

# Revitalizing the Craftsman Spirit of BanMo in Vocational Education for the AI Age

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**Abstract:** *In the context of the era of intelligence, China is facing the dilemma of serious shortage of high-skilled talents, and the integration of BanMo Craftsmanship and vocational education is a new impetus to solve the current talent bottleneck. This paper focuses on the new era connotation of BanMo Craftsmanship and its core value in the context of artificial intelligence, analyses the new trend of application of BanMo Craftsmanship in the era of artificial intelligence, and explores the integration path of BanMo Craftsmanship and vocational education in the era of artificial intelligence.*

**Keywords:** *artificial intelligence; BanMo craftsmanship; vocational education*

## 1. Introduction

Currently, artificial intelligence is gradually transforming into a leading force in promoting the development of strategic emerging industries and becoming a core element in promoting supply-side structural reform. With the development of information technology and the Internet, the field of intelligent manufacturing has become a new centre of attention, and the working environment faced by future workers in the manufacturing industry has also changed.

Vocational education is an important platform for cultivating innovative technical and skilled talents, and AI brings a series of opportunities and challenges while promoting the high-quality development of vocational education. Vocational education is in urgent need of reform and innovation in multiple dimensions such as teaching mode, talent cultivation, industry-education integration, institutional system construction and international cooperation [1]. The core purpose of vocational education is to cultivate technical and skilled talents to meet the needs of modern society, who need to have solid professional knowledge, skilled operating skills, and the ability to adapt to the rapid changes in technological change, which requires vocational education to cultivate students with a certain degree of learning and comprehension, problem-solving ability, as well as the ability to adapt quickly and self-learning.

Currently, vocational education is not only limited to the cultivation of students' skills, but also attaches more importance to the cultivation of students' comprehensive qualities, including the cultivation of soft power such as the spirit of innovation, teamwork and continuous learning. The values embedded in BanMo Craftsmanship can effectively guide students to develop these important abilities and qualities, and thus improve their future career competitiveness. In conclusion, by deeply exploring and practising the modern values of BanMo Craftsmanship, vocational education can better adapt to the challenges of technological change.

## 2. The contemporary connotation of BanMo's craftsmanship in the age of artificial intelligence

### 2.1 Connotation of BanMo Craftsmanship in the Times

The spirit of BanMo Craftsmanship is an important part of the excellent traditional Chinese culture and a valuable treasure precipitated from the long history, which contains deep cultural roots and strong cultural values. Taking Lu Ban, the "Sage of Hundred Craftsmen", and Mozi, the "Sage of Science", as the outstanding representatives, and with the spirit of innovation and practice as the core, BanMo Craftsmanship has been inherited and developed through generations and has formed a profound cultural connotation. Most of the domestic scholars start their exploration from its historical origin and interpret the connotation of BanMo Craftsmanship, that is, BanMo Craftsmanship combines Luban's "Craftsmanship" and Mozi's cultural concepts of "Rites and Virtues, Shangxian, Shangtong, Fraternity,

Non-attack, Peace, Harmony and Harmoniousness", and it is also the most important concept in the world[2]. It includes the spirit of dedication, the spirit of perfection, and the spirit of innovation [3].

While artificial intelligence technology is driving industries to leap from industrialisation to digitalisation and intelligence, it is also reconfiguring the social occupational structure and employment space [4]. The importance of vocational education is increasing rather than decreasing, and the current demand for talents has shifted to applied talents who are able to adapt to the rapidly changing technological and market environments, as well as to innovate and practice. The spirit of "craftsmanship" emphasised by BanMo Craftsmanship, i.e. craftsmen are not only satisfied with the basic technical operation of their work, but also pursue a higher level of craftsmanship and product quality, which is in line with one of the current requirements for cultivating talents in vocational education.

Vocational education needs to adapt to the changes brought about by digitisation and intelligence, teach students' professional knowledge, enhance their professional skills, cultivate professional attitudes, innovative spirit and sense of responsibility, and create higher social and economic value. To sum up, BanMo craftsmanship in the new era is also adapting to the times and evolving.

## ***2.2 Core values of BanMo craftsmanship in vocational education***

There is a certain degree of compatibility between BanMo Craftsmanship and the educational goal of vocational education to cultivate high-quality technical and skilled talents. We need to re-examine the value of BanMo Craftsmanship Culture in vocational education, which is mainly reflected at the student level and the school level, and on the one hand, it promotes the internalisation of students' vocational literacy, the enhancement of their professional skills, and the shaping of vocational morality; and on the other hand, it promotes the implementation of school educational philosophy, the deepening of teaching reforms, and the construction of campus culture. The integration of BanMo Craftsmanship provides cultural support and practical guidance for the cultivation of technical and skilled talents in line with the needs of the times.

### ***2.2.1 Fostering the "artisanal" talent of the times***

Artificial Intelligence technology can complete everyday simple and repetitive tasks using machine execution, while vocational education needs to shift towards the development of high quality technical and skilled personnel with professionalism, excellent craftsmanship, innovative thinking and the ability to solve complex problems. The BanMo educator spirit emphasises that a person's success depends not only on his talents and skills, but also on his character and cultivation [5]. The BanMo spirit promotes the constant pursuit of excellence, challenging the status quo and exploring the unknown, and also emphasises the importance of "knowing and doing". Innovation advocates the transformation of theoretical results into practical products and services with application value, and the integration of the BanMo craftsmanship will focus more on cultivating students' ability to "identify and solve problems", which in turn can promote technological innovation and product innovation.

Craftsmen in the new era should have the excellent qualities of fear of work, focus on innovation, courage to take responsibility, and pursuit of perfection, and need to pay attention to the shaping of qualities and the cultivation of abilities from the time they are students, so as to ensure that they can continue to develop in their future careers, and to realise the dual goals of personal value and social contribution. In the process of education and teaching implementation, the integration of BanMo Craftsmanship into curriculum design, teaching activities and practical activities will not only help to improve students' technical skills, but also help them to form correct professional ethics, improve teamwork ability, enhance the ability to solve complex problems, and ultimately cultivate modern craftsmen who are not only adapted to the needs of the AI era, but also have superb craftsmanship and innovation ability [6].

### ***2.2.2 Promoting the development of professional content in vocational education***

The spiritual qualities and value pursuits embedded in BanMo's craftsmanship, including dedication, professional skills, focused attitude, persistent pursuit and innovative consciousness, are the vocational qualities that vocational colleges and universities are urgently required to cultivate in the process of cultivating technical and skilled talents. Strengthening the cultivation of craftsmanship in vocational education can effectively enhance the refined production capacity of domestic industries [7]. These literacies are the key elements of vocational success and an important driving force for technological progress and industrial upgrading. Vocational colleges and universities need to put into practice the

philosophy and guiding ideology of running schools in the new era, and need to explore a new way of shaping the spirit of "national-level master artisans" with Chinese characteristics.

In the vocational education system, it is necessary to integrate the qualities possessed by the BanMo craftsmanship into the schooling practice and fully penetrate the craftsmanship. Schools need to combine the characteristics of school running, attach great importance to the historical value and significance of the BanMo craftsmanship culture, and explore its contemporary connotation. In the process of pedagogical reform and practical teaching, BanMo Craftsmanship is integrated into curriculum design, teaching practice and student development guidance, and the school realises the excellent inheritance of craftsmanship in the rendering of culture through the construction of spirit, system and culture, and then realises the cultural embellishment of the school.

### **3. Trends and challenges in vocational education in the era of artificial intelligence**

#### ***3.1 Development trend of vocational education in the era of artificial intelligence***

In terms of talent cultivation, AI technology has changed the industrial structure and labour market, and the demand of enterprises for technical and skilled talents has also changed, and vocational education is no longer the traditional meaning of knowledge transfer and technical training, and its connotation and extension have taken a qualitative leap, and the schools need to update their talent cultivation programmes, teaching contents and methods to adapt to the new occupational requirements. More enterprises have begun to use intelligent equipment and systems to complete the design, production and management of products, which requires vocational education to train students not only with theoretical knowledge, but also with practical ability to be directly put into intelligent production. At the same time, the demand for innovative technical and skilled talents in the era of artificial intelligence is becoming more and more urgent, and it is also necessary to pay attention to stimulating and cultivating students' innovative consciousness and ability in the process of talent cultivation [8]. It is necessary to encourage students to explore and try in the practical operation, and cultivate talents who can continue to innovate and develop in the future workplace.

In terms of education and teaching, AI also provides vocational education with new teaching tools and methods, such as the use of big data analysis, virtual simulation and other technologies, to promote the practical transformation of vocational education and to open up a new track for the digitalisation of education. Artificial intelligence technology has promoted the upgrading and transformation of traditional industries, and has also given rise to a large number of new industries and occupations. Vocational education needs to closely tie in with the development trend of these industries, promote the change of the teaching mode, constantly update the curriculum, the integration of industry and education, recreate the practical situation, cultivate students who can meet the actual needs of the industry, and improve the quality of talent training. Of course, teachers need to adapt to teaching in the digital environment and improve their digital literacy. Vocational education should not only adapt to AI, but also lead the development of AI, and promote the development of industry technology through technological innovation.

Vocational education in the era of artificial intelligence will continue to improve its practicality, applicability and innovation to meet the requirements of the new era for the cultivation of technical and skilled talents [9]. The reform and innovation of vocational education need to follow the pace of technological development, continuously optimise the curriculum content and teaching methods through in-depth cooperation with enterprises, and ultimately achieve high-quality talent cultivation in keeping with the times.

#### ***3.2 Challenges to Vocational Education in the Age of Artificial Intelligence***

##### ***3.2.1 Rapid rate of technological updating***

With the rapid development of new technologies, higher requirements have been put forward for the curriculum content, teaching methods and training modes of vocational education, and the existing teaching content may be difficult to keep up with the latest technological development, resulting in the gap between the educational content and the actual demand, vocational education needs to keep pace with the times and quickly adapt to technological changes. On the other hand, the application of AI technology requires vocational education to update the teaching mode to adapt to the new education form, which puts forward higher requirements on the adaptability of both teachers and students, and

students and teachers not only need to have solid professional knowledge, but also have the ability to learn and adapt to the new technology quickly.

### ***3.2.2 Diversification of industry needs***

The traditional orientation of vocational education has been challenged in the context of the diversification of industrial demand. Much of traditional vocational education has focused on providing well-trained technical-skilled labourers to serve traditional industries and known needs. However, driven by artificial intelligence, new industries such as big data analysts, AI programming experts and other positions are rapidly emerging, which require not only technical skills, but also innovative thinking, problem-solving skills and the ability of continuous learning, which require not only technical skills, but also innovative thinking. Vocational education needs to re-position its cultivation goals, placing more emphasis on the ability of innovation, critical Thinking ability, lifelong learning ability and other students' comprehensive ability training, while training students' technical skills. The core value of BanMo's craftsmanship plays a pivotal role.

### ***3.2.3 Disconnect between education and industry***

As new industries continue to emerge, the curriculum and teaching content of vocational education cannot keep up with the pace of industrial change. The talents trained in vocational education are out of touch with the market, i.e. the knowledge and skills learnt by students may not match with the actual needs of enterprises, resulting in the structural problem of "difficult employment" [1]. Enterprises in the new economic situation on the quality of the labour force put forward higher requirements, many low-skilled jobs by automation, intelligent replacement, the demand for high-skilled, innovative talents increased dramatically. Vocational education often neglects the cultivation of students' innovative ability and practical skills, resulting in the need for students to meet the actual needs of enterprises through a period of "re-learning" after graduation, which increases the adaptation period of enterprises' talents.

## **4. Integration Path of BanMo Craftsmanship and Vocational Education in the Age of Artificial Intelligence**

### ***4.1 Reconstructing the talent training model***

Professional education should be adapted to the changes of the times to achieve the purpose of high-quality development, and vocational education should be supported by artificial intelligence to better cultivate the spirit of "craftsmen" in tandem with "artisans", and contribute to the overall development of the students and the future development of society in its due capacity. The strength of vocational education should be better cultivated with the support of artificial intelligence.

A scientific knowledge system of technical skills is formed in the curriculum, and modern technologies such as artificial intelligence and big data analysis are integrated into modern vocational education to enable students to work proficiently with modern information technology. Skill training with the real environment of enterprises, such as machine learning, data science, human-computer interaction design and other emerging courses can be opened. According to students' learning habits and mastery, the use of artificial intelligence for personalised teaching, providing customised learning programmes, and the use of artificial neural networks to simulate practical training and experimental design can provide students with a learning situation close to the real production environment. The integration of craftsmanship is also an important direction of curriculum reform. The demand for high-quality products and services in the era of intelligence is still high, and a large number of professionals with the spirit of craftsmanship are needed to complete it. In the curriculum, we should pay attention to the cultivation of students' professional morality and professional ethics.

In terms of teaching methods, diversified teaching methods such as project-driven, case study, simulation and practical training are introduced to encourage students' active learning and innovative thinking. Students learn new knowledge in the process of solving problems through real work projects or simulated enterprise real-life scenarios, which promotes the improvement of students' practical problem-solving ability. In the teaching process focus on multidisciplinary cross integration of modern work environment many requirements in different fields need to be integrated knowledge, and thus the curriculum design to encourage multidisciplinary cross-study, multidisciplinary research, multidisciplinary cross-study, and research.

#### ***4.2 Reinventing the role of the teacher***

Teacher training in vocational education is an indispensable key factor in improving the quality of education and fostering skilled personnel to meet the needs of the future society. Teacher training in vocational education should pay attention to both the professional ability and moral quality of teachers. BanMo's craftsmanship emphasises the work attitude of striving for perfection and pursuing excellence, which requires vocational education teachers not only to have solid professional knowledge and practical ability, but also to have good professional ethics, sense of responsibility and innovative spirit [4].

Teachers should take the initiative to change their roles from "teaching craftsmen" to "stimulators of learning interests", assume three important roles of teachers, craftsmen and researchers, possess three kinds of abilities in teaching, practice and research, and fulfill three important responsibilities in teaching, production and practice, and social service positions. Under the ecology of the integration of artificial intelligence and education, the role of teachers is no longer just a transmitter of knowledge, but to become a provider of teaching services, a learning companion, and a motivator of students' personalised needs. For this reason, schools should actively establish the mechanism of school-enterprise cooperation in the construction of teaching staff, and improve the comprehensive quality of teachers with the help of the power of enterprises. Enterprises are important bases for technological innovation and practical application. Schools can introduce senior technicians from enterprises to participate in teaching or serve as part-time teachers through close co-operation with enterprises, so as to enrich the teaching content and improve the quality of education. At the same time, teachers can also be encouraged to go into enterprises for practical learning, and bring the actual experience and technical requirements of enterprises back to the classroom, so that the teaching content is more in line with the needs of the industry.

In order to ensure that the teaching content is cutting-edge and the teaching methods are advanced, teachers should strengthen their ideological and political cultivation, improve their business skills, and continuously learn and master new knowledge and skills. Schools should provide teachers with a platform for continuous professional development by establishing a sound incentive mechanism, encouraging teachers' classroom teaching to incorporate BanMo craftsmanship, and carrying out curriculum ideological and political teaching seminars and competitions, and regularly organising teachers to participate in continuing education, skills training and academic exchange activities. For example, teaching achievement awards and technical innovation awards are set up to promote teachers' teaching achievements and professional innovations.

#### ***4.3 Strengthening school-enterprise co-operation for joint training***

To deepen the integration of production and education, vocational colleges and universities have achieved close docking with local enterprises and industries, and have promoted the in-depth participation of enterprise instructors in the planning of vocational education specialities, the development of teaching materials, the arrangement of curricula, the design of teaching, the implementation of teaching and other teaching processes, so as to achieve complementarity of advantages and the sharing of resources. To build a collaborative education model, schools and enterprises share the responsibility for talent training. They clarify the responsibilities and rights of both sides, jointly formulate talent training programmes, jointly carry out professional construction, and jointly organize teaching and production management. Strengthening the modern apprenticeship pilot, through the modern apprenticeship teaching mode, promotes the wide application of the school-enterprise cooperation modes, such as "introducing enterprises into schools" and "enterprises running schools". Schools and enterprises also cooperate deeply in project development, technology improvement and scientific and technological information consulting services. This cooperation promotes the establishment of a professional, efficient and sustainable talent training platform. Schools cooperate with enterprises to establish off-campus training bases and student apprenticeship bases to provide students with practical opportunities and enhance their competitiveness in employment. At the same time, relying on the support of enterprises, we have established practice bases for teachers to help them improve their practical ability through industrial practice and form a "dual-teacher" teaching team. In addition, the fruits of vocational education development are shared, school-enterprise cooperation is promoted to "go overseas in groups," and overseas vocational and technical colleges and overseas "Ban-Mo colleges" are established, thereby realizing the international sharing of vocational education outcomes.

## 5. Conclusion

The traditional goals and values of vocational education are changing, and the reinvention of the value of BanMo Craftsmanship in vocational education has become an important issue. The reinvention of the value of BanMo Craftsmanship in the era of artificial intelligence is the inheritance and innovation of traditional craftsmanship, and it is also the deepening and development of the connotation of vocational education. Looking into the future, we will explore the adaptability and application strategies of "BanMo Craftsmanship" in different social and economic contexts from the perspectives of cross-culture, cross-discipline and cross-industry.

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