

# Development Strategies and Paths of Rural Human Resources Based on Maker Education

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**Abstract.** The unceasing deepening of maker education has highlighted new direction of innovative personnel training. Under the influence of "knowledge creation learning", maker education has improved the characteristics of traditional human resource development with the rapid development of modern technology. Based on analyses advantage of maker education in the development of rural human resources, development paths of rural human resources have been constructed, and development strategies of human resource have been analyzed.

## Introduction

The rapid development of maker education in the world have benefited from the rapid development of information technology, open source hardware and software technology, CNC laser engraving technology and 3D scanning and printing technology. As a new form of education, which is cultivating the creative spirit of the public, maker education has influenced the social, economic, cultural, educational and other fields[1]. Maker education has an important educational value for the creation and innovation of human beings, and the promotion of employment and entrepreneurship, because it plays a significant role in the cultivation of autonomous learning, practical exploration and sharing. By the end of 2018, the number of rural population in China was 56,401 (ten thousand), which accounts for 40.42% of the country's total population. The total number of rural migrant workers was 28,836(ten thousand). Among them, migrant workers had 17,266(ten thousand), and local rural workers had 11,570(ten thousand)[2]. As the builders of the rural economic, social and cultural development, the scientific and cultural quality of the villagers determines directly the success or failure of the new rural construction. The way of rural development should be through science and education. As a trend sweeping the whole world, maker education has put forward the methods and approaches for effective cultivation of innovative talents in rural areas.

## Maker, Maker Education and Human Resources Development

Maker movement can be understood as "Internet +DIY". Everyone can be like scientists and inventors. They put their ideas into reality with the use of available resources (such as software, hardware, materials, experts, peer, etc.), and share it around the world through the Internet platform. Maker is not only a group of people who like or enjoy innovation, but also a kind of culture, an attitude, a way of learning. its cross generational, cross gender and race, and everyone can participate[3]. On the understanding of maker education, Chinese scholars emphasized "learning in creation" or "creative learning". They hold that the implementation of maker education and project-based learning to cultivate people' ability to solve practical problems by learn in the process of completing the task.

The basic elements of human resource development include five factors, such as learners, developers, development content, development methods, and development environment. Human resources development based on maker education is still composed of the above basic elements, but compared with the traditional human resources development, it has a greater difference. The role of learners have Changed. they are no longer passive recipients of knowledge, but become the subject of

the learning process. The main learning style of learners becomes creative learning and self-directed learning. The trainer is no longer the leader of the educational process. The role of the teacher becomes the partner or collaborator of learner's learning, which changes from the traditional authority of knowledge transfer to the learner's tutor. Teaching is no longer standardized. There is no fixed teaching content. The boundaries of learners to explore knowledge in theory are unlimited expansion. The teaching methods are no longer traditional teaching methods, which are mainly adopted problem-based learning and project-based learning.

## **Advantages of Maker Education in Rural Human Resources Development**

### **Firing the Enthusiasm of Farmers to Learn, Innovation, Entrepreneurship**

Maker education is an educational form. In essence, the learning process as a creative process has been pioneered in the maker education, and finally creates artifacts by the creation of learning[4]. The most striking feature of the maker education is innovation. Farmers have encouraged breaking the original thinking. Farmers are administered the full right to independent innovation, and to analyze problems with new thinking, new perspective to examine the issue, finally using the new method to solve the problem.

### **Promoted Synergy of Human Resource Development System**

Maker movement is a new way to reshape education, which can bring some benefits and even subversive changes to education. Human resources development system (training system, teaching methods, technical environment, evaluation mechanism, training team etc.) have been upgraded and optimized by the implementation of maker education. Maker movement is a new open innovation model, which is not a simple DIY (Do it by Yourself), but is DIT (Do it Together)[5]. Do it together means the development of synergistic effect by involved of different groups of people, institutions and resources. Thus, the condition of isolation in the traditional education should be broken. A good circle of maker education coordination chain has been formed by the internal and external subjects communicate with each other, share resources and culture [6]. Driven by the maker education movement, all social forces and resources of the school, family, community, enterprises will be fully mobilized. Formal education and informal education has been connected seamless.

### **Advocated Sharing**

Farmers have encouraged sharing their learning and research results in maker education. Maker education focuses on open education thinking, with emphasis on new perspective. Maker farmers are better than the talents trained by the traditional human resources development mode in analyzing and solving problems. More importantly, maker farmers are willing to share with their results of learning. Maker education will lay a solid foundation for farmers' entrepreneurship by further optimize knowledge, and enhance the cooperation ability of farmers.

### **Extended Creative Space**

Maker space is a place where people share science, technology, digital, electronic arts and other aspects of interest, creative communication and collaborative creation [7]. In the field of human resource development, maker space is a place where learners can learning, can carry out different learning activities, solve the problem or create based on the integration of multidisciplinary knowledge, and the use of tools or resources in space. The characteristic of maker learning space supported by the new technology should be open, dynamic and flexible. The field of Maker space is broader. Maker education space environment not only emphasizes the physical environment, but also puts more emphasis on people's psychological environment and the relationship between the environments, which is greatly enriched the connotation of the training environment. Maker space includes physical environment, psychological environment and relationship environment. It includes the entity relation in the space and the virtual relation in the network. Cyberspace has changed the role of people, and the boundaries between learners and teachers become blurred.

### **Path Human Resource Development Based on Maker Education**

On the one hand rural human resources development based on the ideas of maker education needs the support of national policy, macro guidance and planning; on the other hand, the power of villagers needs relatively independent, in order to ensure the villagers' demands can orderly collection, and timely to enter the political system. In addition, the rural human resources development also needs third party intervention. The third force is different from the government and villagers, which are individuals, communities, enterprises. They achieve self value through the participation in the development of rural human resources. These subjects have different knowledge, ability and resources, that only together can effectively promote rural human resources development. In the development of rural human resources, we can construct a number of different development paths.

### **Based on Scientific and Technological Innovation**

The path of science and technology innovation and learning can be described as a three-dimensional or "horizontal" strategy. The three-dimensional approach means a wide range cooperation of various activity factors within a region social context. The government, universities, research institutes and villagers have their own scientific and technological innovation resources, knowledge, ability and advantage. In the maker space, the cooperation help the development of human resources. Ronde & Hussler find that building external interactions is of greater importance than developing internal innovative competences [8]. The interaction of government, industry, universities, research institutes and farmers is the best way to develop the rural human resources. In this system, the development platform is the foundation and source of innovative activities, which are composed of relevant research institutions universities and research institutes; the maker learning platform is the key of achievement transformation and rural development, which is composed of the rural experimental base, rural schools etc.; the public service platform provide support services for innovation, which formed by the local government local relevant sectors. Those platforms can support effective rural human resources development by combining with each other, and promote each other. The innovation of science and technology and the network of platform is a basic institution of systematic innovation, and its main connection mechanism is the innovation and cooperation relationship among the members. Based on maker education, innovation, learning diffusion and the practical application, the network platform has throughout the development of rural human resources. The research and development platform is the mainly under-structure, innovative learning platform as key point, and service platform as the support.

### **Based on Local Agricultural Industry Chain**

There are five main analysis centers in the commodity chain: the nature of the production process; economic and social organizations of food production; the use and management of labor force; scientific research and promotion activities; sales organization and distribution activities [9]. The commodity chain suggests that the enhancement of the rural environmental conditions and the traditional (i.e., agricultural food) economy can affect the growth of the non-agricultural economy. However, it tends to simplify the process of change, because it focuses on the harmony within the food chain, where all kinds of complex materials and actors tend to be incorporated into the overall process of harmony. From the development trend of the world agriculture, a series of industries related to agriculture, as well as the commercial activities related to ecology, tourism and leisure are the main contents of agricultural management. From the point of view of ecological environment, there are rich ethnic cultural resources and unique ecological environment in the remote ethnic areas. Green agriculture, leisure, tourism, and tourism industry are suitable to development in those places. Modern agriculture is a kind of industrial group served the development of agriculture, which forms a complete system of large agricultural industry by infiltrating into other industries gradually. Therefore, under the condition the traditional agriculture cannot solve the problem of increasing the income of the villagers in the ethnic minority areas. It is possible to excavate, transform and develop the modern agriculture in the national poverty areas through the development of the rural human

resources. The development of the local economy will be promoted through the deep processing industry of agricultural products, the agricultural service industry, the tourism ecological tourism industry, the agriculture related logistics trade and so on.

## **Strategies of Human Resource Development**

### **The Cooperation of Government, Industry, Universities, Research Institutes, Rural**

Since 2015, the development of maker education has been supported by national policy. In March 2015, Chinese government work report mentioned maker clearly. Thereafter the General Office of the State Council issued the document of guidance on the development of the public space to drive the mass innovation, which aimed at creating a good environment for innovation and entrepreneurship, stimulating public entrepreneurship, innovation, creating a new engine of economic development. However, the department of human resources development has not yet attracted enough attention to the development of maker education. Therefore, there are some recommendations to development: first, Concerned people should organized to study the development laws and experiences of maker education and form the relevant knowledge; secondly, long-term development planning and relevant regulations should be worked out to promote the orderly development of maker education; thirdly, the work of rural human resources development should be led by the departments, including other organizations and experts. The participation of social forces can provide the real soil for the learner's practice, not just the simulated environment.

### **Based on Local Resources for Human Resources Development**

Rural area has always been a place of primary production. It not only provide food and raw materials, but also the main source of human resources and the accumulation of primitive capital, and the basis of urban population growth. In the process of modernization, some of the most valuable rural resources (such as environment, natural scenery and cultural tradition) have provided a solid foundation for the development of rural economy and society. However, these resources are often overlooked, although they are part of rural life, but few people consider them as an important source of economic development. Rural resources can be divided into three categories: ecological resources, cultural resources and rural social resources. Ecological resources include clean environment, biodiversity, high quality and good production conditions, special agricultural products, open space, natural and cultural landscape, etc... Cultural resources include rural culture, national culture, folk customs and architectural environment, local cuisine, arts and crafts, local specialties and production methods, ethnic languages, traditional lifestyles, etc.. Rural social resources include social networks, kinship, geopolitical relations, mutual trust and understanding, special communication way, etc... Based on local resources, the development of human resources fits the curiosity and creativity of human nature, and gathers innovative education, experiential education, project learning and other ideas as a whole.

### **Creating Maker Space Based on Rural Libraries**

The key to farmers getting rich is mastering modern scientific knowledge. Rural library is the main position of spreading scientific knowledge, which plays an important role in enlightening wisdom and improving farmers' quality. Since the Third Plenary Session of the Eleventh Central Committee, China's rural library has been regain its development with the vigorous development of the socialist reform and opening up. In 2007, the "book house" project was launched in China, and the book category proportion was provided, such as the political and economic accounts for 4%, science and technology accounts for 40%, and cultural life accounts for 35%. By the end of 2010, China had planned to build the 200 thousand "book house", that the farm library has ushered in a new upsurge of construction. by the end of 2013, the central government and all levels of government had invested more than 30 billion Renminbi. That the goal of each village had a book house had realized. Rural libraries can be created as maker space. In support of the agricultural research team, a variety of maker projects may have been launched through workshop and craft. Regardless of whether or not

the villagers have maker background, they can choose to complete a maker project to develop their own creativity, environmental awareness and creative skills.

### **Flexible Selection Mode of Rural Human Resources Development**

According to the characteristics of the rural population, the design of the maker project should consider the cultural background, knowledge background and cognitive characteristics of peasants. For elder learners, the project is simple and fun. For young learners, the project should have a certain difficulty and challenge. Through the training, young learners not only can deepen the understanding of knowledge, but also can cultivate their comprehensive ability in many aspects. Rural human resource development can be used in three ways to carry out: the completely opening maker space will be constructed. The learners can participate in some thematic creating activities or use maker space resources according to their learning needs; Maker education curriculum will be set up; Maker education need be integrated into the training content.

### **Summary**

Maker education has led the upsurge of innovation by new rules of community operation, self-organization, and cross-border cooperation from bottom to top. Makers aggregation is because of interest, which develops their common interests in the interaction. The sustainable development of creative projects from the creative to the products is a challenge to the wisdom of the group and the execution of innovation. Creating practice make people dare to try to change them, and make them think about the meaning of innovation and entrepreneurship value based on open source tools and easy access to technology. At present, under the impetus of innovation and Entrepreneurship Policy in rural areas, farmers are experiencing profound transformation and calling for the response of education. Under the background of globalization of knowledge, the development of rural human resources cannot be independent of the trend of the times. The public space and ecosystem of rural maker education has been set up, which not only provide opportunities to change the countryside for rural makers and creating community, but more importantly form innovative culture in rural. The future of China's rural development will be profoundly affected by comprehensive consideration of the rural human resources development based on maker education.

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