and the Siemens platform achieving production line fault prediction, reducing equipment downtime by 40%. Smart healthcare, AI-assisted lung cancer screening has increased the early detection rate from 65% to 92%, and the Mindray intelligent uAI system has a misdiagnosis rate of 3%. Intelligent vehicles, "multi-modal perception + large model decision-making + vehicle-road-cloud collaboration" promote the implementation of full-scenario autonomous driving, with Huawei's Haier Alpha S equipped with 3 laser radars and sound perception systems, still accurately avoiding obstacles in heavy rain. Educational transformation, 42 schools in Fujian Province were selected as "Artificial Intelligence + Education" cases, such as Xiamen Haicang Middle School using AI to restructure dance teaching, achieving real-time evaluation of movements and learning situation analysis.

Market size: The core AI industry in China is valued at nearly 600 billion yuan, with over 4,500 enterprises; global AI spending is expected to drive a 17% GDP growth in 2030.

2.2 Theory of the Labor Process

The theory of the labor process is a political economy theory that studies the way in which workers combine with production materials in capitalist production and the control mechanism of this combination. Its core lies in revealing how capital achieves the domination of labor and the extraction of surplus value through labor organization.

The labor process is a material transformation process in which workers, through purposeful activities, use labor materials (tools/equipment) to transform the labor object (raw materials) and create use value. Under the capitalist system, this process is restructured by capital as a tool for the production of surplus value. The core contradiction is the control and exploitation of "living labor" (labor transformed into actual labor) by capital. Control logic: Capital breaks down the complete labor into simple operations through scientific management (such as Taylorism), weakening the bargaining power of workers; at the same time, it ensures labor intensity through hierarchical supervision, promoting the efficient conversion of labor into surplus value. Capital controls the labor process to narrow the gap between the potential of the laborer and the actual labor output, maximizing surplus value.

Natural attribute: the eternal process of humans transforming nature, the creation of use value. Social attribute: the exploitation device coerced by capital under the capitalist system, the process of value augmentation.

Marx first systematically analyzed the exploitative essence of the capitalist labor process in "Das Kapital". Breifman proposed the "de-skilling" theory to reveal the disguise of technological control.

The theory of the labor process should include four key points. First, labor creates surplus value. Second, the inherent demand for capital accumulation forces capital to constantly innovate the labor process. Third, in the labor process, capital must implement a control system to ensure profit acquisition and the actual possession of the labor it buys. Fourth, capital must obtain innovation and cooperation from the specific production process of the laborer, and take certain measures to make the laborer go through the process from resistance to obedience and then to voluntary work.

2.3 Skill-biased Technological Progress Theory

The Skill-Biased Technological Change (SBTC) theory defines that technological progress has an asymmetric impact on different skill levels of the labor force, significantly enhancing the marginal productivity of highly skilled workers, leading to a differentiation in skill demand and an expansion of wage gaps in the labor market.

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The upgrading of the employment structure leads to the automation replacement of low-skilled positions and the expansion of demand for high-skilled positions.The upgrading of the employment structure leads to the automation replacement of low-skilled positions and the expansion of demand for high-skilled positions. In China's manufacturing industry, simple labor positions are replaced by "high-quality capital + high-skilled labor".

Medium-skilled positions shrink, routine tasks such as accounting and assembly lines are easily replaced by algorithms and robots, while low-skilled service positions increase, and non-routine manual labor such as cleaning and nursing are difficult to be replaced by technology. New occupations in China include ride-hailing drivers, food delivery riders, etc.

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The wage premium for skills increases: In the United States, the wage growth rate of highly skilled workers is three times that of low-skilled workers (1980 - 2020); in China, a special phenomenon is that the increase in skill supply does not reduce the premium, but instead leads to a "brain-body inversion", with migrant workers' wages approaching those of college graduates, reflecting that the skill-biased technological progress lags behind the expansion of education.

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2.4 The Theory of the Iceberg Model of Competencies and Qualities

The ability-skill iceberg model was proposed by Harvard University professor David McClelland in 1973 to distinguish the core differences between outstanding and average performers in a position. This model compares a person's qualities to an iceberg, dividing them into the visible "above-water part" and the hidden "underwater part", with the latter being the key factor determining an individual's long-term performance. The part above the "water surface" is intuitive, easy to acquire, and easy to measure, and is called benchmarking skills or explicit skills, specifically referring to knowledge and skills; while the part submerged below the "water surface" is abstract, silent, and difficult to measure, and is called discriminative skills or implicit skills, including values, attitudes, social roles, self-image, traits, and motivations.

This theory has been further refined to form the ability-skill iceberg model. This model holds that an individual's professional ability-skill is 7/8 implicit, including professional awareness, professional ethics, and professional behavioral habits, which although difficult to have an immediate effect on work performance, do affect an individual's long-term development; while the other 1/8 is explicit, including external image, technical ability, various skills, etc., these skills are explicit and easy to measure, and therefore are often valued by enterprise human resource management.

Based on the ability-skill iceberg model theory, a person's professional quality has both explicit and implicit parts that are easy to measure and difficult to measure, respectively. The former, such as professional knowledge and skills, are more concrete; the latter, such as professional awareness and spirit, are more abstract. Unlike enterprises which pay more attention to explicit skills and intermediate characteristics, school education shoulders the mission of cultivating people and needs to pay more attention to implicit skills, so this study also comprehensively considers the explicit and implicit parts of professional quality when exploring the structure of professional quality.

2.5 The theory of "the all-round development of human beings"

"The all-round development of individuals" was Marx's conception for the cultivation of workers."The all-round development of individuals" was Marx's conception for the cultivation of workers. "All-round development" specifically refers to the coordinated and full development of an individual's various labor capabilities. "All-round development" specifically refers to the coordinated and full development of an individual's various labor capabilities. When the socially necessary labor time was reduced to a certain limit, people began to have leisure time to engage in self-updating and cultivate their comprehensive qualities.

3. Vocational Students' Professional Quality in the Era of Artificial Intelligence

3.1 The impact of the three technological revolutions on employment

The impact of technological changes on the employment of workers was analyzed along the historical development trajectory. The effects of the first, second, and third technological revolutions on labor employment were analyzed from the micro, meso, macro, and international perspectives, and the patterns of labor employment changes under the conditions of these three technological revolutions were summarized. This provided historical references for coping with the changes in labor employment under the new round of technological revolution.

Human history has experienced three technological revolutions, corresponding to three technological eras: the mechanization era, the electrification era, and the automation (informationization) era. During these three technological revolutions, technological progress promoted the transformation of labor means from manual labor to semi-mechanized and mechanized labor, and mechanical power gradually replaced human muscle power. Subsequently, it developed towards automated labor. This reflected the extension of machine functions and the process of machines replacing human manual labor.

Corresponding to these production organization forms, in the first technological revolution, they changed from workshop handicrafts to machine-based large-scale industry. In the second technological revolution, they transformed into Fordism characterized by large-scale assembly lines, and subsequently changed to the new Fordism and post-Fordism of the third technological revolution. The three technological revolutions brought about mixed changes in social production technologies and micro-level production organization methods, not only fundamentally changing social productivity but also causing changes in the social production relations and social classes at the upper level of society.

Now, the "intelligent era" characterized by artificial intelligence and digital technology is underway. It is not merely a continuation, technological advancement, or system upgrade of the third technological revolution, but a new type of technological ecosystem with a unique technological path. In the mechanization era, workers in the agricultural and handicraft sectors transformed towards machines and large-scale industrial sectors. In the electrification era, manual laborers in transportation transformed into skilled laborers with technical application skills. In the automation era, the demand for mental labor increased, and there was a "dualization" phenomenon in employment. In the intelligent era, highly skilled workers also face the risk of being replaced, and human work is moving towards a "human-machine collaboration" direction. This chapter analyzes the process of the impact of the first three technological revolutions on labor employment from a historical perspective, providing historical references for the development of labor employment under the ongoing fourth technological revolution.

3.2 Problems of vocational qualities among vocational college students in the era of artificial intelligence

The core issues of vocational students' professional qualities in the era of artificial intelligence: They mainly manifest in five aspects: weakened originality due to tool dependence, disconnection between digital skills and industrial demands, insufficient cross-disciplinary integration, weak ethical cognition, and lack of humanistic qualities. The specific problems are as follows:

1) Tool dependence leads to the degradation of originality. Critical thinking weakens, and students overly rely on AI to complete tasks such as literature reviews and data analysis, weakening their ability to think independently. Some students develop a "technological dependence syndrome," lacking the ability to deeply analyze complex problems. Innovation ability is suppressed, and after AI efficiently handles repetitive tasks, the time students have gained does not translate into innovative practice; instead, due to algorithm path dependence, the breakthrough thinking for solving new problems deteriorates.

2) There is a structural gap between digital skills and industrial demands. Core technologies are weak, with only 12% of vocational students mastering programming tools such as Python. The popularity rate of high-level skills such as AI model training and algorithm optimization is less than 5%, and the matching rate for the urgently needed machine learning engineer positions is less than 30%. Training resources lag behind, with only 35% of students having used industrial robots or digital twin systems. The teaching equipment is 2-3 generations behind the technological iteration of enterprises, and the coverage rate of new training platforms such as intelligent warehouse management is only 28%. The application of tools is shallow, with over 60% of students being able to only use AI for basic information retrieval, lacking high-level abilities such as human-machine collaborative decision-making and Prompt engineering. In digital collaboration tasks, the proportion of active coordinators is less than 20%.

3) Insufficient cross-domain integration ability

The barriers between disciplines have not been broken. Professional courses still mainly focus on single skills training. For example, the e-commerce major lacks cross-teaching of intelligent supply chain and data visualization, resulting in students being unable to handle complex tasks. The integration of technology and humanities is lacking. Technology courses neglect ethical design (such as AI bias verification) and cultural adaptability in business scenarios, resulting in a shortcoming of "knowing technology but not society."

4) Weak ethical risk cognition and protection ability

Data security awareness is lacking. Only 15% of students regularly change passwords, and 23% have experienced privacy leakage. However, their understanding of technical risks such as deep fakes and algorithm discrimination is vague. Copyright ownership is unclear. Over 40% of students have no clear concept of the copyright ownership of AI-generated content, and high-frequency infringement behaviors such as unauthorized use of materials and citation without annotation are prevalent.

5) Marginalization of humanistic qualities and emotional intelligence

Interpersonal collaboration skills decline. AI intervention atomizes the learning process, and group discussions are replaced by machines, leading to the degradation of social skills such as conflict mediation and team empowerment. Professional mission awareness weakens. The tendency towards technological utilitarianism squeezes value creation, and only 30% of courses integrate national and family sentiments and craftsmanship spirit into the application scenarios of intelligent technology.

The deficiencies in vocational qualities will weaken employment competitiveness. The essence of the current vocational students' professional quality problems is the crisis of the compatibility between education supply and technological revolution. Skills training lags behind the speed of AI industry development, resulting in a mismatch between talent supply and demand. The lack of ethical education and humanistic care exacerbates the risk of technology abuse. Measures such as curriculum reconfiguration, school-enterprise collaboration, and ethical education are needed to build a "technology-humanities-ethics" tripartite new ecosystem.

3.3 The special reasons for the vocational qualities of vocational college students

Specificity and Targetedness: The requirements for vocational qualities of vocational college students are different from those of other educational types, and they have specificity and targetedness. Vocational education aims to cultivate high-quality technical and skilled talents, requiring students to possess high professional qualities and certain thinking abilities to meet the needs of society and enterprises. This vocational quality not only includes professional knowledge and skills, but also covers professional ethics, professional awareness, and professional spirit, with distinct educational and vocational nature.

Hierarchy: Vocational quality is a multi-level and three-dimensional concept, which can be composed of several vocational quality units and can be intuitively represented through a certain vocational quality model. For example, the 5D3L system quality model constructed by Liu Lanming et al. includes 5 dimensions, 3 levels, and 40 quality points, providing a basis for the cultivation of skilled talents. This hierarchical vocational quality model helps to understand and cultivate the vocational quality of vocational college students more systematically and comprehensively.

Developmental Nature: With the rapid development of artificial intelligence technology, the vocational quality of vocational college students also faces new requirements and challenges. The application of artificial intelligence technology has led many traditional industries to undergo transformation and optimization and upgrading, raising higher requirements for the skills and qualities of workers. Vocational college students need to have stronger adaptability, transferability, and penetration, to cope with the career changes brought about by technological changes. This developmental vocational quality requirement prompts vocational education to constantly adjust and optimize the talent cultivation model to meet the needs of society and enterprises.

Differences: Due to individual differences among vocational college students, their vocational quality manifestations also vary. This difference can be discovered and evaluated through measurement methods, such as scales and questionnaires. Zhang Xiangyun et al. quantitatively evaluated the vocational knowledge, vocational ability, and vocational awareness of vocational college students using a hierarchical evaluation model, grading them as excellent, good, medium, pass, and fail, and assessing 15 items of vocational quality. This assessment of differences helps to carry out targeted vocational quality cultivation and improvement.

Practicality: Vocational quality of vocational college students can be improved through certain practical paths, and it has practicality. Vocational college students' vocational quality can be formed through school-enterprise cultural influence, moral formation, skill education, as well as self-management, self-education, and training, enabling them to possess corresponding vocational cognition, vocational skills, and vocational psychological state, to adapt to social development and the needs of job positions. This practical training path helps vocational college students better apply the knowledge and skills they have learned in practical work and enhance their vocational quality.

4. The Impact of Artificial Intelligence Literacy on Labor Employment

4.1 The labor qualities required by the three technological revolutions

Since the Industrial Revolution, the social production mode has successively gone through simple machine production, mechanized assembly line production, semi-intelligent automated production, and is gradually moving towards fully intelligent production. During this process, humans have utilized technological progress to enhance their overall labor capacity, constantly breaking through their physiological limits to increase labor productivity. This has led to the mechanization of labor materials and the "disembodiment" of human labor, and has developed towards the "dishumanization" of human labor.

During the Second Technological Revolution, the Taylor system and Ford's assembly line production workshops based on machine systems mechanized labor materials, standardized and decomposed labor tasks through division of labor, and the technical system of the bureaucratic management department determined the work content and speed that each worker needed to complete. The management layer in enterprises achieved actual control over the labor process, and workers began to lose their control over their own labor. Starting from the Third Technological Revolution, semi-intelligent automated technologies have been widely applied in specific production processes, especially in the application of machine tools in manufacturing. The automation of machine tools can not only operate automatically according to the instructions of managers, but also adapt to flexible and variable production demands, greatly improving production efficiency. Semi-intelligent automated production is the automatic operation of machine equipment based on mechanized assembly line production. This mainly relies on a programmable automation technology that can be stored in a computer to control the operation of machines. With the development of big data production, storage, and algorithm technologies, artificial intelligence is increasingly applied in the production process, including industrial robots, intelligent production workshops, intelligent logistics systems, and so on. Intelligent production processes are based on automation, deeply integrating artificial intelligence technology, information physical systems (CPS), and big data technology to achieve a production mode that is independent of human control and fully automatic.

4.2 Industrial structure and regional structure

The different degrees of substitution of technological advancements such as artificial intelligence for various types of labor, and their impact on the capital composition of different industries, are also uneven. This is reflected in the employment levels and income distribution of each industry. Considering the distribution of industrial capital in different regions, and taking into account different economic development conditions, the labor force quantity and structure, the impact of artificial intelligence on employment in each region also varies greatly.

Just like previous technological revolutions, artificial intelligence enhances labor productivity through methods such as updating machines and reforming enterprise organizations. However, artificial intelligence is different from previous technological revolutions in that the new machines not only include physical hardware but also virtual software. Artificial intelligence integrates technologies such as big data and machine learning. Through multiple cycles and upgrades, machines become increasingly intelligent, effectively reducing the defect rate of products, improving the accuracy of product production, achieving the saving of constant capital, and to varying degrees, slowing down the speed of capital composition increase. Artificial intelligence not only affects the production process but also has a profound impact on the circulation and consumption fields. In the circulation field, artificial intelligence strengthens the control of the circulation field. This is specifically reflected in industries such as retail, transportation, and logistics, for example, unmanned stores, intelligent supply chains, smart transportation systems, and automatic logistics vehicles, etc. The use of these new technologies will greatly improve the production efficiency of enterprises in the circulation field, reduce the required labor force, and thereby lead to an increase in the capital technology composition.

4.3 Changes in job market demand

Every revolutionary technological change brings about significant changes in the labor market. Currently, the new revolutionary technology of artificial intelligence is disrupting the previously balanced labor market and creating a new "ecological balance" in the labor market. Artificial intelligence has both negative destructive effects and substitution effects on job positions, as well as positive expansion and creation effects. The combined action of these two effects results in the ultimate overall effect of artificial intelligence on employment.

The introduction of artificial intelligence technology mainly replaces programmed and standardized job positions, especially routine operations and cognitive labor, such as personnel administration, accounting, customer service, and logistics transportation personnel.

Artificial intelligence continuously upgrades labor tools, which may cause laborers' labor skills to temporarily fail to meet the requirements of corresponding positions, thereby displacing a large number of laborers. Currently, artificial intelligence can already be implemented without the direct participation of workers in some industries with high work intensity, harsh working conditions, high risk factors, and deep mechanization. The destructive effect of this will become more and more obvious as artificial intelligence technology matures. Finally, the application of artificial intelligence technology promotes the improvement of the capital-labor ratio and changes the demand for labor through the substitution of production factors. This not only has a huge destructive effect on the labor supply market of low-end manufacturing and service industries, but also further reduces the value of labor, even making it a commodity that no one wants to buy.

4.4 Income Distribution in the Era of Artificial Intelligence

Artificial intelligence, as a representative technology of the new round of technological revolution, is profoundly and comprehensively influencing our lives. From the perspective of technological application, artificial intelligence has similar functions to machines. They respectively extend human capabilities in terms of intelligence and physical strength. Artificial intelligence, as a technology, is neutral. Its wide application will not lead to polarization of employment, unequal income distribution, and widening of the gap between the rich and the poor. However, the capitalist application of artificial intelligence may trigger such results.

In a capitalist society, capitalists control material wealth such as production resources, while workers have nothing but their own labor power. The private ownership of production resources determines this confrontational distribution relationship under the capitalist system. The distribution system based on capital allocation brings absolute inequality. However, in a socialist system, although artificial intelligence will exacerbate the Matthew effect in income distribution and may lead to income inequality, if the distribution system based on labor distribution as the main body and multiple distribution methods coexisting is adhered to, it provides a fundamental guarantee for gradually achieving relative equality in distribution.

5. Strategies for Promoting Employment in the Era of Artificial Intelligence

5.1 Countermeasures for Cultivating Vocational Competence of Higher Vocational Students in the Era of Artificial Intelligence

In response to the problems of vocational qualities of vocational college students in the era of artificial intelligence, this study proposes the following training countermeasures:

We should strengthen professional construction to cope with the challenges of the artificial intelligence era. We should reform professional settings, eliminate traditional majors that do not meet the demands of the times, increase emerging majors with promising prospects, integrate cutting-edge professional fields that are cross-disciplinary and can be combined, and achieve professional structure upgrading. We should build cross-disciplinary professional clusters to promote the integration and complementarity of related majors, integrate advantageous resources, clarify training goals, and introduce "dual-qualified" teaching staff. We should create a "specialization and innovation integration" platform, build diversified practical platforms, provide professional courses and innovation and entrepreneurship courses, carry out project-based, inquiry-based, and problem-solving teaching, and improve students' innovation and entrepreneurship abilities. Through industry-university-research cooperation, We should enhance the application and transformation level of scientific and technological achievements, and build a comprehensive education and training platform.

We should implement the "three teaching" reform to improve the quality of vocational college students' training, enhance teachers' intelligent teaching capabilities. Teachers need to master intelligent technology operations and use online teaching platforms for video lectures and assignment distribution. We should Invite enterprise mentors to participate in teaching and adopt the "dual-mentor" system, leveraging the technical expertise of enterprise mentors and the teaching expertise of school teachers. We should compile "artificial intelligence +" textbooks and develop textbooks with characteristics of the artificial intelligence era, incorporating new technology products such as VR scenes, video animations, and 3D physical courseware, breaking the limitations of classroom space, and consolidating students' digital capabilities. We should introduce project-based teaching methods: construct modular and project-based teaching models, and cultivate students' ability to solve practical problems around work tasks. We should improve employment guarantee measures to enhance the employment competitiveness of vocational college students, conduct mental health education and social skills training, strengthen mental health education, pay attention to the psychological development process of students, provide psychological intervention and counseling. We should Offer social skills training courses to impart social knowledge and improve students' interpersonal communication skills. We should create more social practice opportunities: establish student organizations, carry out various colorful student activities, such as clubs and volunteer activities, and provide social practice experience opportunities. We should standardize the management mechanism of student organizations, implement the job rotation system, and cultivate students' communication and problem-solving skills. Through the above countermeasures, the aim is to enhance the vocational qualities of vocational college students in the era of artificial intelligence, strengthen their employment competitiveness, and provide a reference for the transformation of the talent cultivation model of higher vocational education.

5.2 Reform the education system and adjust the talent structure

The development of artificial intelligence has led to a shift in the skills of workers towards "de-skilling" and "universalism". Currently, in the labor market of our country, there is a shortage of high-quality and highly skilled talents, as well as an overabundance of middle and low-end labor. Especially, the development of artificial intelligence requires a large number of versatile talents who are proficient in both robot research and operation and the characteristics of enterprise processes. For example, architecture engineers and implementation engineers. However, our country is currently lacking high-end technical talents and comprehensive talents in the field of artificial intelligence. Therefore, it is necessary to reform the education system and promote the adjustment of talent structure to better align with the development of artificial intelligence-related industries.

We should have the autonomy to set up disciplines and specialties, based on the skill requirements for professionals in the field of artificial intelligence and related industries, to modify the relevant teaching content and meet the future development needs of the artificial intelligence industry. The reform of the education system should be market demand-oriented, combined with the technical characteristics of artificial intelligence and the requirements of related industries, to set up specialized programs such as intelligent control, equipment manufacturing, robotics, and electronic information, and establish internship and training bases to cultivate more highly skilled and high-quality talents that meet the needs of the advancement of artificial intelligence technology. We should strengthen the construction of the artificial intelligence discipline, enhance the cultivation of basic research talents and practical comprehensive talents, and more importantly, emphasize the important role of enterprises in talent cultivation, and achieve joint cultivation by the government, universities, and enterprises.

5.3 Strengthen vocational education in the application of artificial intelligence

Although currently, most of the jobs replaced by artificial intelligence are those of low and medium-skilled workers in regular occupations, the degree to which artificial intelligence will replace highly skilled workers will gradually increase in the future. Therefore, strengthening vocational training for workers and enhancing their comprehensive qualities is the wise approach to responding to changes in the demand for labor.

Online education platforms can be used for conducting online vocational skills training. The goal of achieving information exchange and real-time training through individual accounts is feasible. Online education platforms can be utilized for conducting online vocational skills training, and the goal of achieving information exchange and real-time training through individual accounts is feasible. We encourage different training institutions to provide targeted training content and methods, in order to address the issue of the disconnect between vocational skills training content and the demands of emerging industries, and improve the quality of vocational skills training. At the same time, we should explore the employment training model of "enterprises placing orders and the government providing subsidies", where the government uses tax incentives, special allocations, and training subsidies to guide enterprises and training institutions to participate in labor force training, in order to adapt to the new round of technological changes. We should also point out the new employment directions brought about by changes in artificial intelligence technology, and form a comprehensive system of employment guidance, employment training, and employment recommendation, to reduce the costs for workers to change jobs or look for employment.

We should accelerate the development of related emerging industries of artificial intelligence, with the aim of creating more labor positions in the future. We should cultivate emerging industries related to artificial intelligence, enhance the domestic ability of independent scientific and technological research and development, seize the initiative in international competition, and gain market discourse power; At the same time, we should promote the transformation of the manufacturing industry towards automation and intelligence, increase the policy subsidies for enterprises' intelligent research and development; We should encourage the introduction of foreign key technologies and core supporting parts, and on this basis, develop new technologies with independent property rights to improve the core competitiveness of artificial intelligence-related manufacturing industries.

We should encourage regional talent mobility, optimize the spatial allocation of talents. According to the different development levels of artificial intelligence in different regions, the government should optimize the spatial allocation of different talents based on market demand, support the development of artificial intelligence enterprises in different regions, and encourage enterprises with advantages to establish branches in different regions to provide the possibility of cross-regional mobility for artificial intelligence talents. Moreover, the whole country should quickly formulate unified standards for artificial intelligence talents and mutually recognize the evaluation results of talents, to break the barriers to cross-regional mobility of relevant talents.

6. Conclusion

By constructing a vocational quality structure model for higher vocational students, analyzing the current situation and proposing targeted training countermeasures, the following conclusions were obtained:

In the era of artificial intelligence, the structure of vocational quality for higher vocational students should cover three dimensions: vocational knowledge, vocational ability (including differential ability and adaptability ability) and vocational awareness. This structure conforms to the new demands of technological change for technical vocational talents and reflects the hierarchy and development of vocational quality.

At present, higher vocational students have obvious deficiencies in cross-border integration and migration ability, creative ability, digitalization ability, interpersonal communication ability and the ability to solve complex problems, and these abilities are exactly what the employment market in the era of artificial intelligence urgently needs.

The vocational quality of higher vocational students is greatly influenced by individual factors (such as gender, grade and on-campus work experience), while it is less affected by external factors (such as the location of the family, the nature and level of school operation).

By strengthening professional construction, promoting "three teaching" reforms and improving employment guarantees, training countermeasures can effectively enhance the vocational quality and employment competitiveness of higher vocational students, helping them better adapt to the vocational requirements of the era of artificial intelligence and improving the level of vocational education.

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