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Dual System and Progressive Education: What Can China Learn from the U.S. and Germany's Vocational Education Systems?

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DUAL SYSTEM AND PROGRESSIVE EDUCATION
---WHAT CAN CHINA LEARN FROM THE U.S. AND GERMANY’S VOCATIONAL EDUCATION SYSTEMS?

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To my dear Mom, Lishan Zhou
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Unlike the industrialized countries such as the U.S. and Germany, where the formal vocational education evolved from their social and economic development, the vocational education in China has to face challenges like strong influence of Confucianism, lack of philosophical foundation which values hands-on learning and vocational education and low level of universal education and industrialization. Confronted with human resource crisis and problematic vocational education system, China has turned to the developed countries for useful lessons and practices. This study compares secondary vocational education systems among China, the U.S. and Germany with the purpose to explore useful lessons that China can learn from the two countries. From the social functionalist perspective, Germany's dual system shows some advantages in solving China’s human resource crisis and in providing structured and job-specific training to students. However, the current practice in China to learn from Germany has been limited and superficial, with some important features about Germany’s dual system being neglected by researchers and policy makers. In addition, more attention should be given to John Dewey’s philosophy and the progressive aspects of the U.S. vocational education system in order to help China to develop a more informed and balanced strategy to improve its vocational education, not only to meet the demand from its economies and industries, but also to achieve the individual student’s development and social equity.
CHAPTER ONE

INTRODUCTION

Background and Research Questions

One century ago, China was helpless prey under the exploitation of colonial powers; now with its blooming economic development, it has become one of the major economies in the world. Despite the global economic downturn, China has managed to maintain its GDP growth rate above 8% during the past decade, which is higher than most of the countries, even including the developed countries. In 2010, China has overtaken Japan as the second largest economy in the world, right next to U.S. (New York Times, 2010).

This transition has major implications to China's educational system, particularly the career education and training system. Preserved as privilege for the socially advantaged in traditional Chinese society, schooling is now universally provided to all Chinese students for 9 years from primary to middle schools. The adult literacy rate has increased from 20% in 1950 (Plafker, 2001) to 94% in 2009 (UNESCO, 2009). The operation of this enormous “world factory” requires a well trained workforce in large amount, and the vocational education system in China, which is the main source for labor training, has expanded enormously accordingly.

However, the fast economic and educational development did not take place evenly. The living standard and educational level in rural areas and west China still lags far behind the cities in the coastal region. In addition, the quick economic expansion has presented new challenges and pressure on the vocational education system in China, which has turned out to be barely able to catch up with the huge demand for better-skilled labor force. As a result, the general quality of labor force is still low and the urbanization and industrialization is accompanied with acute shortage for skilled workers. The vocational education system in China has been increasingly criticized for its unpractical curriculum, poor teacher training, inefficient administration system, insufficient funding, and lack of work-place training etc.

Under this context, it is important to compare China's vocational education system with those from developed countries. It can provide a better perspective to review and evaluate China's current vocational education system and highlight the useful lessons that China can learn from other countries. In fact, when establishing the first modern educational system and
vocational schools one century ago, China's policy makers and educators had already turned their attention towards other industrialized countries, an effort which resulted in the introduction of the American educational system and John Dewey's educational philosophy into China. More recently, much attention has been given to Germany's dual system, which has been hailed as one of the best vocational education systems by the Chinese government.

This paper will compare China with the U.S. and Germany in their vocational educational systems. The reason to choose these two countries for comparison with China is not only because they are both major industrialized countries and attract China's interest and enthusiasm now and then; more importantly, the choice is based on the fact that the U.S. and Germany show interesting contrast with each other in their vocational education systems, an important aspect which most comparison studies in China neglect. If the vocational education in the U.S., strongly influenced by Progressivism, is featured with general vocational education within comprehensive high schools, where students are free to choose vocational courses as electives, the vocational education in Germany is more like a "sorting machine", which streams students into distinct vocational and academic tracks at young age and provides those on the vocational track with job-specific training at workplaces and schools. Exploration of these differences can be of importance to China because it can broaden the perspective for China's policy makers and educators in learning useful lessons from different systems. It can also highlight the different socio-cultural and economic contexts of various countries and offer a better understanding of how certain vocational education policy and strategy functions under different social and educational structures. Furthermore, the comparison between the two countries can be conducive to revealing the strengths and weaknesses of the vocational education models in the U.S. and Germany, thus helping China to absorb the best lessons while avoiding potential pitfalls in its current efforts to introduce useful practices from developed countries.

Acknowledging the importance of social and historical contexts which can still shape and influence the current educational practices in various ways, this paper starts from a historical review of how vocational education developed and changed in China, in comparison with the related history of the U.S. and Germany. It is then followed by a discussion about how some of the cultural and economic factors in the history are still influencing the current development of vocational education in China. The rest of the paper juxtaposes the U.S. and Germany's models of vocational education, explores the strengths and weaknesses of both models, and examines
which aspect of each model can fit China's social and cultural context and provide useful solutions to the human resource crisis and inequality issues in China. In the final section, some potential steps are suggested to further the reform of vocational education in China based on the examination on the useful lessons that China can draw from both countries.

**Literature Review**

As an important tool for policy makers and educators, international comparative studies have become prominent since the 80's when China reopened itself to the outside world after the Cultural Revolution. The comparison studies on vocational education have also increased along with the quick development of vocational schools in China. With the view of learning from others, most of the studies cover developed and industrialized countries such as Japan, Britain, Germany, U.S., Australia, Canada, etc (Chen, 2008; Huang, 2007; Shi, 2001; Wang, 2001; Zhou, 2005; Zhou, 2008). A few studies based on large scale international databases cover more countries for comparison, including some developing countries as well (Guo & Lamb, 2010).

Not surprisingly, several studies in China have focused on the vocational education in major industrialized countries such as Germany and the U.S. Some studies provide general introduction of vocational education systems in the two countries and usually conclude with authors' suggestion about potential lessons for China to learn. Among this type of studies on U.S., some give general description of current vocational education system in U.S. (Chen, 2000; Wang, 2000; Zhan, 2003) or a brief history of its development (Liu, 2008). Several studies focus on relevant laws and their influence on the development of vocational education in U.S. (Li, 2005; Wang, 2005; Liu, 2011; Fang & Wang, 2008). Some other studies also focus on the role of community colleges in vocational education (Xu, 2005, Li, 2010; Shen, 2010; He, 2010). It is interesting to observe that the authors of these studies seem to presume that vocational education in U.S. starts from post-secondary stage. A few other studies cover such aspects as agricultural occupational education (Zhu, 2010), competence requirement and assessment of vocational teachers (Li, 2010), and career guidance integrated in a high school Biology textbook (Cheng, 2010). The suggestions the studies provide are often general and commentary, without much support from empirical data. The useful lessons which the authors believe China can learn from the U.S. include strengthening the government funding, improving the vocational education law, tightening the connection between vocational education curriculum and labor market and so on.
The studies about Germany are more comparative in nature, which focus on the differences between China and Germany in addition to introducing the vocational education system in Germany. The aspects for comparison cover a wide range including the dual system, teacher training, curriculum design, laws, the involvement of enterprises, and government funding. Like those studies about the U.S., most comparative studies about Germany and China are also descriptive and commentary, except for a few containing statistic data for comparison (for example, Lai, 2009). The studies are overwhelmingly positive about the vocational education system in Germany, particularly its dual system (Guo, 2009; Lai, 2009; Wu, 2010). They also point out other advantages Germany's vocational education system enjoy compared with China, such as extensive involvement of enterprises (Wu, 2010; Lai, 2009), practical and relevant curriculum (Chen, 2005; Lai, 2009; Wu, 2010), comprehensive law system (Wang, 2009; Xie, 2008), rigorous teacher training (Guo, 2009; Zhu, 2006; Lai, 2009), and large funding from government (Lai, 2009; Wu, 2010; Wang & Zhang, 2009).

Although these studies provide some information about the vocational education in the U.S., Germany and other countries, most of them are general descriptive case studies with overwhelmingly positive comments about other countries' practice. Few studies provide detailed comparison and in-depth critique. Nor are there enough quantitative studies using indictors to measure and compare the vocational education input and output in an empirical way. In addition, in comparing China with other countries, there is not enough discussion about the different historical and socio-cultural contexts, which can shape the vocational education policy and practice in significant ways. Simply transplanting a model from one country to another without paying due attention to different social and cultural backgrounds can sometimes turn out to be detrimental and invite unintended consequences. Moreover, for those comparison studies involving multiple nations, little attention is paid to the differences among the developed countries in their vocational education models which the authors recommend China to learn from.

This paper aims to making some contribution to the current literature through comparing China with the U.S. and Germany from social and historical perspectives. It will examine and compare how vocational education developed and evolved in the three countries under different social and cultural contexts. It will also highlight the differences between U.S. and Germany in their current vocational education models and provide critiques about the strength and weakness
of the two models in terms of their potential effectiveness in solving China's problems. It is hoped that the comparison through socio-historical perspective can help China to learn from other countries in a more informed and balanced way.

**Methodology**

In the field of international comparison, two main methodologies can be identified—the variable-oriented comparative approach and the case-study approach (Guo & Lamb, 2010). The variable-oriented approach involves the use of statistic data which is compiled into certain key indicators (variables) for comparison. It is a type of quantitative study which allows comparison across large numbers of countries on a wide range of relevant evidence and important features. A typical example is Guo and Lamb's study (2010), which compares China's vocational education with more than 40 other countries on key indicators such as the government/private expenditure on vocational education, students' enrollment and graduation rate from vocational schools, duration of vocational education programs, location of vocational education instruction, labor force participation rate, unemployment rate etc.

As mentioned earlier, most of the published literature which compares China with other countries in vocational education involves the second type of method, case study. Unlike the variable-oriented approach, case study only involves one or a few countries, while at the same time allowing more detailed and in-depth description of the different vocational education systems, programs, and settings. A typical example is Barabasch, Huang & Lawson's study (2009), which describes the vocational education structures in Germany and China, followed by a projected future if China adopts various vocational education models from a few industrialized countries.

This study will use mixed methods involving both approaches to different degrees. On the one hand, it will be largely a case study, which focuses on the three countries of China, Germany and the U.S. and provides detailed description about the socio-historic backgrounds and the vocational education systems of the three countries through comparative perspective. On the other hand, it will also substantiate the profiles with statistic data on some key variables such as participation rate of vocational education, types of educational program, public expenditure on vocational education etc. Some of the data is cited from other studies, while some is calculated and compiled by the author.
Some Terms and Definitions

UNESCO uses the term "technical and vocational education and training (TVET)", defined as "a comprehensive term referring to those aspects of the educational process involving in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life" (UNESCO, 2005, p.7). This term is also adopted in China while "career and technical education (CTE)" is used in the U.S. and "vocational education and training" (VET) is used in Germany. Although many comparison studies use UNESCO 's term of TVET, this study will use a more generic term of "vocational education". Since this study will include extensive discussion about the vocational education in the history of the three countries, which was more of informal and unformal types of education provided within family, guilds, and churches, the term of TVET will not be appropriate with its connotation of formal vocational education delivered through a modern schooling system. In addition, for the convenience of comparison, this study will also use the term "middle school" interchangeably with "lower secondary school", and "high school" with "upper secondary school", since the three countries all use these terms in various settings.
CHAPTER TWO

HISTORICAL REVIEW OF VOCATIONAL EDUCATION IN
CHINA, THE U.S. AND GERMANY

China

Ancient Period

Under the strong influence of Confucianism, Chinese culture places high value on education. Confucianism, established by Confucius about 2500 years ago, aimed at educating the "moral man", or Junzi. To become a Junzi, a person must observe established social rules and rituals, governed by humanity, justice, virtue, and righteousness, with devotion to his country and filial piety to his ancestors and parents (Munch & Risler, 1987). To Confucius, Junzi is not like a utensil, fashioned for a specific purpose (Jun Zi Bu Qi); instead, he is an omnipresent moral model for his family and community. According to the teaching of Confucius, any man can achieve this state through education, but only through the education of classic philosophy, history and literature. Therefore, education cannot be measured in terms of its direct utility, and specialized education, such as vocational training, was dismissed as a mere means for survival (Nan, 1990).

Not surprisingly, the traditional education system in China founded on such a philosophy as Confucianism rarely included vocational education in schooling system. Offering classes only on classical works of poems, history, politics and Confucianism, traditional schools in China mainly functioned as preparation of civil officials in the centralized bureaucracy, who occupied the highest position in traditional Chinese society, above the peasants, craftsmen and merchants. In order to become an official, students typically spent many years in school on intensive study of the canonical texts in preparation for the national qualifying examination for official positions. The examination system, which formed in Han Dynasty (206 BC-220 AD) and matured in Tang Dynasty (618-907), is based on the testing of the "five classics" (Shi jing - the classics of poetry; Shu jing - the classics of history; Liji - the classic of rituals; Yijing - the classic of changes; and Chu qiu - the Spring and Autumn Annals) and "four books" (Lunyu - the conversations of Confucius; Menzi - the conversation of Menzi, who was a Confucius' disciple; Daxue and Zhongyong - two articles in Liji, the classic of rituals). The "five classics" and "four books"
formed the major part of orthodox doctrine and were consequently the subjects for the national examination (Tao, 1985; Sun & Ren, 1997). As one ancient Chinese poem describes, "ten years of lonely study, next to the freezing window, only for the day, to see my name inscribed on the golden pole". Of course, in return of the hardships, the government position can glean for the individual and his family not only prestige but also decent income.

Overshadowed by this test-oriented education system founded on the philosophical foundation of Confucianism which exalts classic humanity cultivation over any specific work-skill training, including applied scientific study, vocational education in China had traditionally been absent in schools. The knowledge and technology of craftsmanship was usually transmitted among family members, or to be more precise, male family members. For example, an ancient piece of classic work, Guanzi, described how in Qin Dynasty (221 BC-206 BC), craftsmen lived close to each other, discussed technical issues, selected materials, exhibited their products, and exchanged certain technologies. Their children, growing up in such a learning community, acquired the skills naturally without deliberate or strict instruction from the father or elder brother, and adopted the livelihood of their fathers' or brothers' through informal education and socialization (Dai, 2003).

With the further development of technology and trade, guilds began to develop. Beyond the family and clan boundary, apprenticeship training was provided within the guild, which strictly controlled the number of apprentices and duration of apprenticeships, as well as product price, quality, apprentice wages, etc. According to the Italian merchant Macro Polo, who lived in China from 1260 to 1294, there existed 414 guilds in the city of Hangzhou, Capital of China then (Munch & Risler, 1987).

In addition to guilds, it was not uncommon to see craftsmen, particularly the excellent ones, organized together to serve the luxury needs of emperors and royalties. For example, in Tang Dynasty (618-907), the central government established several state-owned workshops, which also provided formal training to new apprentices. The duration could vary, depending on the type and level of craftsmanship under training. The government also organized quarterly and annual exams to ensure the quality of these workers (Dai, 2003). These types of training can be regarded as early forms of formal career education in China. However, due to the deep-rooted self-sufficient agricultural economy as well as Confucianism's bias against trading, the

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1 The golden pole is to post the names of the top students who were to be assigned with government positions.
industrialization was never fully developed in China like in the West (Huang, 2007). Thus, career education had largely been carried out through apprenticeship within guild or family.

**Contemporary Period**

The situation abruptly changed during the second half of the 19th century with the cannons fired from the Western colonial powers. Since the Qing dynasty (1636-1912), the emperors had decided to close China to the outside world, under the illusion that China would retain its advancement in civilization, economics, and technology with no need for communication and exchange with the outside world. Such blind arrogance and ignorance had turned out to be fatal. Because of the self-isolation, China missed the opportunity to catch the wave of industrialization surged by great scientific and technological development in the West. When besieged by the colonial powers during the Opium War (1840), China was completely helpless and hopeless in confrontation with the colonial powers equipped with weapons and vehicles invented with newest science technology (Huang, 2007).

Since the defeat of the Opium War, China was forced to open its market, give up lands and ports, and pay tons of silver and gold to the colonial powers. The shock and shame prodded some officials, scholars and business men into "self-strengthening movement". During this period, a military sector based on heavy industry was developed---coal and ore mines were established; steel ships and railways were constructed; and telegraph links were set up. Accordingly, several vocational schools (Shi Ye Xue Tang) were created to cultivate workers and technicians for those emerging industries (Tang, 2004). These vocational schools are generally regarded as the first formal career education in China (Tang, 2004).

In 1903, the imperial government established the first public education system following the Japanese pattern, which in turn was modeled after the French and Prussian systems. It provided a continuous structure from primary schools, secondary schools, and the already existing universities (Munch & Risler, 1987). Although the traditional school based on Confucianism was not yet openly criticized until the May 4th Movement in 1919 and the traditional school continued to co-exist with the "new school", more and more people began to recognize that traditional education was too narrowly focused on humanities and liberal arts, and that those subjects of science, math, and engineering, which had been ignored and disregarded by Confucianism, were crucial to the dominance of the Western powers. This new conception was
reflected through the introduction of the subjects of math, physics, biology, chemistry, navigation, etc. into the new public education system (Gerwurtz, 1978; Tang, 2004).

In addition to the introduction of Western schooling system, another defining feature of the reforms during this period was the establishment of modern vocational educational system in China. In 1904, the Qing government stipulated the famous "Guidelines for Schools", which expanded the already-existing vocational schools up to three-levels---primary, middle and high levels, paralleling with the new public schooling system of elementary school, middle/high school and university. This event marked the first official recognition of the importance of vocational education and the establishment of the first formal career education system in contemporary China (Gerwurtz, 1978; Tang, 2004).

These new education reforms carried out by the Qing dynasty, however, did not save it from doom. In 1911, the Qing Dynasty was overthrown, and the Chinese Republic was established. The new central government, greatly weakened by the local war lords who fought with each other for power, did not take much further step to pursue the educational reform. Education had become a "forgotten project as far as the central government was concerned" (Wang, 1966, cited from Gewurtz, 1978). Busy with keeping itself afloat above the political turbulence, the central government had to let the local authorities to take over the administration and funding of the local education, but the local government was also paralyzed by the political disturbances as well.

**Chinese Vocational Education Association and the American Influence**

Ironically, it is this political vacuum that indirectly contributed to the further development of vocational education in China. It allowed space for professional educators to establish local, non-governmental organizations to promote the education reforms in China (Gewurtz, 1978, p. 160). One of the organizations is the Chinese Vocational Education Association (CVEA), which played a crucial role in shaping vocational education in China. One thing worth noticing is that several prominent educators who were active in reforming China's education were trained primarily in the U.S. and were deeply influenced by Progressivism and John Dewey’s philosophy. For example, the literary scholar Hu Shih, university presidents Jiang Menglin and Guo Bingwen, textbook author Zhu Jingnong and finally, Tao Xinzhi, who was one of the most important founders of the association, all studied at the center of Progressive
philosophy in the United States, Columbia University. When they returned back to China, they also brought with them the influence of American education system, theories and philosophy. John Dewey himself also visited China and lectured at several major universities during 1919-1920, which further extended the influence of Progressivism in China (Brown, 1990).

Given this historical background, it is not surprising to see CVEA's strong pragmatic stance in promoting a type of education which can “solve the problem of livelihood ”(Huang, 1931, cited from Gewurtz, 1978). CVEA pointed out that despite the new reform on schooling structure and curriculum, there were too few technical and vocational schools in the total system. They deplored the fact that only a small percentage of students could go to higher level of education, and most of school graduates, if they got any education at all, were unemployed. They believed that schools should provide "vocational and practical training, not merely in the schools of higher grades, but also in the schools of lower grades" (Fugh, 1925, cited from Gewurtz, 1978).

Tao Xingzhi, one of the early founders of CVEA, shared with Dewey's educational philosophy in criticizing the schooling in China as being only designed for elites, without any organic connection with the larger society or the actual needs of society. "Books," Tao once said, "are just tools, just like a hoe. They are all just for doing something." The esoteric knowledge and subjects should be replaced by more practical education such as science or vocational training. He coined a slogan called "Life is Education", claiming that he had taken from Dewey's formula of "Education is life". Through the switch, he argued that the classroom should not only be the miniature of the larger society, but also need to permeate into every aspects of society (He, 1997). As Brown summarized, according to Tao, "all of life, particularly all of human social existence, was the proper arena of education." (Brown, 1990, p.34)

Under the leadership of progressive educators represented by Tao, CVEA published various journals such as "Vocation and Education", established several vocational schools across China, introduced the American educational philosophies and practices, and invited Dewey to visit China. CVEA's influence peaked in 1922 when the government promulgated the new public school system which gave vocational education prominent place (Gewurtz, 1978). The new system adopted the American 6-3-3 model of six-year elementary school, three -year middle school and three-year high school. It also integrated the American system of elective courses and credits (Brown, 1990). Above all, it created two different types of middle and high schools:
the regular or general education schools and those devoted solely to vocational training, such as the vocational schools sponsored by local educational advocate group like CVEA. In addition, it also stipulated that the general type of school should also provide some vocational training. According to the Ordinance of the Ministry of Education, “the curriculum of the elementary schools may include pre-vocational training…the junior middle schools…may carry on various vocational courses.” (Chen and Tao, 1955, p. 109, cited from Gewurtz, 1978, p. 163) Thus, vocational training was made available throughout the new school system, both in general schools and vocational schools.

However, this momentum to promote vocational education was unfortunately stalled by the invasion of Japan, followed by China's Civil War, the Cold War, and then the Cultural Revolution. It was not until 1978, when China was reopened to the outside world and refocused on economic development that the development education, including vocational education, was put back on track.

**The History of Vocational Education Development in the U.S. and Germany in Comparison with China**

**Industrialization**

Compared with China, where formal vocational schooling was more of an imported concept and practice under the social and political pressure to revive China, the vocational education systems in the U.S. and Germany seems to evolve in a more natural and gradual manner. Take the U.S. as an example. By the mid 19th century, the U.S. was already in the transition to an urban-industrial society. The apprenticeship developed during colonial period could no longer serve the demand of the booming industry. What the factory system needed was no longer a handful of well-trained craftsman who could master the whole process of the "arts and mysteries of a craft"; what the factory system needed was large amount of semi-skilled or low-skilled workers for the highly segmented subdivisions of production lines in the factory. This change made apprenticeship both expensive and useless (Gordon, 1999).

In addition to the economic aspect, the industrialization also led to profound changes in other aspects of social life including schools. Manufacturers demanded that schools should reform its traditional education on arts and classics to focus more on industrial skills and machine training. Educators also called for more relevant and hands-on learning to reinvigorate
the classroom dulled by repetitiveness of recitation and drill of material of ambiguous value (Lazerson, & Grub, 1974).

Against this economic and social background, the movement for manual education in schools began to gain national prominence in the late 19th century. By the end of the 19th century, manual education schools had been established in several cities, and according to a national survey, 36 cities reported thousands of students from elementary to high school levels received some training in drawing, cardboard construction, wood and mental work, sewing, and cooking. By the early twentieth century, almost all students were exposed to some manual training at school. (Lazerson & Grub, 1974).

The manual education movement was later replaced by the vocational education movement, which further strengthened the connection between schooling and specific vocational training. Like the manual education, the vocational education movement gained wide range of support from politicians, educators, industrialists, philanthropists and even labor unions (Lazerson & Grub, 1974). In 1906, the National Society for the Promotion of Industrial Education was founded, and by 1917, the trend of vocationalism reached its peak through the passage of the Smith-Hughes Act, which ensured federal funds for vocational training. Even the World War II, which dismantled the new modern education system in China, only reinforced the vocationalism in the U.S., linking specific job training to national defense (Gordon, 1999).

Similar to the case of the U.S., vocational education in Germany also evolved gradually with its economic and social development. Like China, Germany also had a long history of guild-regulated apprenticeship, which can be traced back as early as the Middle Ages. By the 16th century, however, the rise of manufacture and industrialization, as well as economic liberalism, greatly weakens the guild's regulating power. The apprenticeship training was downgraded into "exploitation of apprentices" (Munch, 1991). In response to the demand for skilled labors, some industries began to run their own training workshops in the 19th century, which can be regarded as the forerunner of vocational education at workplace. Meanwhile, religious Sunday schools and industrial Sunday schools were founded in some states like Prussia and Wurttemberg during the 18th Century. Later, these two types of schools were brought together and eventually developed into today's vocational schools in Germany (Tremblay & Le Bot, 2003; Munch, 1991).
In comparison, China did not experience such industrialization, which created natural demand for the development of vocational education in U. S. and Germany. When vocational education was introduced into the county, China was still an agricultural society. There was no demand from a factory-system for a systematic vocational training at school to produce large number of machine-adept workers. According to a study conducted in 1922 by Huang Yan-pei, one of the founders of the Chinese Vocational Education Association, almost half the newly established vocational schools in China were agricultural, while 18% were commercial, 12% were industrial, and 22% were mixed. Accordingly, more than 50% of the books published for use in the vocational schools dealt with agriculture. However, due to the low literacy rate in rural area, about 80% of these agricultural schools were nevertheless located in urban areas, leading to its divorce from social reality and consequent decline (Gewurtz, 1978). Thus, the vocational education development in China was stranded in a dilemma from the very beginning: on the one hand, the lack of urban commercial-industrial economy resulted in the agricultural focus of most vocational schools; on the other hand, the leaders of the vocational education movement, most of whom were urban, bourgeois intellectuals, chose urban cities with more educated population to set up vocational schools, causing a urban/rural split. Although the CVEA and Tao later tried to shift their efforts to rural areas and established a few vocational schools in some villages with the so-called "Rural Development Movement", it was soon swept away by the turmoil of the Civil War and Anti-Japanese War (Brown, 1990). One scholar argued that the failure of vocational education movement in China could be partially attributed to the fact that the leaders of the movement drew too much of its inspiration and material from the American vocational education movement which fitted a more advanced urban commercial-industrial economy instead of an agricultural society like China (Gewurtz, 1978).

**Universal Education**

Both Germany and the U.S. had already set up a system for universal education before vocational education came into being. In Germany, under the strong influence of the Lutheran denomination, compulsory education was advocated as early as 17th century for the purpose of enabling people to independently read and interpret the Bible. By the 18th century, a free universal primary education system had already been established, which put Germany among the first countries in the world to introduce free and compulsory basic education (Paulsen, 1908).
Similarly, the access to basic education was also open to masses in the U.S. During the colonial period, provision of some basic education was always a concern for puritans, as was reflected in the famous Old Deluder Satan Act of 1647, requiring that towns with fifty or more families in Massachusetts must provide instruction in reading and writing, and those with a hundred households or more must establish secondary grammar schools. Later on, the Common School movement pushed by Horrace Mann greatly increased both the access and quality of the compulsory basic education (Spring, 2000; Gordon, 1999). By the early 20th century, both countries had actually added a few years of secondary schooling as part of its compulsory education system.

In contrast, there existed massive illiteracy among Chinese people, which created another disadvantage against the development of vocational education in China. In 1911, the illiteracy rate was around 80%; In 1928, only 21% of the children of school age attended primary school (Munch & Risler, 1987). Without any preparation of basic education, nor a sizable and stable student population at school, it became almost impossible to promote vocational education effectively.

In addition, due to the lack of basic education among the majority of Chinese, most of the schools at that time were of elite characteristics, even including the vocational schools. For example, a large number of vocational schools established by the Chinese Vocational Education Association in early 1920's had to be changed back into general schools for elites. Zou Tao-fen, one of the leaders of the Association, described in a report that most of the students in the vocational schools were from middle class or gentry families, who preferred the school to teach more academic subjects rather than practical subjects as a better preparation for college and university. The majority of the students actually never intended to join the work force (Gewrutz, 1978, p. 172). From the description, one can still see the strong influence of the traditional education philosophy on people's bias against vocational training. As a contemporary Chinese scholar insightfully summarized, in the Confucian tradition, education had been a "preparation, not for practical efficiency" (Meng, 1925 from Gewurtz, 1978).

From the comparison, we can see that while schooling in China had been elitist, the U. S. and German systems of education (in the modern era) were both egalitarian. As a result, the development of vocational education was much quicker and smoother in these two countries because most young people had not only been prepared with basic skills of reading, writing and
arithmetic, but were also bound by law to receive further education, be it academic or vocational. Unfortunately, the early educators in China had no choice but to set up its first vocational schools in urban cities where the literacy rate was relatively higher, but only to be confronted with the urban elite students showing no interest in agricultural or technological training, a dilemma which eventually contributes to the failure of the vocational education movement in China.

**Philosophical Foundation**

Not only did the development of vocational education in the U.S. and Germany benefit historically from industrialization and the wide spread of education; their educational philosophical foundation which values the practical and rationale aspects of education also facilitated the development of vocational education in these two countries. For example, in the U.S., concurrent with the industrialization was the rising criticism against the teaching practice at school---the rote memorization, the irrelevant curriculum, the neglect of students' needs and experiences etc. (Lazerson & Grubb, 1974). Calling such education as "traditional education", Dewey, one of the most influential educational philosophers in U.S., saw vocational education as a means of liberalizing students and teachers. He believed that youth could be adequately prepared if they began to study occupations at school. His experimental elementary school at the University of Chicago reflected this ideology with shop work, cooking, sewing, textiles and gardening as part of the curriculum. Dewey believed that through this hands-on learning connected with students' experience, students could understand the science of tools, processes of work, problem solving and other skills and attitudes necessary for living in an age of science (Dewey, 1938; Gordon, 1999; Wirth, 1972).

In addition to Dewey, other contemporary scholars and educators in the U.S. also touted vocational education as a way to reform the traditional education. For example, Booker T. Washington believed that the essential goal of education was both cognitive and problem-solving skills, which vocational education could realize; David Snedden and Charles Prosser held that schools should prepare youth for the occupations at which they excelled and that vocational education should be integrated into the general curriculum (Gordon, 1999). Both of them also became important policy makers pushing for vocational education (Wirth, 1972).
Germany, with its longer history, shares some similarity with China in its focus on language, arts, and classics in traditional education. For example, during the long Middle Ages, education in Germany offered through various institutions such as monastery schools, Cathedral and collegiate schools, city schools and universities all emphasized Latin, Greek, Christian Scripture, theology, and later, the Roman laws and the cannons of Aristotle, Hippocrates and Galen. Although arithmetic and astronomy were also included, they were taught in a limited way mainly for the purpose of keeping Christian calendar (Paulsen, 1908).

However, during the Renaissance, mathematics and physics began to appear in university curriculum, and such subjects as arithmetic, geometry, physics and cosmology all found their ways to secondary school curriculum. During the 17th and 18th century, the rising rationalism as well as the development of mathematics and natural science further elevated the status of science and technical education at school in erosions against classic antiquity (Paulsen, 1908).

Pushing behind this trend of change was a group of education reformers represented by Ratichius (1571-1635) and John Amos Comenius (1652-1670). They held that the school had put too much emphasis in teaching languages and antiquity, leaving no room for the things themselves. They believed that knowledge of things was the only knowledge which had any immediate value, while knowing how to express the same idea in three different languages or antiquity was indirect and secondary. For them, a true education should provide students with knowledge about the existing world of matters and mind, with the course of instruction at school encompassing broad encyclopedic culture and all sciences (Paulsen, 1908).

This pragmatic educational philosophy spread in Germany and led to significant changes in the curriculum and pedagogy in Germany. Take secondary school as an example. Although Greek, Hebrew, Latin and the Bible were still taught at school, a lot more room was given to science instruction such as mathematics, natural science, geography etc. More importantly, great stress was laid on practical applications in teaching these subjects. For instance, the instruction of geometry was accompanied by the practice in the open field and botany was taught either in the country or in the herbarium. The students were also taken to watch artisans at work, in order to see the process and products of human art, as well as its connection with sciences taught at school. Some schools even provided facilities for manual training in turnery, glass-grinding, and wood-sawing etc. (Paulsen, 1908).
Similar trend also trickled down into elementary school in the 18th Century in Germany, initiated by an important educator, Johann Bernhard Basenow. As a son of a wigmaker, he refused to take his father's business and ran away. He managed to obtain university education as a clergyman, and later opened his experimental school, Philanthropinum, where he implemented several educational innovations. Greatly influenced by Rousseau's Emile, Basenow strongly opposed the prevalent practice at school where children were treated as miniature adults, forced to memorize abstract scriptures and irrelevant grammar rules under strict discipline. Running against the current trend, he advocated that the aim of the school was to direct and not suppress children's natural instincts and interests. Under the principle of "everything according to nature", Basenow implemented a wide objective and practical curriculum at Philanthropinum, including bits of anthropology, anatomy, physiology, uses of domestic animals and their relation to industry, trees and plants, agriculture, minerals and chemicals, math and physics, as well as trades, history and commerce. In addition, with the belief in the educative value of constructive work, he also suggested that every child receive between 2-6 hours of training on handicrafts---carpentry, turning, planting and threshing, (Graves, 1912; Quick, 1890). From this brief historical review, it is obvious to see that although a separate and systematic vocational education was not established until almost 200 hundred years later in Germany, the stage had already been set by generations of educators and philosophers with pragmatic and progressive beliefs about education.

China, however, did not have such ideological and philosophical preparation for its development of vocational education as the U.S. and Germany did. As discussed earlier, its deep-rooted and dominant philosophy, Confucianism, has always disregarded manual training and applied science education as being inferior to the teaching of classics. In addition, its traditional nation-wide exam system for government officials, which to a large extent determined the school curriculum, also excluded the testing of the subjects like science and technology, making it even more difficult to introduce any forms of vocational education into schools. The sharp contrast in the attitude towards vocational education between China and the other two countries might be best illustrated by the quotes from the following two philosophers. One is the Mencius, Confucius' most important disciple and the other one is Booker T. Washington, who has greatly influenced the manual education movement in the U.S.
Mencius: "those who work with their mind should rule people, whereas those who work with their hands should be ruled." (Cited from Gewurtz, 1978)

Washington:"An educated man on the street with his hands in his pockets is not one whit more benefit to society than an ignorant man on the streets with his hands in his pockets." (Cited from Gordon, 1999, p. 23)

The result of the comparison in the historic backgrounds of the three countries by the early 20th century is summarized in the table below (Table 1).

<table>
<thead>
<tr>
<th>Economical Structure</th>
<th>Philosophical Foundation</th>
<th>Education Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>China</strong></td>
<td>Limited degree of industrialization and urbanization; still agriculture-based economy; no significant demand for trained workers from factory</td>
<td>Strong bias against vocational education and training under the influence of Confucianism</td>
</tr>
<tr>
<td><strong>U.S.</strong></td>
<td>Industrialization and urbanization created demand for trained workers</td>
<td>Support for vocational education from various philosophers and educators (John Dewey, Booker T. Washington, David Snedden etc.)</td>
</tr>
<tr>
<td><strong>Germany</strong></td>
<td>Same as above</td>
<td>Support for vocational education from various philosophers and educators (Ratichius, Comenius and Basenow)</td>
</tr>
</tbody>
</table>
CHAPTER THREE

CURRENT VOCATIONAL EDUCATION SITUATION IN CHINA

Policy Development and the Current Vocational Education Structure

Based on the historic comparison among these three countries, the disadvantages and challenges that China had to face in developing vocational education were obvious: lack of industrialization, absence of factory system, elite educational system, massive illiteracy rate, entrenched bias against labor and manual training from Confucianism as well as the political turmoil within and beyond the country. Now, after one century of development, a lot of these hurdles have lessened or disappeared. A modern educational system has been established, covering six years of elementary school, 3 years of middle school, 3 years of high school, and 2-4 years of college or university. Laws were passed to guarantee 9 years of compulsory education. In 2009, the adult (15+) literacy rate reached 94% (UNESCO, 2009). In addition, China is transitioning from an agricultural society to an industrialized society. Since China opened itself to the outside world in the early 80's, and later adopted a more market-oriented economy, the industry, particularly the manufacturing section, has been expanding quickly. Thanks to globalization, China has now become the "world factory". The booming industry and growing factory system puts great pressure on vocational education system to produce skillful workers and managers (Velde, 2009; Zhao & Coniam, 2009; Wu & Ye, 2010).

Realizing the importance of vocational education to economic development, the Chinese government has made several policies on vocational education since 1978, when China reopened itself to the outside world and focused back on economic development after the Cultural Revolution and the Cold War. In review of these policies, three stages can be identified in terms of the policy focus. During the first stage, the policies were mainly promulgated to rebuild the educational system, including vocational education system in China. For example, in 1980, the Ministry of Education and the Ministry of Labor jointly released the "Report on How to Reform the Structure of Secondary Education" with the aim to increase the number of the vocational schools and add vocational courses into the curriculum of the general high school as elective courses (Chan, 2010).
During the second stage, policies were passed to expand the scale of vocational education, particularly at the secondary level, to satisfy the demand from the fast growing manufacturing and heavy industry. For instance, in 1985, the Communist Party of China Central Committee passed the "Decision on Reforming Education System", which pointed out that "socialist modernization construction needs not only senior scientists and experts, but also secondary and elementary technicians, management staff and workers with technical and vocational education" (Wu & Ye, 2010, p. 5). Under this guideline, the policy stipulated that in five years, at least 50% of eligible high school students should be enrolled in secondary vocational schools (Zhao & Coniam, 2009, p. 337). In 1993, Ministry of Education (MOE) issued the" Outline for Reform and Development of Education in China", which pushed the goal further to enroll 60%-70% of eligible incoming high school students into vocational schools (MOE, 1993; Zhao & Coniam, 2009). Although these proposed goals were never reached, the number of students in vocational high schools increased from 32.1% to 49.9% of the high school student cohort from 1995 to 1999 (Wu & Ye, 2010).

At the third stage, the government began to switch the emphasis from increasing the quantity of the vocational education to enhancing the quality, particularly regarding curriculum. For example, in 2002, the National Congress issued the "Decision on the Strong Promotion of Vocational Education Reform and Development", which proposed that the vocational education should be more market relevant and employment-oriented. In 2007, the MOE reiterated the importance of the curriculum relevance between vocational training and labor market in the "Eleventh Plan of the National Education Development", requiring that at least 50% of teaching hours to be devoted to practical skills training. It was also proposed that the curriculum be composed of general knowledge, vocational knowledge and practicum on the ratio of 3:3:4. In 2009, MOE issued "the Guiding Principles on Making Teaching Plans for Senior Secondary Vocational Schools", which covered various aspects including enrollment, curriculum requirements and outlines for syllabus design. It also urged the state and local government to design and implement more specific guidelines which can both suit the local needs and align to the national guidelines (Chan, 2010).

After one century on the winding road, China has finally developed a separate and complete vocational system with the implementation of the policies. The system encompasses three levels: elementary level, secondary level and post secondary level, with the secondary level
accounting for the majority. At the elementary level, the vocational schools are mostly made of vocational middle schools, which mainly recruit primary school graduates. These vocational middle schools usually last for 3-4 years, and offer basic courses plus one year of skill training (Wu, 2010). Currently, most of the vocational schools are located in under-developed rural area as a mean to push the 9-year compulsory education. The scale of the middle vocational schools is very small and many researchers actually neglected this type of vocational schools in their description of the vocational education system in China (Cooke, 2001; Biermann, 1999; Li & Lumby, 1998; Zhao & Coniam, 2009).

The vocational education at secondary level is carried out at the high school level (grade 10-grade 12). The school recruits graduates from general middle school or vocational middle schools and the length of study is usually 2-4 years. There are three types of vocational school at this level including specialized secondary school (zhong zhuan), vocational high school (zhi ye gao zhong) and skilled worker school (Ji xiao) (Wu, 2010; Zhao & Liu, 2007). Both secondary specialized school (or specialized senior secondary school) and skilled worker school (or technical workers schools) were imported from Soviet Union in the 1950s. While the specialized secondary school mainly aimed at cultivating technicians or intermediate-level workers and managers for the industry in general, the skilled workers school focused on training skilled workers for manufacturing industry. The vocational high school was created in the 1980's, resulting from the policy which switched several general high schools into vocational high schools to satisfy the increasing demand for workers and technicians from the booming economy (Zhao & Coniam, 2009; Biermann, 1999). Despite the historical differences among these three types of secondary vocational schools, currently, there is little difference among them in terms of training target and teaching contents (Zhao & Lu, 2007).

At the tertiary level, vocational education is mainly delivered through vocational universities, colleges, or other higher institutions (Wu, 2010). Some general universities or colleges also offered vocational training programs (Velde, 2009). They were mainly established in the urban area where the industrialization and economics are more developed than the rural area for the purpose of training higher level of technicians and managers. They recruit graduates from general high schools, vocational high schools, secondary specialized schools and skilled worker schools. The duration of study can vary from 2 to 4 years (Wu & Ye, 2010).
In addition to the school-based vocational education described above, the workplace also provides skill training in China. It aims at improving or renewing the professional knowledge and skills of in-service employers (Cooke, 2001; Wu & Ye, 2010). This paper will only focus on the school-based vocational education at middle school and high school levels. The types and structure of vocational education is summarized in Table 2.

<table>
<thead>
<tr>
<th>Levels</th>
<th>Providers</th>
<th>Lengths</th>
<th>Recruitment</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Level</td>
<td>Vocational Middle School (or Vocational Junior High School)</td>
<td>3-4 year</td>
<td>Primary school graduates</td>
<td>To train farmers or workers with basic skills</td>
</tr>
<tr>
<td>Second Level</td>
<td>Specialized Secondary Schools, Vocational High School, Skilled Worker School</td>
<td>Mainly 2-4 years</td>
<td>Middle school graduates (general or vocational)</td>
<td>To train middle-level skilled workers and technicians, elementary school teachers, etc.</td>
</tr>
<tr>
<td>Third Level</td>
<td>Vocational College/University</td>
<td>2-4 years</td>
<td>Graduates from regular high school or vocational high school</td>
<td>High-skilled workers and technicians, managers and school teachers</td>
</tr>
</tbody>
</table>

**Issues and Challenges in Developing Vocational Education in China**

From the above description, it is beyond doubt that vocational education in China has made great progress compared with the situation one century ago. Particularly within the past two decades, vocational schools have been expanding fast (See Figure 1). However, there still exist problems and challenges, some of which are due to the fact that the historical, social and cultural contexts which hindered the initial development of vocational education in China are still exerting influence on the current development of vocational education in China today.
One serious issue facing China today is the recent trend of the shrinking scale of vocational schools regardless of the increasing demand for skilled workers and professional, which is partially attributable to people’s strong bias against vocational education under the influence of traditional culture as well as some unintended consequences from recent educational policies. Although 80's and 90's witnessed the great expansion of vocational education in China, such momentum waned at the turn of the century. For example, in 1985, there were 4.156 million students in the vocation middle schools and high schools; in 1998, the number has more than tripled into 15.55 million. Nevertheless, in 2002, the number decreased by almost 4 million (11.65 million). Although the figure slowly increased in the following year, it is largely due to the natural increase of school-aged children, and the percentage of vocational school enrollment among high school students have been hovering around 40%, much lower than the government's goal of 60-70% (See Table 4). The percentage is also low compared with other industrialized countries. From Table 3 below, we can see that in some major industrialized countries such as Germany, UK, and Australia, the majority of students (61%-71%) received vocational training and education while in China, only 37% of the high school students choose vocational schools.
Table 3: Participation rate in vocational programs as a percentage of all students at upper secondary level (2004)

<table>
<thead>
<tr>
<th>Type of Upper Secondary Program</th>
<th>General</th>
<th>Vocational</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>63.0</td>
<td>37.0</td>
</tr>
<tr>
<td>Germany</td>
<td>38.8</td>
<td>61.2</td>
</tr>
<tr>
<td>UK</td>
<td>28.5</td>
<td>71.5</td>
</tr>
<tr>
<td>Australia</td>
<td>37.5</td>
<td>62.5</td>
</tr>
</tbody>
</table>

Source: Guo & Lamb, 2010

Several studies implied that one of the reasons behind the decline is related to the still strong influence of traditional culture, which favors academic education over occupational education and training. Under the influence of Confucianism and elite education tradition, the status of vocational education is still regarded inferior to the general college-bound schooling (Munch & Risler, 1987). It is widely held that only those students who enter college can be called intelligent and successful; and vocational education is merely perceived as the "dumping ground" for the unintelligent instead of an alternative path other than college to pursue ones' interest and value (Zhao & Lu, 2007, p. 56; Biermann, 1999, p. 4). Some study demonstrates that even at the higher education level, vocational colleges were also perceived negatively and worthless compared with academic universities and colleges (Huyton & Ingold, 1999, cited from Velde, 2009, p.37).

Some government policies also unintentionally reinforced people's bias against vocational education. When expanding the vocational education through transferring general high schools into vocational schools, only the ones that were not performing well enough were picked by the government to be reformed into vocational schools. Nowadays, the minimum entrance exam score required for vocational schools is usually much lower than that for general high school in most cases (Cooke, 2001). These policies were designed to facilitate enrollment of vocational students, but it nevertheless entrenched people's stereotype against vocational schools and students.

The negative consequence of the prevalent prejudice and the regression of vocational education is also exacerbated by other government reforms at the turn of century, which not only gave students and parents more freedom to choose types of schools, majors and jobs by abolishing the former "allocation" system of the planned economic system, but also expanded the
scales of colleges and universities. Now the student can choose to enter either academic or vocational colleges based on their entrance exam score instead of being passively "assigned" by the government under the old planned economic system. It means that the government can no longer regulate and increase the vocational school enrollment with administrative power. It also means that the entrance to college is much easier because of the loosened selection criteria as the result of the expanded recruitment. The entrenched cultural elitism, together with the widened door to college and individual choice, resulted in the decreased enrollment in the vocational schools, in spite of the great demand for skilled workers and high unemployment rate among the new college graduates after the expansion.

Because of the expansion of colleges and universities, the enrollment in regular high schools, which usually prepare students to enter colleges and universities, also increases greatly. As Table 4 and Figure 1 indicate, for almost ten years between 1990 and 1999, the enrolment in regular high schools increased slowly, while the enrollment in the secondary vocational school jumped by almost 2.5 times. However, the situation was reversed after 1999, when Chinese government began the expansion of colleges and universities. Only in four years (1999-2003), the enrollment in general high schools doubled, while the enrollment in vocational high schools decreased. As a result, the percentage of the students enrolled in the secondary vocational school decreased.

Table 4. Participation in general and vocational high schools in China (1990-2010) (Unit: 10 thousand)

<table>
<thead>
<tr>
<th>Year</th>
<th>Regular High School</th>
<th>Secondary Vocational Schools</th>
<th>Percentage of Vocational School Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>717.3 (unclear whether this number includes adult high school students)</td>
<td>763.6</td>
<td>51.6%</td>
</tr>
<tr>
<td>1998</td>
<td>977.63</td>
<td>1554.57</td>
<td>61.4%</td>
</tr>
<tr>
<td>1999</td>
<td>1092.86</td>
<td>1417.51</td>
<td>56.5%</td>
</tr>
<tr>
<td>2000</td>
<td>1201.3 (not including adult high school students)</td>
<td>1060.2 (Not including adult high school students)</td>
<td>46.9%</td>
</tr>
<tr>
<td>2001</td>
<td>1435.99</td>
<td>1164.94</td>
<td>44.8%</td>
</tr>
<tr>
<td>2002</td>
<td>1717.33</td>
<td>1190.81</td>
<td>40.9%</td>
</tr>
<tr>
<td>2003</td>
<td>1986.68</td>
<td>1256.73</td>
<td>38.7%</td>
</tr>
</tbody>
</table>
In the former planned economic system, the vocational school could simply "sit and wait" for the government to allocate students into their schools. Now they have to compete with regular high schools for recruitment, and a lot of vocational schools loose the battle and have to close down. In order to redress the problem, the Department of Education of China has set a minimum line for each province to recruit a certain number of students into vocational schools and publicly castigate those provinces who did not accomplish the "task" (Shi, 2010). At the school level, desperate vocational schools have also used a variety of recruiting strategies even including illegal fraud and false advertisement (Xie, 2010).

However, the aggregation towards academic track is so strong that according to some studies, many students who are admitted into secondary vocational schools abandon the chance to enter the school; they would rather repeat another year in the middle school and try to take the high school entrance exam again next year, hoping to enter a general high school with higher entrance exam score and eventually going to colleges (Xin, 2003).

The bias against vocational training and favoritism on academic and university education is not the only historic and cultural factor defining the context of vocational education in China now; another important one is the low basic educational level in China. As discussed earlier, when vocational education was first introduced from the U.S. into China, most Chinese were still illiterate, while in the U.S., the compulsory education had started extending into high school level. Similarly, high level of universal education was also achieved in Germany.

Although the 9-year compulsory education is now available in China, which is a huge leap forward compared with the situation one hundred years ago, the majority of students still have limited access to high schools, particularly those from the poor rural areas in west China.
In 2004, only 46.5% of the relevant school-aged population was enrolled in senior secondary schools (Guo & Lamb, 2010). To a large extent, high school education is still elite education rather than universal education. With vocational education mostly provided at high school level in China, it leads to an issue that only limited number of students can have access to vocational education, exacerbating the problem of the already low enrollment in vocational schools and shortage of skilled workers and technicians. Although the number of students who go to secondary vocational schools has been increasing in recent years as shown in Table 4, if we also consider the low participation in the high school, the picture is not so encouraging. When measured against the whole high school age group, only about 9% of high school age cohort received vocational education in China, a much lower number compared with some industrialized countries like Germany, UK, and Australia as Table 5 below demonstrates.

Table 5: Participation in initial vocational education, by age

<table>
<thead>
<tr>
<th>Country</th>
<th>Age Group</th>
<th>Less than 15</th>
<th>Age 15-19</th>
<th>Age 20-24</th>
<th>Age 25-29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td></td>
<td>0.0</td>
<td>20.9</td>
<td>17.9</td>
<td>NA</td>
</tr>
<tr>
<td>China</td>
<td></td>
<td>1.7</td>
<td>8.9</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td>0.0</td>
<td>39.7</td>
<td>14.1</td>
<td>1.8</td>
</tr>
<tr>
<td>UK</td>
<td></td>
<td>0.0</td>
<td>30.0</td>
<td>7.0</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Data source: Guo & Lamb, 2010

In addition to the challenges inherited from history and cultural tradition, the vocational education in China also has to deal with new issues arising from its contemporary development. For example, researchers have pointed out that the quality of vocational schools varies a great deal in terms of length of training, teaching materials and training facilities. Some vocational schools still use outdated teaching materials and some schools lack technical facilities to carry out essential training (Chen, 2007). Many students may never have the chance to obtain substantial hands-on training in a real or simulated workplace environment (Cooke, 2001). According to a large-scale survey conducted in Anhui province, more than 80% of the vocational teachers indicated that the training mode in their schools were too out-dated to teach students the useful skills and knowledge demanded in the real world (Xiao, 1999). A more recent survey conducted in a province in West China asked the teachers from 9 vocational schools whether
they would choose their own school for their children to obtain vocational training, and 60% of them indicated no. In addition, only less than half of the students (48.5%) in the surveyed vocational schools felt that what they learned at school was useful and practical. (Xie, 2010)

Related to the quality issues of vocational schools, researchers have also examined some problems existing with the training of vocational teachers. Despite the shortage for vocational teachers, there is not sufficient number of institutions devoted to training vocational teachers compared with general teacher training institutions. Lots of vocational schools have to recruit graduates from general colleges and universities, who lack training both in pedagogy and specialty skills (Huang, 2000, from Zhao & Lu, 2007, p. 67). In addition, with the absence of national guidelines, vocational education teachers' colleges are left to themselves to set up specialty according to their own understanding of vocational education and their capacities, causing lack of systematic and scientific management of course design and implementation. More seriously, it also leads to lack of connection between the specialized courses and the requirements of the labor world. (Zhao & Lu, 2007) The cumulative consequences of these problems can be serious: there already exist the problems of overstaffing of the general knowledge and theory teachers and lack of specialized course teachers in vocational schools, but even with those limited number of specialized course teachers, there are still probabilities that they don't possess the knowledge and skills which will be useful and practical to the students in the real world.

Given the problems with the low quality and limited teachers' training for vocational schools, it is not surprising to see that despite the official statistics which show the employment rate of vocational school graduates has been over 90% since 2002 (Jiao, 2008), complaints were still found from employers about the insufficient competencies of the graduates from vocational schools (Cooke, 2001). For instance, 60% of employers from a province in central China who participated in a survey in 1998 felt the knowledge base of the graduates from vocational schools were too narrow, and 80% of the employers indicated that the practical operational skills of the graduates were not sufficient for their posts (Xiao, 1999, cited from Cooke, 2005, p. 34). Similar results were also found in a nation-wide survey to 435 enterprises, 87% of whom were only "partially satisfied" with the graduates from high school and vocational school (Venter, 2003).

Lack of funding is another problem with vocational education in China. The public expenditure on education in China is already low compared with other countries. In 2004, the
public expenditure on education in China only accounted for 2.1 percent of its GDP, which ranked China on the second lowest among the 40 countries in the study, just below India and above Indonesia. The percentage for Germany is 4.8 and the U.S., 5.9 (Guo & Lamb, 2010). Although there is no systematic study on the lack of funding of vocational education in China, it is not far-stretching to assume that the issue becomes more acute in vocational education, which generally incurs higher costs than the general or academic education due to the extra cost of materials, tools and facilities for training. The lack of funding is worsened by the fact that the vocational schools cannot benefit from the favorable tax policies and subsidies from the government, which is nevertheless enjoyed by general high schools (Cooke, 2005). The financial problem facing vocational education is even more severe in the rural area and West China due to limited local tax revenue (Wu & Ye, 2010).

The 1996 Vocational Education Law did little to solve the financial problem, with its ambiguous language on funding, such as "The central government encourages raising fund to support vocational education through various legitimate ways (item 26) ", or "the state and municipal government should specify an average cost per student at vocational schools (item 27)". Such unsubstantial law makes one wonder whether it should be actually called law, or merely a symbolic guideline, which, if anything, only signals the central government's incapability to make any meaningful commitment to provide financial support for the vocational education in China.

Confronted with the problems, policy makers and scholars have been exploring and experimenting with other countries' training models since the People's Republic China was established. For example, in 1960, the Russian model of professional training was utilized, which later developed into the skilled worker schools and the specialized technical school (Zhao & Coniam, 2009). Later on, the dual system from Germany were also studied and introduced. In recent years, models from the U.K. also receive some attention (Cooke, 2001).

Germany and its dual system has been attracting attentions from both government and academia since China reopened itself to the outside world in early 80's. Several studies are devoted to the Sino-German comparison of vocational education system with the discussion about specific lessons China can learn from Germany. On the practice level, there have been consistent corporation between Chinese and German governments to introduce and experiment with various aspects of the Germany's vocational education model during the past 30 years such
as curricular development, teacher training and Sino-Germany collaborative vocational schools and research institutes of vocational education (Jiang, 2009).

However, among the consistent interest and enthusiasm of China to experiment with vocational education systems from other developed countries, little attention has been given to the U.S. Although in the published literature, there are some studies introducing vocational education in the U.S., there is lack of discussion about specific useful practices that China can learn from the U.S. unlike the literature on Germany. In addition, on the practice level, Chinese government has made few attempts to try the U.S. model. The neglect is perplexing particularly given the strong historical influence from the U.S. on China's initial establishment of modern educational system one century ago.

The following chapter will address this issue by comparing the current vocational education policies and practices in China, Germany and the U.S. among each other. As the comparison below will soon reveal, the U.S. and Germany's vocational education systems show interesting contrast with each other, which has been neglected by scholars in China. Exploring these differences, particularly about the U.S. educators' strong concern with the German model, can not only fill an area of need in the literature, but also help the Chinese government make more informative and strategic decisions in its current efforts to learn from Germany.
CHAPTER FOUR

VOCATIONAL EDUCATION SYSTEMS IN GERMANY AND U.S.

Vocational Education System in Germany

The educational system in Germany is like a sorting machine, through which students are carefully streamed through career or academic tracks. As soon as students finish primary school (Grundschule, attended by children from the age of 6 to 10 or 12), the student and their parents need to make decision among four types secondary schooling—Gymnasium, Realschule, Hauptschule and Gesamtshule. Gymnasium, usually translated as grammar school, is designed to prepare pupils for university education. After 6 to 7 years of study, students graduate from Gymnasium with the exit exam of Abitur, which qualifies them to enter universities.

The Realschule, or the intermediate secondary school, caters for more vocationally inclined students and prepares them for the world of work rather than entering universities (Cockrill & Scott, 1997). Realschule students graduate at grade 10 and they either continue to receive further vocational training or change to a Gymnasium to gain university entry qualifications, although such transition is usually rare due to the difference in curriculum and length of study.

The third option, Hauptschule, is the least academic-oriented school. It was originally established to prepare students for craft and industrial occupations and used to be the most common and basic form of vocational training. Now, it just provides low level of general education and most students had to receive some pre-vocational training after they graduate (Cockrill & Scott, 1997; Powell etc. 2009).

In a few states in Germany, there is also the fourth option, Gesamtchule, or comprehensive secondary school. In this type of school, students either receive the same type of education till the end of compulsory education at the age of 15 or 16, or they are taught separately in the three tracks mentioned above, only within the same school (Cockrill & Scott, 1997).

After graduating from any of these four types of schools usually at the age of 15 or 16, students are considered as finishing the lower level of secondary school (middle school) and
compulsory schooling. According to the law in Germany, young people who do not attend any full-time school afterwards are required to attend part-time (vocational) school for 3 years. It means that although compulsory schooling in Germany officially lasts for 9 years (10 years in 5 Länder), in practice, young people are required to attend school from the age of 6 to 18 (Hippach-Schneider & Schober, 2009). Therefore, graduates from the lower secondary level schools (or middle school) need to continue to choose between academic or vocational track at upper secondary school level (or high school). Students who decide to stay on academic track (usually graduates from Gymnasium) will continue the preparation for universities at higher-level grammar school; those who choose vocational track (usually graduates from Realshule and Hauptschule) may enter into vocational training in full time schools or within the framework of the dual system.

The dual system is the largest educational area at the upper secondary level. By law, everybody who has completed compulsory education in Germany can obtain vocational training within this system. In 2008, 64.7% of the school-leavers from general education opted for a dual-system apprenticeship (Hippach-Schneider & Scholber, 2009).

Under the dual system, learning usually takes place in two places: companies and vocational schools. Students spend one or two days in the vocational school and three or four days in their company. Students study vocational subjects and general subjects at school and receive occupational training in the company. The dual system usually lasts for three years, and the average age of the beginning trainees are between 16 and 18 years old. Towards the end of training, students are required to take a series of examinations to demonstrate sufficient vocational knowledge and competence, which are applicable to nation-wide standards. Success in passing the exam will lead to endowment of certain professional certificate. After completing the training in dual system, many students take the opportunity of further training in senior technical school (Fachobershulen) or grammar school with a vocational emphasis (Berufliches Gymnasium/Fachgymnasium), which teaches specialized occupational skills and theory and confers university entrance certifications (Munch, 1991).

Attendance of the vocational school is free of charge, and so is with the in-company training. The enterprises not only bear the cost of the training, but also pay the trainee remuneration according to the apprenticeship contract. Usually the remuneration increases with
every year of training and averages about one third of the starting salary of a trained skilled worker (Hippach-Schneider & Scholber, 2009).

In addition to the dual system, the students who choose vocational track can also obtain vocational training in the full-time vocational school (Berufsfachschule). The school lasts for 1-3 years, offering training on a variety of occupations. Some schools take students through to a vocational training qualification on one occupation, while some schools provide partial vocational training on one or more occupations, where attendance can be credited as the first year of vocational training in the dual system. Some programs in the full-time vocational school can also lead to a university entrance certificate with certain restriction. (Federal Ministry of Education and Research, 2003)

At the tertiary level, students can either choose to continue their academic track by entering a regular university or receive further vocational training at universities of applied sciences, vocational academies or through dual study programs. The university of applied science offers students courses in various fields such as engineering science, economics, social affairs, computers etc. The program normally runs for 6 semesters for a Bachelor's Degree and extra 4 semesters for a Master's Degree. Vocational academies and dual programs provide students with opportunities to work for an enterprise part-time while receiving advanced training in related field at higher education institutions (Hippach-Schneider, Schober, Toth & Woll, 2007).

**Vocational Education System in the U.S.**

In the U.S., students enter elementary schools at the age of 6, which is similar to Germany and China. The primary education in the U.S. lasts for 5 years instead of 4 years. After graduating from the elementary school, students in the U.S. all enter middle schools and receive the same type of general education for three years, rather than being streamed into different types of middle schools based on vocational or academic tracks as is the case in most Landers in Germany. In other word, in the U.S., systematic vocational education is not introduced into middle school and students are not put into vocational or academic tracks.

When students enter high school, which normally takes 4 years to complete, they do have chances to obtain some vocational training and education, mainly at three settings, including comprehensive high schools, vocational high schools, and area or regional high schools (AVSs).
Comprehensive high schools typically have an academic focus, but a lot of high schools also offer various vocational courses or structured vocational program within the same school. Vocational high schools typically have career or occupational themes, but they also provide academic core courses required in a high school curriculum. The area or regional vocational schools are only part-time schools, providing vocational instruction to the students, who still need to attend their home high school to receive academic instruction for the rest of the day (Silverberg et al., 2004). According to a national report, there are about 9500 comprehensive high schools, 1000 vocational high schools and 800 AVSs in the U.S. which offer vocational courses to students. Although vocational high schools and AVSs are expected to offer more intensive and in-depth vocational training with better equipments, most vocational education is provided in comprehensive high schools (Boesel et al. 1994b, cited from Silverberg et al., 2004, p. 20). In other words, while in Germany, vocational education and academic education are provided in separate schools at upper secondary level, in the U.S., they are offered within the same comprehensive high schools to all enrolled students in most cases.

In addition, the U.S. is also different from Germany in that the offering of vocational courses is of elective nature. While in Germany, students not on academic track are required to obtain systematic vocational training, in the U.S., there is no such requirement. At the comprehensive high school, which is the main source for vocational education, the student can choose vocational courses among other elective offerings, such as art, music, or more advanced academic classes while finishing the required core courses to graduate. Thus, the student can adjust their career or academic focus during the high school based on the proportion of academic or career credits they earned. Although there still are career track and academic track in some schools, the distinction between them is becoming more and more blurred, particularly with the recent policy initiative which advocates that high schools should prepare students both vocationally and academically (Lewis & Cheng, 2006; Lucas & Berends, 2002).

In the U.S., the more structured, job-specific vocational training is provided at the post-secondary institutions, particularly the community college. These institutions offer a wide range of vocational programs with the primary purpose to prepare students to enter specific occupations in the labor market. According to a recent national report, the enrollments in these post-secondary vocational programs have grown substantially since the 1980s, and as a result, the majority of high school graduates in the U.S. nowadays enroll in sub-baccalaureate programs
with a certain vocational major in community colleges (Silverberg et al. 2004). Therefore, compared with Germany, systematic vocational training in the U.S. starts at a later stage in students' life.

**Comparing the Structures of Vocational Education in the Three Countries**

Figure 2 juxtaposes the simplified structure of educational systems in Germany, the U.S. and China, with the element of vocational education highlighted in yellow.

<table>
<thead>
<tr>
<th>Age</th>
<th>Germany</th>
<th>China</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Vocational Schools (Full time vocational school, Senior technical school, senior vocational school)</td>
<td>General High School</td>
<td>Vocational High School, Sppcialized secondary school, skilled worker school</td>
</tr>
<tr>
<td>18</td>
<td>Grammar school (Grade 11-13)</td>
<td></td>
<td>Comprehensive High School (including vocational courses as elective classes)</td>
</tr>
<tr>
<td>17</td>
<td>Dual system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Secondary</td>
<td>Grammar school (Grade 11-13)</td>
<td>General Middle School (and very small portion of vocational middle school)</td>
</tr>
<tr>
<td>15</td>
<td>General Schools</td>
<td></td>
<td>General Middle School</td>
</tr>
<tr>
<td>14</td>
<td>Intermediate school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Comprehensive secondary school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Grammar School</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>General Middle School (including vocational courses as elective classes)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Primary education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Primary education</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 2. Comparison of the vocational education structures in Germany, china and the U.S.**

From the structural graph, we can see that China shares some similarities with both Germany and the U.S. at middle school and high school level. At the middle school level, China resembles the U.S. in that middle school students receive the same general education instead of being streamed into academic or vocational track like Germany. At the high school level, China shares some commonality with Germany in that students are kept in discrete tracks and receive either general/academic education or vocational education under separate school settings, while in the U.S., vocational courses are offered as electives together with academic courses within the same educational setting, namely, the comprehensive high school in most cases.

Faced with the two distinct systems in Germany and the U.S., some reasonable questions to ask would be: what are the strengths and weaknesses of the two models which can provide
useful lessons for China to learn to improve its vocational education? How can the differences between these models inform China's current efforts to learn from developed countries, particularly from Germany? The following chapter will try to answer these questions by first examining the advantages of the German model from the perspective of social functionalism. It will then describe John Dewey's concerns with the German model reflected through the debate between him and David Snedden and how the debate can shed lights on China’s efforts to learn from Germany and improve its vocational education.
CHAPTER FIVE

LESSONS FROM GERMANY AND THE U.S.

Strengths of Germany’s Model

First of all, the German model is effective in providing students with intensive and systematic vocational training. As we have discussed above, under the German model, the duration of vocational training is longer, and the curriculum is more structured and standardized around a certain occupation. In the U.S., studies have shown that a variety of unrelated vocational courses are offered to students without specific sequence or structure in many comprehensive high schools (Silverberg et al., 2004). In some schools, vocational courses are offered to students in a more structured way, such as through career academies, which are a school-within-school program of 2-4 years, where vocational courses are taught in a certain sequence around a career theme. However, studies have shown that even when schools offer such programs, students are still free to enroll in courses across occupational areas and levels (Boesel et al. 1994b). Because of the elective nature of vocational courses in U.S., it is very likely that many students graduate from high school with various degrees of vocational training spread over different occupational areas.

The lack of structure of vocational education in U.S. presents challenges to describe and summarize information about students' participation by occupational field, because the course-taking pattern can vary from school to school, and from individual to individual. Not only do schools and district have different names and requirement for certain vocational track; the vocational courses which students select by themselves might be too scattered to fall under one career track, particularly for those students without specific career planning. That explains the unavailable data from U.S. in international comparison studies about vocational education (see for example, Guo & Lamb).

The National Association of Vocational Education (NAVE) 2004 Report, however, provided a useful analytical perspective to solve this problem. After examining high school students' transcripts, the authors of the report first identified those high school graduates earning three or more credits in occupational courses as "occupational investor". Then they divided them
into two subgroups: the "Occupational Concentrator" whose credits fall into single program areas (such as business service or health care) and the "Occupational Explorer" whose credits spread over more than one program area. According the report, in 2003, 44.5 percent of the high school students were Occupational Investors, among whom 26.0 percent took their vocational courses within a single occupational program (the Occupational Concentrators) and 18.5 percent explored several areas (the Occupational Explorer).

Imperfect as it is, this paper adopts the "Occupational Concentrator" as the closest proxy to compare with the students in Germany and China on vocational track. Table 7 below shows the comparison results in terms of the percentage of high school students who receive intensive and systematic vocational training around certain occupation in these three countries. The result demonstrates that the percentage for U.S. is the lowest (26%), even compared with that in China (40%).

Table 7. Enrollment and percentage of students on general, prevocational and vocational programs at upper secondary level (ISCED 3): European Union, Germany, U.S. and China

<table>
<thead>
<tr>
<th>Total ISCED3</th>
<th>ISCED 3 General</th>
<th>%</th>
<th>ISCED Prevocational</th>
<th>%</th>
<th>ISCED Vocational</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Union (27 countries) (2006)</td>
<td>22205390</td>
<td>10723395</td>
<td>0.48</td>
<td>1185480</td>
<td>0.05</td>
<td>10296515</td>
</tr>
<tr>
<td>Germany (2006)</td>
<td>2922253</td>
<td>1186934</td>
<td>0.41</td>
<td>-</td>
<td>-</td>
<td>1735319</td>
</tr>
<tr>
<td>U.S. (2003)</td>
<td>•</td>
<td>•</td>
<td>0.55</td>
<td>-</td>
<td>-</td>
<td>•</td>
</tr>
<tr>
<td>China (2006, excluding adult students)</td>
<td>42168000</td>
<td>25145000</td>
<td>0.60</td>
<td>-</td>
<td>-</td>
<td>17023000</td>
</tr>
</tbody>
</table>


The strength of the German model demonstrated through the comparison table above is meaningful under China's contexts of shortage of skilled worker. Among the 140 million workers in urban China, only about 70 million was classified as skilled workers (Cooke, 2005, p. 27). According to the "White Paper of China's Employment Situation and Policy", among those 70 million skilled workers, the ones possessing high-level skills only accounted for 3.5%, and the majority of them (65%) are aggregated at the lower end of the skill level. However, the fast development of China's economy demands much more skilled workers, particularly the ones possessing medium and high level skill. Official statistics show that in all the major industrialized regions in China, the demand for the workers with medium and high level skills at
medium is 1.52-1.81 time higher than the current available labor supply. The shortage for highly-skilled workers nation-wide is estimated to be more than 20 million in 2010 nation-wide (Nan Feng Chuang, 2010).

Given the severity and urgency of the shortage of skilled workers and technicians in China, the dual system in Germany seems to be able to offer some useful solutions. As the comparison above demonstrates, the Germany's system starts providing systematic vocational training to students at earlier stage, and as a result, a higher percentage of young people in Germany are equipped with certain vocational skills when graduate from high schools than in China and the U.S. In addition, Germany's dual system can recruit apprentices and train skilled workers in a relatively short period of time. These features can be helpful to solve the problem of acute shortage of skilled-workers in China.

Some international comparative studies on education have also provided some empirical evidence which indicates the advantage of Germany's model in preparing its youth for the labor market. For example, in a comparative analysis of the process and outcomes of the school-to-work transition in the U.S. and Germany based on two nation-wide longitudinal data sets of 12 years, the researchers found that while most American youngsters (62%) entered lifework soon after leaving high schools, most youths in Germany (79%) continued formal vocational training beyond secondary education. 5 years later, the unemployment rate of the school-leaver cohort in the U.S. was 11.9%, almost six times as high as the unemployment rate of the German cohort, which was only 1.9% (Buechtemann, Schupp & Soloff, 1993).

A more recent quantitative study also showed similar results. In a meta-analysis of data on youth's educational qualifications and occupational attainments from thirteen countries including U.S. and Germany, it was found that in most countries, secondary vocational education increased students' chance of employment and enter the labor market as a skilled worker. Such advantage of vocational education was stronger in countries with job-specific secondary vocational education such as Germany. In U.S., however, with its vocational education of general and elective nature, the high school graduates who had attended the vocational track are actually at a disadvantage in getting employed. Furthermore, the influence of vocational education on students' future of entering the job market as skilled workers is much weaker in the U.S. than that in Germany (Shavit & Muller, 2000).
Of course, when interpreting the results of these studies, one needs to keep in mind that in the U.S., systematic and specific vocational education does not start until the postsecondary level, a stage which was not included in comparison by the above study. However, these studies are still relevant under China's context, where the majority of students have limited access to high school, and only about 20% of high school graduates can enter colleges (Zhang & Wei, 2007). In addition, confronted with the severe shortage of skilled workers and technicians, China probably cannot afford the time to postpone the structured and intensive occupation training until postsecondary stage.

**Lessons from the Debate between John Dewey and David Snedden**

However, it does not necessarily mean that the U.S. model of vocational education is irrelevant to China. Neither does it mean that China should fully embrace the Germany's model. Indeed, from the social functionalist perspective, the Germany's dual system does demonstrate certain strengths in sorting students into distinct vocational or academic tracks at early stage, providing intensive and structured training accordingly, and socializing them into certain productive roles, be it academic or vocational. However, this rigid system nevertheless neglects individual development and choice, which is what the U.S. model of vocational education offers, with its integrated curriculum and room for students to freely explore, choose and adjust their own career paths. Actually, to a certain degree, the vocational education system in the U.S. was developed through some conscious efforts to avoid the German model, which is reflected through a contentious debated between the social efficiency ideas of David Snedden and the social reconstructionist and progressivist ideas of John Dewey (Luweis, 1995; Wirth, 1972).

David Snedden, who graduated from the doctoral program at Teachers College at Columbia University and later became Commissioner of Education in Massachusetts, was a powerful advocate for social efficiency doctrine. For him, the ultimate aim of education was "the greatest degree of efficiency". He argued that public education should not only provide training for culture's sake, but also that "utilitarian training which looks to individual efficiency in the world of work" (Wirth, 1972).

Not surprisingly, he is also a supporter for establishing a vocational education system modeled after Germany. Believing that "the end of vocational education cannot be achieved merely through courses of general instruction", he argued that vocational education should be
provided through an occupation-specific instruction system separated from general schools (Gorden, 1999, p. 27). He also argued that the common education should end after the sixth grade; afterwards, students should be sorted into differentiated programs of vocational or academic track according to their "probable destinies" (Wirth, 1972).

Snedden vision of vocational education, derived from his social efficiency ideas and bearing strong characteristics of the vocational training model in Germany, met with strong opposition from Dewey. Although Dewey also saw the importance of vocational education in bringing relevance to schooling and replacing the "bookish, sterile" traditional education, his vision of vocational education is different from Sneddens' at profound levels.

Dewey did not agree that the vocational schools be separated from general education. He believed that it would waste large amount of resources to divide and duplicate buildings, teachers and administrators for separate vocational and academic schools (Dewey, 1915b). More importantly, Dewey argued that the dual tracks would be detrimental to both academic and vocational education. He wrote, "I argued that a separation of trade education and general education of youth has the inevitable tendency to make both kinds of training narrower and less significant than the schooling in which the traditional education is reorganized to utilize the subject matter---active, scientific and social of the present day environment." (Dewey, 1915a, p.42)

He also opposed Snedden's suggestion to stream students into vocational and academic track as young as twelve years old. He rejected any occupational training for students under the age of eighteen or twenty. Dewey believed that the aim of education in democracy was to keep youth under educative influence for a longer time, not to induct them prematurely into workplace for a specific occupation (Kliebard, 1999).

More importantly, on the social level, Dewey was deeply concerned that the vocational education as Snedden advocated would become a mechanism of social class stratification by offering second-class education. Calling it "the greatest evil now threatening the interests of democracy in education", he criticized that separate vocational school would isolate, stigmatize and reproduce the dominated social class of the children of America's working class. It thus reinforced the negative consequences of industrial system instead of reforming it. He wrote, "The kind of vocational education in which I am interested is not one which will 'adapt' workers to the existing industrial regime; I am not sufficiently in love with the regime for that. It seems to me
that the business of all who would not be educational time servers is to resist every move in this direction, and to strive a kind of vocational education which will first alter the existing industrial system, and ultimately transform it" (Dewey, 1915a, p. 40).

The evidence of Dewey's philosophical divide with David Sneddens' can also be found outside the debate. For example, in his book "Democracy and Education", Dewey offered a different definition of "social efficiency" from David Sneddens'. He argued that when social efficiency "is defined in terms of rendering external service to others", it might bring conflict between one's social role at a workplace and his internal refinement of a mind, or culture. But if social efficiency is defined as individual's "power to join freely and fully in shared or common activities", it could then be both intellectually rewarding and socially productive (Dewey, 1916, p. 123). He also argued that the true aim of education should not be something externally imposed such as the "preparation of a remote future", which would make "the work of both teacher and pupil mechanical and slavish" (p. 110).

It is also worth noticing that Dewey distinguished "vocation" from "occupation". According to Dewey, vocation means "a direction of life activities " which a person perceived significant to her/him, while occupation refers to the "development of artistic capacity of any kind", including science, business, politics or mechanical labor. A person can have multiple callings or vocations, and it should not be confused with occupations where "immediately tangible commodities are produced" (p. 307). This differentiation was important to Dewey because he warned that when education became strict preparation of some future occupation, it would injure the present development of a child or youth and might "develop a machine-like skill in routine lines " (p.310). Therefore, in place of specific occupational training, Dewey proposed an indirect vocational education through "active occupations which are indicated by the needs and interests of the pupil at the time". Furthermore, he maintained that vocational education should also prepare students for constant self-discovery of one's calling which can be ever-evolving. Such view about vocational education stands in sharp contrast with that of Snedden, who once wrote, "Vocational education is irreducibly and without unnecessary mystification, education for the pursuit of an occupation." (Cited from Kliebard, 1999, p. 127).

Although it is debatable how close the current American vocational education is to Dewey's ideals, Dewey's strong caution against job-specific training provided through a rigid, separated vocational track like Germany's model deserves close attention from China's educators
and policy makers. Currently, China shares some similarities with Germany at high school level with its separate vocational school systems. With little career counseling and guidance offered at middle schools or high schools, students in China enter vocational schools with very limited knowledge or exposure to the vocation under training. Some studies have indicated that a significant number of students in vocational high schools are not interested in becoming technicians or skilled workers. According to a national survey administered to the elementary, middle and high school students in six provinces, 41.0% of the vocational high school students indicate that they choose to go to vocational schools mainly because their test scores are not high enough for them to go to the general high schools; less than half of the students (42.3%) would choose vocational schools if they had second chance (Zang, 2005). Another survey conducted in Beijing area demonstrates that only 12.28% of the secondary vocational school students plan to become skilled workers and technicians after graduation; the majority of the students (66.61%) plan to obtain higher education after graduation (Xin, 2003).

Therefore, even if the vocational schools in China can produce skilled workers to satisfy the huge demand from industry (a questionable assumption to make given the problematic qualities of vocational schools in China as discussed earlier), it is still not "efficient" according to Dewey, because the individual student's natural development, interest and potentials are neglected and sacrificed. In Dewey's opinion, as long as a person is confined to a certain activity without internal stimulus of interest and motivation, like those unwilling students in the vocational schools in China, wastage and inefficiency will occur because the person's genuine talents still remained unavailable to the community even in his employment (Dewey, 1916).

In addition, Dewey's warning about the consequence of social reproduction of separate vocational education is also worth the attention from China's educators and policy makers. As discussed earlier, a large number of vocational high schools in China were transformed from previous general high schools, which were not performing academically well. The entrance criteria for vocational schools is much lower than that for general high schools. These facts, coupled with insufficient funding and the poor teaching quality and limited training facilities of some vocational schools, seems to reinforce the already strong social stereotype that the vocational school is the "dumping ground for the less intelligent". The recent government policy to promote vocational education in remote and poor rural areas in western China also unintentionally carries some connotation that vocational education is the second-class education.
preserved for the less fortunate. Although there is lack of empirical studies which systematically compare the demographic and social-economic background between vocational high school students and general high school students, strong caution should be taken to guard against the possibility that China's separate vocational education system might become a mechanism for social stratification and reproduction, through which the marginalized and disadvantaged students are disproportionally streamed into vocational track and working class labor with low payment, as Dewey warned.

Based on the discussion above, it seems that both Germany and the U.S. can offer useful lessons for China to learn to improve its vocational education regardless of their differences. However, a close examination on the published literature and public policy soon reveals that little attention and action has been made to actually adopt these useful lessons into practice. Such limitation is especially striking in the case of Germany, given the long history of over three decades of enthusiasm from both researchers and policy makers in China to study and introduce the German model. The following part of the chapter will first summarize scholars' suggestions about the useful lessons for China to learn from Germany, and then discuss the important aspects of vocational education in Germany which have been neglected by researchers and policy makers. In the conclusion, a more comprehensive list of suggestions will be offered for China's policy makers drawing on the previous discussion about the useful lessons from both Germany's dual system and the American progressive education.

**Lessons Suggested to Learn from Germany**

As mentioned earlier, many researchers in China have hailed the dual system in Germany as one of the best vocational systems in the world, a model which China can follow to improve its vocational education. The useful practices that researchers recommend cover various aspects and are summarized as following.

**Dual system**

Out of the whole vocational education system in Germany, the dual system receives the most attention from the researchers in China. The vocational education in China has been blamed for lack of connection to the real world, too much focus on theories and insufficient hands-on training. The dual system is believed to be able to solve these problems with its structure under
which students alternates between work and school and supplement their school learning with work practice and observation. It can also increase students' interest and motivation because it makes learning more relevant (Chen, 2006; Guo, 2009; Lai, 2009; Zhu, 2006).

**Teacher training**

As discussed above, China is faced with shortage of vocational school teachers, particularly those who can teach practice courses. Most of the current vocational school teachers lack the knowledge and skills in both pedagogy and practice. In addition, teachers are not required to be certified to teach in a vocational school in China, which also contributes to low quality of teachers. In Germany, it is stipulated by the law that all vocational school teachers must be certified in vocational education field. It requires strict training process which includes at least 8 -semester study at university, 3-12 months vocational training, and 12-18 months teaching practice, with each phase associated with state exams. The trainer of the student at workplace is also required to possess qualification as a foreman, skilled worker or craftsman before he/she can take any apprentice (Munch, 1991). Several researchers argue that China should introduce similar training process and qualification requirements to ensure the quality of vocation education (Guo, 2009; Zhu, 2006; Lai, 2009).

**Funding**

Some studies have compared public expenditure on vocational education between China and Germany in arguing that China lags far behind Germany and should increase its funding on vocational education (Lai, 2009; Wu, 2010, Guo & Lamb, 2010). According to the available comparable data, in 2003, both China and Germany spent more on vocational education than on general/academic education on the upper secondary level measured with per student expenditure; however, in dollar terms, China's expenditure was only one fifth of Germanys', as Table 6 shows. In addition, one needs to keep in mind that the figure does not include the funding from enterprises, which was almost twice as much as the government expenditure in Germany in 2003 (Wu, 2010), while in China, the enterprise seldom offers substantial financial support to schools.
Table 6. Public expenditure on general and vocational program at upper secondary level: China & Germany

<table>
<thead>
<tr>
<th>Upper Secondary</th>
<th>All program</th>
<th>General Program</th>
<th>Vocational Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>2185</td>
<td>1847</td>
<td>2762</td>
</tr>
<tr>
<td>Germany</td>
<td>10232</td>
<td>5962</td>
<td>12744</td>
</tr>
</tbody>
</table>

Source: Guo & Lamb, 2010

Enterprises' involvement

Studies have also pointed out the contrast of enterprises involvement in vocational education between the two countries. In Germany, enterprises are responsible for training the students at work place, bearing all the associated cost, and paying apprentices salaries. In China, the enterprise's involvement in vocational education is very limited, despite the governments' strong encouragement in official statements. The enterprise often fails to realize its promised funding to the vocational school, and for the small number of enterprises who partner with schools, their involvement rarely goes beyond coordinating field trips, or providing limited facilities for school training. Some researchers argue that the absent or perfunctory participation from the business has caused stagnant development of vocational education in China (Wu, 2008, Lai, 2009).

Law

A few studies also touch upon the law system for vocational education. Although no direct criticism was aimed at China's 1996 Vocational Education Law, it was implied that Germany has developed a more effective legal system to ensure the development of vocational education. It is pointed out that Germany started creating laws about vocational education much earlier than China, and after more than 150 years of development and evolution, those laws have formed into a system, covering various agents such as enterprises, schools, industries, youths, etc. Compared with China's Vocational Education Law of 1996, which are mainly composed with a few pages of general guidelines, Germany's vocational Education and Training Act is more implementable and contains much more specific regulations over different aspects of vocational education including length of training, curriculum design, certification exams, teacher and trainer's qualification requirement etc. (Xie, 2008; Wu, 2010; Zhu, 2008).
Lessons Neglected to Learn from Germany

Although the researchers’ suggestions to learn from Germany's useful practice have covered various aspects, there are still some important aspects about the vocational education system in Germany missed by the current literature in China. The neglect is also reflected in the limited steps taken by the Chinese government to implement useful practices from Germany over the past 30 years (Jiang, 2009).

Vocational Guidance and Exposure at the Middle School Level

First, most of the studies focus on Germany's dual system at the upper secondary level, which as our earlier discussion reveals, is only one part of the complicated vocational education system in Germany (see Figure 2.). They fail to realize that to a large extent, the vocational education already starts at the lower secondary level, where students are streamed into academic or vocational tracks. Although the Federal Ministry of Education and Research claims that the purpose of lower secondary education is to provide general education and prepare students for the education at the upper secondary level, the schools for vocational track students, namely, Hauptschule and Realschule, in fact include introduction to the working world as a compulsory component of all course. Therefore, students in those types of middle schools actually receive extensive vocational education through various venues, such as pre-vocational studies, work experience placements, model business and corporation projects, and career guidance (Hippach-Schneider & Toth, 2009).

Apprenticeships in the Dual System

Second, in addition to the vocational education at the middle school level, another important part that most studies neglect is the apprenticeship, which is the essence of the dual system. These studies merely call for more participation from enterprises into the vocational education without touching upon the possibility to establish an apprenticeship system in China for the middle school or high school graduates. With the lack of attention on the vocational education in Germany in the middle school level, plus the neglect of the apprenticeship within the dual system, the current studies have missed the target and limited the efforts to learn from Germany's vocational training system in meaningful ways.
As mentioned earlier, China's compulsory education only covers 9 years, up to the middle school. In 2004, only 46.5% of the relevant school-age population was enrolled in senior secondary schools (Guo & Lamb, 2010). The percentage in rural China is even lower. When measured against the whole high school age group, only about 9% of high school age cohort received vocational education, while in contrast, the percentage is about 40% in Germany. By narrowly concentrating on the dual system in Germany at the upper secondary level, the researchers miss the needs of the majority of China's youth who graduate from middle school but can't go to high schools. Unlike Germany, the students in China receive very little introduction and exposure to the future working world in the middle school. Without proper career education at middle school and limited access to high school, a large proportion of the middle school graduates have to enter the workplace usually as low-skilled workers with low-paid jobs. From human capital perspective, it causes the problems of low quality of workforce and shortage of skilled workers which hinders the economic development in China.

From critical social perspective, this issue has also led to educational inequality in China: more than half of the middle school graduates do not have access to high school education, and the situation is even worse in the less developed rural area in West due to families' inability to afford the high school tuition and fees. With the "alienating effect" of the school curriculum centered on the dominant culture of an urban and industrialized society, plus the deterioration of rural environment and meager profit of agriculture, most of these young people choose to become a migrant worker in urban area instead of staying in hometown and becoming a farmer. However, due to their lack of vocational training, they usually have to take low-skilled, dangerous and heavy-labored job in the city, with very low payment and nominal benefits. Instead of equipping students with essential life skills and facilitating social mobility and equity, schooling in China has become a mechanism to maintain, if not exacerbate, the socio-economic hierarchy. Students from poor rural family were screened out through schooling system and then pushed into the "sweat shop". To a large extent, the myth of quick revival of China as the "world factory" has been established above the abominable working and living conditions of these migrant workers. Some economists have whitewashed it as "the population bonus" of China, referring to the price edge of the made-in-China products given by the plenty supply of the cheap labor. However, it is actually a "population curse" to these young Chinese under exploitation.
Given the situation in China, serious consideration should be made to introduce extensive career exposure and education in the middle school in China without necessarily streaming students into career track or academic track at young age. It can not only make schooling more relevant and practical to the students, but also gives them some advantage in the job market. In addition, the apprenticeship imbedded with the dual system should also be considered for China. It can help enterprises start training and using the apprentices/future skilled workers, thus alleviating the acute human resource crisis to a certain degree. In addition, compared to the low-paid and dead-end cheap job, the apprenticeship can better the future for the middle school graduates in China, because as apprentice, they can not only benefit further vocational training while still earning some income, but also have a better chance to be hired by the company in the future as a skilled-workers with much higher payment. In addition, just as the national apprenticeship system in Germany has strengthened the power of labor union (Thelen, 2003), it is hoped that the establishment of an apprenticeship system can also help unite and protect the basic human rights for workers in China such as minimum wages, workplace safety, and benefits. It will be especially beneficial to those migrant workers, who are currently working as "contract workers" without any organization to represent them and protect their basic human rights.

**Full-time Vocational Schools**

Third, in addition to the apprenticeship within the dual system and vocational education at middle school level, another important area which researches missed is the full-time vocational schools, which consists another important component of vocational education in addition to the dual system in Germany at the upper secondary level. It was initially established to mainly train students who will later enter the dual system after one year of study, as well as to fill in the "gap" left by the dual system with 3 years of occupational training which is difficult or nearly impossible to obtain within the dual system. Examples of such occupations include data engineering, computer science, biology techniques etc. (Munch, 1994). Now, the full-time vocational school has the largest number of pupils, and only one out of every six pupils learn a recognized occupation within the dual system (Federal Ministry of Education and Research, 2003). In other words, the full-time vocational school by itself forms an important occupational
training and certifying system, which should deserve close examination and discussion among Chinese researchers and policy makers.

**Duality of Competencies**

Fourth, most of the studies share common misconception about the dual system, which mistakenly interpret the name as being based on dual learning sites---school and workplace. However, vocational schools and companies do not keep their tasks rigidly divided: schools do not merely teach theory, and company provides more training than simply practice (Federal Ministry of Education and Research, 2003). The larger enterprises often provide additional in-house training with its more pronounced division of labor while the smaller business with limited resources and fewer apprentices usually send their apprentices to external training centers (Munch, 1994). Therefore, the learning and training actually happen through "multiple" venues instead of just "dual" sites.

What the "dual system" actually refers to the duality of competences, namely, the Federal Government being responsible for vocational training and enterprises and the Lander being responsible for the vocational school. This duality should not be neglected because it provides a clear legal and institutional framework for the development of vocational education in Germany.

This "dual system" in its real sense is what China lacks. In China, the three types of vocational schools at the upper secondary level are administered by various departments and government agents. Most of the skilled workers' schools are operated under the responsibility of Ministry of Labor; the specialized technical schools are often under the charge of branch ministries or umbrella organizations in different sections such as Trade, Energy, Transportation, etc. The bulk of vocational education provider, the vocational high schools, belongs to the jurisdiction of the Ministry of Education, which in turn, designates the responsibility to the Ministry of Education at the local level (Biermann, 1999). This array of government bodies managing vocational education at the same time is very likely to cause confusion of responsibility, overlapping of administration, inefficient use of resources, and difficulties to ensure a uniform standard for education quality. It might also lead to unhealthy competition among various departments. There has been some reports about the Ministry of Education with its stronger bureaucratic power trying to take advantage over the other ministries in funding and
recruiting students for the vocational high school under its jurisdiction (Cooke, 2001). Neglect of the structural strength of the dual system in Germany is not helpful for China's policy makers to realize and address its own reflect on the administrative weakness.

**The Harmonization Process**

Fifth, when praising the dual system in Germany in terms of the combination of school learning and workplace training, most researchers fail to notice the linkage between the dual sites, which is a crucial but challenging part to make the dual system successful in Germany. In these studies, it has been mistakenly assumed that the establishment of a dual system will automatically bring about complementary relationship between school learning and workplace training. In reality, it is likely that they can be disconnected from each other, with their different learning environments, teaching methods, and nature of knowledge delivered. In order to avoid such disconnection, the German government has actually established a special mechanism which can harmonize the curricular between school and workplace. To design or revise the content and structure of instruction for a certain occupation, the federal government and the Lander must develop the in-firm training curriculum and vocational school curriculum respectively, and then attend a plenary session to discuss and reach the consensus on the final version of the curricular. The harmonization process also involves social partners, employers and unions (Much, 1994; Tremblay & Le Bot, 2003). Thus, to merely advocate to strengthen the workplace training in China without paying due attention to the harmonization mechanism will miss the real strength of the dual system in Germany.

**Motivation behind Enterprises’ Involvement**

Sixth, when criticizing Chinese enterprises' lack of involvement in vocational education through comparison with their German counterparts, most studies only focus on the aspect of funding and workplace training. However, in Germany, the enterprise can exert much more influence beyond those two aspects. Through themselves and the representation of Chambers, enterprises can apply for the creation or reform of occupation training, challenge the federal government's training project if it is believed to be too remote from the realities of in-firm training, draw up and monitor the final exams and issue occupational certificates (Tremblay & Le Bot, 2003). With the workplace training actually directing the instruction in vocational
schools (Munch, 1994), enterprises also becomes a decisive referential point of in-school curriculum as well. Most studies fail to realize the strong influence of the enterprise in Germany. Only asking for more funding and training facilities from enterprises without ensuring them meaningful participation in designing and implementing vocational education curriculum will not likely to motivate the enterprise, which is indispensable to connect the vocational education to the real demand of workplace and labor market.

Finally, most of the comparative studies did not go beyond their criticism and lamentation about the lack of involvement of the enterprises to develop vocational education in China. They did not take one step further to explore the potential reasons behind the passivity. They also missed one important fact that in Germany, the enterprise does not have to provide workplace training within the dual system. Under the federal law of Vocational Training Act, the enterprises are entitled, not obligated to provide vocational training. Neglect of optional nature of enterprises' participation will lead to the overlook of the motivations behind those enterprises that choose to provide training and bear the cost in the dual system. According to a national study published in 2000 by the Federal Institute for Vocational Training, the top five reasons why companies in Germany offer training are: develop employees directly in line with company requirements (94%), skilled employees not available on the job market (90%), prevention of personnel fluctuation (80%), opportunity to "pick and choose" the best trainees (74%), and avoidance of wrong hiring decisions (73%). Therefore, even though it will cost enterprises about 8705 marks per year to train an apprentice by estimation, about one fourth of Germany's company still choose to offer training to students. The majority of these companies (93.3%) are large companies with more than 500 employees (Federal Ministry of Education and Research, 2003). In China, it would be beneficial to conduct a similar study among China's enterprises to explore the potential incentives and barriers about their involvement with vocational education, for it will be very difficult to improve vocational education without the participation of the enterprise. Moreover, considering that most enterprises in Germany indicating the training and utilizing skilled workers through the dual system as the most important reason for their participation, it further confirms the suggestion forwarded earlier that the dual system and the apprenticeship can be introduced in China with potential support from the enterprises.
CHAPTER SIX

CONCLUSION

China used to be the biggest manufacturer of the ancient world, with its porcelains, jewelries, and silk products exported to the corners of the world. The vocational training within the family and guild system seems to have coexisted well with the dominant culture of Confucianism despite its elevation of academic learning on classics and bias against vocational training. When formal vocational education was established in China in the early 20th century, it was more of a desperate strategy to revive China from the mortified Chinese educators and government officials in reaction to the shock and shame of China's colonization by the Western powers. Unlike the industrialized countries such as U.S. and Germany, where the formal vocational education was evolved from their social and economic development, the vocational education in China, since its first introduction from U.S., has had to face challenges like strong influence of Confucianism, lack of philosophical foundation which values hands-on learning and vocational education and low level of universal education and industrialization.

In addition to China's social, cultural and economic contexts which strongly influence the development of its vocational education, it also important to explore the differences in vocational education systems among the industrialized countries which China tries to learn from. For example, examining the prominent difference between the U.S. and Germany can be informative in China's current efforts to learn from Germany. If Germany's vocational education can be likened to a well-designed sorting machine, featured with its separate vocational school system, job-specific training and national standard credentials, the U.S. vocational education system shows very different characteristics, which integrates vocational and academic courses within comprehensive high schools and gives students individual freedom to choose certain classes without being streamed into distinct tracks.

From the social functionalist perspective, Germany's model seems be effective in providing structured and job-specific training to students. It can also ensure a closer tie between the labor training and job market through extensive involvement from enterprises. Its national standard certificate system can also ensure the quality of vocational training. All these futures
will help China to improve the quality of its vocational training and solve the acute shortage of skilled workers.

Despite the advantages that the German model can potentially bring to China, the current practice to learn from Germany has been limited and superficial, which is reflected in the existing comparison studies on Germany's and China's vocational education systems. While highlighting some of the aspects that China can learn from Germany such as the dual system, vocational teacher training, the relevant law system and government funding, they nevertheless miss other crucial components including apprenticeship, vocational training at the middle school level, harmonization of curriculum between vocational school and workplace, the duality of administrative framework, and the motivation behind enterprises' extensive involvement in the vocational education. In order to have a "true" experiment with the Germany's model, it is suggested that the policy makers and researchers should take a deeper and wider exploration of Germany's vocational education system. Based on the critique of the literature, the following suggestions are made in addition to the ones already forwarded by previous researchers.

a. Introduce career exploration and exposure into middle schools;

b. Establish apprenticeship system and the part-time vocational school;

c. Clarify and simplify the administrative framework for vocational education and workplace training;

d. Involve enterprises not only in terms of funding and training, but also in designing curriculum at vocational schools and workplace;

e. Establish a national exam and credential system for both vocational school and workplace training;

f. Improve the training curriculum for vocational teachers and introduce standard qualification requirements for vocational teachers and workplace trainers;

g. Conduct comprehensive research to explore potential incentives and hindrance for enterprises' participation of the vocational education, which is indispensable for a successful and meaningful vocational education;

Finally, the heated debate between Dewey and Snedden and the sharp contrast between U.S. and Germany's vocational education systems can also offer some useful insights to China in its current efforts to learn from Germany. Dewey's concern about a separate vocational education system like Germany's model should not be brushed off, even though the recent development of
Germany's vocational education system has made some of his criticism irrelevant. Actually, Dewey's criticism about streaming students into separate vocational and academic tracks at young age should be taken into consideration when introducing some general vocational education at middle schools as was suggested earlier. Under China's context, the vocational schools at the upper secondary level is already pushed into margin by the general high school with students' and parents' strong preference to college-bound education. If, by following Germany, separate schools or programs based on academic or vocational track are introduced at the middle school level in China, it can be foreseen that similar problem will extend to this level as well. Thus, it is suggested to introduce vocational education and career exposure into all middle schools without streaming students into different tracks. It can prevent vocational education from becoming a mechanism to screen out and marginalize the academically less-capable and the socially disadvantaged while still making schooling more relevant and meaningful to the middle school students and preparing them for the more intensive and structured vocational training at the high school level. Moreover, at the high school and college level, further vocational training with flexibility should also be established like Germany for employees to obtain higher education in order to prevent vocational education from becoming a "dead-end" pathway and "de-facto tracking".

Moreover, if we take one step further and look at Dewey's concern about job-specific training and separate vocational tracks, we can see that to him, vocational education is not an end by itself, but a mean to a better, more meaningful pedagogy. From this perspective, his criticism is relevant not only to vocational education, but to the schooling as whole. Actually, a movement similar with the one initiated by the China's Vocational Education Association in the last century is still very much needed in the current China to systematically re-introduce Dewey's educational philosophy and bridge the severance between "learning" and "doing" split by Confucianism. To some extent, the schooling in China is what Dewey criticized as "the traditional education" (Dewey, 1938), which has given too much focus on academic learning and theories, while ignoring students' interest, motivation and life experience. In this sense, more efforts should also be made to reform vocational education into an important component of a reformed schooling in China, which is meaningful and relevant to the students and beneficial to the whole society.
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