



王纪安 井上雅弘 主编

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# 首届中日高职高专教育论坛文集

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# 交流合作,共创中日高职高专教育的美好未来

## (代序)

随着亚洲和全球经济社会的迅猛发展,作为高等教育机构的一种类型,高职高专院校的教育目的已不再是单纯的技术传承,其应将培养具有创新与应用能力和国际视野的应用型、高技能专门人才作为重要任务。对中国和日本高职高专院校来说,加强国际交流,拓展合作平台,借鉴各自的职业教育理念,建立并完善有各自特色的高等职业教育模式,提高高等职业院校的国际知名度,拓宽院校和专业发展战略视野具有重要意义。

鉴于此,中国承德石油高等专科学校与日本国佐世保工业高等专门学校通过双方的多次交流与互访,于2006年6月30日双方在日本佐世保市签定友好学校合作协议。作为当时的承德石油高专校长,我提出可以构建一个平台,联合部分有兴趣的院校,进行更大范围的交流与合作,得到了日本佐世保工业高等专门学校井上雅弘校长的热情响应和高度赞同。双方商定共同发起并成立“中日高职高专教育论坛”,分别负责邀请所在国部分有影响力的高职高专院校共同参与,开展中日高职高专院校民间长期的学术交流,以加深中日高职高专教育界的了解与合作。“首届中日高职高专教育论坛”将于2008年5月11~14日在中国承德隆重召开。此次论坛由中国承德石油高等专科学校主办,日本佐世保工业高等专门学校协办,主题为“新时期中日高职高专教育的发展与合作”。论坛将从多种视角出发进行讨论,采取高端论坛和平行自由论坛相结合的方式,日本和中国一批院校长和专家学者进行深入的学术交流。这是中日两国高职高专教育界在中国举办的一次重要的学术交流活动,是中日两国高职高专教育界的盛会,必将在中国高等职业教育的对外交流史上留下重要的印记。

承德石油高等专科学校坐落在风景秀丽的历史文化名城——承德市。承德以世界文化遗产——避暑山庄、皇家寺庙群和金山岭长城闻名于世。承德石油高等专科学校是中国办学历史悠久、水平较高的优秀高等职业院校之一。1997年被中国国家教委确定为首批“全国示范性普通高等工程专科重点建设学校”,2005年在高职高专院校人才培养工作水平评估中评价为优秀,2007年被确定为国家示范性高等职业院校立项建设单位。学校始于1903年,创办于天津的“北洋工艺学堂”,是中国兴办最早的高等工业职业院校。1905年学校创建的实习工场是我国创办时间最早的高等学校校办实习工厂之一。目前学校占地面积80公顷(1200亩),校舍建筑面积24万平方米,面向全国招生,现有普通高职专科在校生近9000人。学校现设有机械工程系、电气与电子工程系、热能工程系、化学工程系、计算机与信息工程系、汽车工程系、石油工程系、建筑工程系、管理工程系、人文社科系、数理系、旅游系、体育健康与艺术教育部、成人教育与培训部、信息中心(含图书馆、网络中心和电教中心)、工业技术中心,开设以工为主的高职专科专业41个。学校紧跟行业、产业、企业和区域经济发展需求,进行以真实工作任务为载体的工学结合人才培养模式改革,形成了具有本校特色的“工学结合、道艺兼修”的人才培养模式,先后有8个专业成为中国教育部教改试点专业,6门课程成为国家精品课程,承担市厅级以上科研课题160多项,学生曾获得数学建模竞赛全国一等奖、电子设计大赛全国一等奖等多种奖

项,毕业生就业签约率连续5年名列河北省同类院校前列。

日本国佐世保工业高等专门学校成立于1962年(昭和37年),是日本成立最早的12所国立高等专科学校之一,也是日本九州地区成立最早的高专院校。学校位于日本长崎县佐世保市,占地面积160余亩,全日制在校生800余人,学校教师中80%以上具有副高以上职称。学校主要招收初中毕业生,进行5年全日制教育,1997年(平成9年)学校开设专攻科,招收高中毕业生,学制2年。毕业生就业近半数到日本关东地区。目前学校共有机械工学科、电气电子工学科、电子控制工学科、物质工学科,基础科目科,专攻科共6个教学单位。学校另外设有信息处理中心和综合技术教育研究中心。综合技术教育中心分设海洋开发机器部、生物环境部、信息处理部、加工测量系统部、成教部。学校重视学生的实践环节,较早地组织学生技术实践,并获得JABEE认证(技术者教育认定机构认证)。学校重视与产业界和政府部门的交流与合作,并从1998年(平成10年)开始举办“产学官交流协议会”。

论坛组委会先后收到论文60余篇,经过认真筛选,将其中40篇辑录成集。这些论文反映了中日两国广大高职高专教育工作者多年来在高职高专教育的发展与改革方面经过不懈努力而取得的丰硕成果,也是许多专家和教授在这一领域内长期工作、研究和智慧的结晶,他们对高职高专教育未来前景的探讨以及由此提出的新观念、新思路和新的战略措施,显示了他们的改革意识、创新思维与真知灼见。相信这本文集的出版必将对中日高职高专教育的发展、合作与改革起到一定的推动作用。

论坛的筹备和召开过程得到了日本国佐世保高等专门学校及其同行、中国教育部、河北省和承德市行政主管部门,以及各高职高专院校同行的热烈响应及大力支持。特别要感谢井上雅弘校长、须田义昭副校长的支持和密切合作。天津大学出版社承担了论文集的编审和出版工作,付出了辛勤的劳动。我愿借此机会对上述单位和个人以及所有论文的作者一并表示感谢!

首届中日高职高专教育论坛组委会主席

中国承德石油高等专科学校党委书记、校务委员会主任

王纪安

2008年4月2日

# **Sino-Japan Communication & Cooperation for the Bright Future of Higher Vocational Colleges**

## **( Preliminary remarks )**

With the rapid economic development both in Asia and worldwide, higher vocational colleges, being a type of higher education institutions, no longer aim at transmitting techniques, but cultivate practical and high-skilled professionals with a creative mind and the ability of applying their knowledge into field work. It is of great importance for higher vocational colleges both in China and Japan to increase international communications, to enlarge the cooperative platform, to learn from each other's vocational education notion, to build and improve the higher vocational education mode with specialties, to spread the worldwide fame of higher vocational colleges, and to broaden the view of colleges and vocational development strategies.

After much communication and exchanging visits, a friendly cooperation agreement was reached between Chengde Petroleum College of China and Sasebo National College of Technology of Japan in Sasebo on June 30, 2006. Being the president of CPC (Chengde Petroleum College) at that time, I proposed to build a platform and invite more colleges to communicate and cooperate. My proposal met with a positive response and agreement from the president Masahiro of SNCT (Sasebo National College of Technology). So it was agreed that Sino-Japan Forum on Higher Vocational Colleges should be established, and both sides are entitled to invite influential colleges from home to participate and start a long-term non-governmental communication between China and Japan in order to know each other and cooperate between higher vocational colleges in both countries. The First Sino-Japan Higher Vocational College Forum will be held in Chengde, China from May 11 to May 14, 2008, which is sponsored by CPC, with the help of SNCT. The theme of this forum is The Development and Cooperation Between Higher Vocational Colleges in China and Japan in New Era. The forum will start from different angles of view and adopt a mixed pattern of top forum and parallel forum to ensure a further academic communication among presidents of different colleges and among experts and scholars. It is an important academic exchange in the field of higher vocational colleges of both China and Japan, and it is a big gathering in the field of higher vocational colleges in both nations. It is for sure to leave an impressive mark in the history of China's international communication of higher vocational colleges.

Chengde Petroleum College is situated in the beautiful historical city—Chengde, which is well-known for its world cultural heritage—the Mountain Resort, the imperial temples and Jinshanling Great Wall. CPC is one of the oldest and excellent high-quality higher vocational colleges in China. It was granted as one of the first batch of National Model Higher Vocational Colleges under Construction. CPC was given an excellent assessment remark in the evaluation of talent cultivation of higher vocational colleges in 2005. It was entitled National Model Higher Vocational College with Project under Construction in 2007. CPC was founded in Tianjin as “Peiyang Technology School” in the year of 1903, and was one of the earliest higher vocational

colleges in China. The earliest field-practice factory was set up by CPC in 1905. CPC has the school coverage of 80 hectares, with the buildings occupying 240,000 m<sup>2</sup>. CPC recruits students from all over China and it has 9,000 full-time students. There are different departments in the school, namely the department of mechanical engineering, electrical and electronic engineering, thermal engineering, chemical engineering, computer and information engineering, automobile engineering, petrol engineering, and construction engineering, adult education and training section, information centre (including school library, internet centre and electric centre), and technology centre. CPC has 41 majors at present, with a stress on engineering majors. CPC keeps up with the need of industries, enterprises and regional economic development, and reforms on the mode of talent cultivation, namely the combination of work and study, which is carried on by authentic work tasks. Thus a special mode of talent cultivation "combination of work and study, and of moral education and professional education" is born here. Right now, the school has eight trial majors approved by the Ministry of Education, six national key courses, 160 research projects of or above municipal and provincial level. Students in CPC have ever won the top prize in the national contest of mathematics modeling and electronic design. The employment rate for graduates has been among the highest for 5 years compared with other schools which are of the same level.

Sasebo National College of Technology was founded in the year of 1962, and is one of the earliest 12 state-owned higher vocational colleges. It is also the earliest vocational college in Kyushu. SNCT is located in the city of Sasebo, with the coverage of more than 160 Chinese acre. It has 800 full-time students, and more than 80% of the teaching staff are associate professors or above. SNCT mainly recruits junior middle school students to study for 5 years. In the year of 1997 the school started to set up specialty majors which are for senior middle school students to study for 2 years. Nearly half of the graduate students are employed in Kantou. At present the school has 6 teaching units, namely the department of mechanical engineering, electrical engineering, control engineering, chemical and biological engineering, general education, and advanced engineering course. In addition, SNCT has an information processing centre and a technical education and Research centre. This research centre consists of: (1) marine development, (2) biological environment, (3) information processing, (4) manufacturing measurement system (including a workshop factory) and (5) reeducation of the engineers. SNCT emphasizes students' field practice, and arranges technical practice for students at an early stage of schooling, who are later accredited by JABEE (Japan Accreditation Board for Engineering Education). The school pays much attention to the communication and cooperation with industries and government departments, and started the communication and consultation between industry, academic research and local government in the year of 1998.

The organizing committee of the forum received more than 60 papers. After careful selection, 40 were compiled into this collection. All the papers here reflect the abundant achievement of educators of higher vocational colleges both in China and Japan. The achievement is mainly on the development and reform of higher vocational colleges and is the product of many experts and professors' hard work in the field. They proposed new concept, new ideas and new strategic measures on the future of vocational colleges. These proposals indeed reveal their views on reform and their creative thinking. Hopefully, the publication of this collection will boost the development, cooperation and reform in higher vocational colleges in both China and

Japan.

The preparation and opening of the forum met with an active response and support from Sasebo National College of Technology and its brother schools, the Ministry of Education of China, the provincial and municipal departments, and many other higher vocational colleges. My special gratitude will go to president Masahiro Inoue and vice president Yoshiaki Suda for their support and close cooperation. Tianjin University Press endeavored to compile and publish the collection. I'd like to give my sincere thanks to the above-mentioned units and persons, as well as to the authors!

Chairman of the organizing committee of  
the First Sino-Japan Higher Vocational College Education Forum  
General Secretary of CPC, Director of Faculty Committee of  
Chengde Petroleum College

Wang Ji'an

April 2, 2008



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# “工学结合”职业教育思想的发端和内涵

王纪安

(承德石油高等专科学校, 河北承德, 067000)

**摘 要:**探讨了“工学结合”职业教育思想在国外和中国的起源、形成过程和发展现状,分析了“工学结合”职业教育思想的基本内涵和表现形式。

**关键词:**工学结合; 职业教育; 高技能人才

高等职业教育作为高等教育发展中的一个类型,肩负着培养面向生产、建设、服务和管理第一线需要的高技能人才的使命。其一个重要的办学思想就是“工学结合”,即一边在企业实践,一边在课堂学习,“学中有工,工中有学”。这种办学形式既是国际上的普遍规律,又是中国的职业教育特色;既是中国历史的产物,又是当今职业教育的亮点。我国经济与社会的发展赋予了工学结合新的内涵。

## 1 “工学结合”教育思想的国外起源和发展

“工学结合”教育模式最早可以追溯到 1903 年在英国开始实施的“三明治”教育模式(Sandwich Education)(英国桑得兰德技术学院)。1906 年,美国俄亥俄州辛辛那提大学开始实施与英国基本相同的工学结合教育模式,并称之为“合作教育”(Cooperative Education)。1983 年世界合作教育协会在美国成立,协会成员来自 40 多个国家,每年召开一次国际性会议。2000 年协会理事会经讨论决定,将合作教育改为“与工作相结合的学习”(Work-integrated Learning),以进一步从名称上凸显工学结合的基本特征。

实际上,现在发达国家的现行职业教育模式的核心思想,也就是“工学结合”教育思想是在自己国情下的实践形式。如德国是世界上职业教育和培训比较发达的国家之一,“双元制”是其职业教育的主要形式。所谓“双元制”就是职业院校与企业合作的职业教育模式,“准职业人”在职业学校里以学生的身份接受与职业有关的专业理论和普通文化知识教育,在企业里以学徒身份接受职业技能和相应知识的培训。这种模式将企业与学校、理论与实践结合起来,培养既具有较强操作技能又具有所需专业理论知识和一些普通文化知识的技术工人。再比如日本的“产学合作”教育。日本“产学合作”职业教育思想的基本点是强调“理论学习唯有同职业实践相结合,学生的职业能力才会得到增强”,其主要形式就是院校与产业界的紧密合作,从而对国家、企业和个人都有利。还有如澳大利亚的“新学徒制计划”。澳大利亚从 1999 年开始实施“新学徒制计划”,这项计划通常是在一个雇主和一个新学徒之间签订一份培训协议,雇主为新学徒提供就业岗位和培训,其实质是把实践工作与有组织的培训结合起来,颁发全面认可的学历资格证书。各个国家的具体模式可能各有不同。有一年分为三学期,工作与学习交替进行的;也有一个星期几天学习几天工作的;也有每天半天学习半天工作的,等等。无论是什么形式,他们的共同点是学生在校期间不仅学习而且工作。这里的工作不是模拟的工作,而

是与普通职业人一样的有报酬的工作,使学生真正融入到社会中得到锻炼。学生的工作作为学校专业培养计划的一部分,除了接受企业的常规管理外,学校有严格的过程管理和考核,并给予相应学分。尽管形式多种多样,但其共同特点都是把人才培养与产业和企业实践紧密联系起来,这种教育模式的思想核心就是“以职业为导向,以提高学生就业竞争能力为目的,以市场需求为运作平台”,在“工学结合”中培养高技能人才。

## 2 “工学结合”职业教育思想在我国的发展

我国“工学结合”教育思想同样早已有之,时间上与国外的“三治”教育还令人惊奇的一致。19世纪末和20世纪初叶,实业救国成为时代发展的必然选择,与此同时在我国南北商业重镇开始兴办各类实业学堂。承德石油高等专科学校的前身,1903年创办于天津的北洋工艺学堂是其中最早的一个。当时学校设有机师科、化学科2个正科,化学制造科、绘图科2个速成科。1904年9月建立直隶高等工业学堂附设实习工场,这是中国高校最早的校办实习工厂。后学校几经变更名称,诸如“河北省立第一职业学校”、“河北省立工业学院高职部”、“河北高级工业职业学校”等,兴办高等职业教育百年传承,延拓至今。2002年,教育部和河北省教育厅联合组织由北京大学、厦门大学等专家组成的校史论证专家组确认“承德高等专科学校源于1903年创办的属于高等教育层次的北洋工艺学堂,办学历史连续,承续分明,已有百年办学历史”。

学校成立伊始,就以瞄准职业、工学并举为己任。学校首任校长、直隶工艺总局总办兼北洋工艺学堂总办周学熙即阐述了“工”、“学”密不可分关系的重要性——“学堂为人才根本,工艺为民生至计,二者固宜并举。而计求之道,亦属相资。工艺非学不兴,学非工艺不显”。其提出者周学熙是我国著名的实业家和教育家。周学熙生于1866年1月12日(清同治四年十一月二十六),1893年中举人。1898年报捐候补道,派为开平矿务局会办,次年升总办。1903年赴日本考察工商业,归国后任直隶工艺总局督办。1906年创办启新洋灰公司、滦州煤矿公司,获利颇丰。因振兴工业有功,由候补道、直隶通永道、天津道、盐运使历官至按察使。1908年创办京师自来水公司,1919年创办中国实业银行任总经理,1922年与比利时商人合办耀华玻璃公司。周以兴办实业成绩卓著,与南方实业家张謇齐名,有“南张北周”之说。1947年9月26日卒于北平寓所。“工艺非学不兴,学非工艺不显”是我国早期“工学结合”教育思想的精练表达,明确指出了理论学习与工艺实践的辩证关系。

为办实习工场,学堂向袁世凯奏报提出“实习工场与工艺学堂联为一气”,“以工场为学生之实验厂,以学堂为工徒之研究室”,从而建立了我国最早的实习工场和实验厂。这样的工厂不是一个模拟训练场,而有明确的生产项目,堪称我国最早的高等学校附设生产性实习工厂。此后学校每设置一个专业,就必定在校内建设相应的专业实习场馆(其中有生产性实习工厂,有仿真环境的技能训练馆室)。安排师生利用实习工厂条件自制教学实验设备,与工人一起生产产品,强化技术技能训练,当时的实践教学学时数即已占了教学总学时的40%以上。

1929年学校升办河北省立工学院,院长魏元光提出“既习其理,又习其器”,进一步阐述了工学结合的教育思想,其教务概况中对高职教学提出明确要求“高职部于学理外对于机器使用技术熟练力与充分时间之实习,以养成实地工作之才,为达此种目的,本院设有物理实验室、化学实验室和电机实验室及机厂以于学生各种实习及实验之机会”。1948年学生到省内中防第一机械厂等28个企业进行生产实习,签署学生实习协议书,企业以文件形式向学校回复,并给予充分安排。学校明确把“发展新工

业、改良旧工业”作为教育目标,学校为形成“特殊学风”,对学生提出“分工合作,促进生产教育”、“手脑并用,造成实用技术人才”、“教学做合一,提高研究学问的兴趣”以及人格、作风等八条标准要求。“工学结合”的思想和实践都已有了雏形。这是到目前为止“工学结合”教育思想在我国的最早发端。

到上世纪 50 年代,我国教育改革中出现了三类学校并存的形式,即全日制学校、半工半读学校、业余学校,其中半工半读学校“轮流上课和下厂”的学生有 200 多万人。1964 年刘少奇同志倡导两种教育制度和两种劳动制度,1965 年“顶岗劳动和教室学习交替进行”的半工半读学生达 433 万多人。进入改革开放新的历史时期以后,特别是随着经济与社会的发展,党中央、国务院高度重视职业教育,倡导大力发展职业教育,“大力推行工学结合、校企合作的培养模式,逐步建立和完善半工半读制度”,并赋予了“工学结合”新的内涵。

“工学结合”做为一种职业教育思想,充分体现了“把学生作为行动主体”的教育理念,“工学并举”,手脑并用、学中做、做中学;体现了职业教育适应经济与社会发展的价值取向,即由封闭的学校教育走向开放的社会教育,从单一的学校课堂走向实际的职业岗位,从学科学历本位转向职业能力本位,从理论学习为主转向实践过程为主,从学科中心转向学习者中心。对高等职业教育而言,“工学结合”已成为高等职业教育人才培养模式改革的重要切入点,从而带动专业调整与建设,引导课程设置、教学内容和教学方法改革。人才培养模式改革的重点是教学过程的实践性、开放性和职业性,实验、实训、实习是三个关键环节。“工学结合”重视学生校内学习与实际工作的一致性,校内成绩考核与企业实践考核相结合,探索课堂与实习地点的一体化;通过推行订单培养,探索工学交替、任务驱动、项目导向、顶岗实习等有利于增强学生能力的教学模式;引导建立企业接收高等职业院校学生实习的制度,加强学生的生产实习和社会实践。国家要求高等职业院校要保证在校生至少有半年时间到企业等用人单位顶岗实习。“工学结合”也不是单纯的单向结合,要通过教育与企业和社会需求的紧密联系,高等职业院校要按照企业需要开展企业员工的职业培训,与企业合作开展应用研究和技术开发。企业也在分享学校资源优势的同时,参与学校的改革与发展。校企携手在合作中创新人才培养模式,培养满足企业需要、适应国家发展、学生和家长满意的高技能人才。

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# **Inception and Connotation of “Combination of Work and Learning” Vocational Education Thought**

**Wang Ji-an**

(Chengde Petroleum College, Chengde 067000, China)

**Abstract:** This essay, after probing the origin, developing process and present state of “Combination of Work and Learning” both at home and abroad, analyzes the connotation and existing form of it.

**Key words:** combination of work and learning; vocational education; high-skilled talents

Higher vocational education, a new education type of higher education development, is responsible for cultivating high-skilled talents in the field of production, construction, service and management. One of its important ideas is “Combination of Work and Learning”. That is to say, while learning, students are required to practice in enterprises, which is not only the most popular vocational education principle all over the world, but also the distinguishing feature of Chinese vocational education; it is the product of Chinese education history and also the highlight of nowadays vocational education. The characteristic of economic and social development in China has attached new connotation to it.

## **1 Origin and development of “Combination of Work and Learning” abroad**

The education mode of “Combination of Work and Learning” can be traced back to 1903 when Sundert and Technical College in England was carrying out a new education mode called Sandwich Education. Then 3 years after that, the University of Cincinnati in America began to apply similar education mode, however, it was called Cooperative Education there. In 1986, the World Association for Cooperative Education (WACE) was set up in America. The members, coming from more than 40 countries, held an international meeting each year. In 2000, the Council of WACE, after much discussion, came up with the idea of changing the name of cooperative education into “Work-Integrated Learning” so as to outstand the basic feature of the combination of work and learning from its name.

In fact, the core of vocational education in developed countries is the embodiment of “Combination of Work and Learning” in their own specific education background. Let me show you some examples. In Germany, the quite advanced country in vocational education and training in the world, the main form of its vocational education is “double base system”, namely, the education mode under which vocational colleges cooperate with enterprises. This kind of education thought requires the “professionals-to-be” to learn professional theories and common academic knowledge as students and at the same time to be trained in professional skills and other work-related aspects in enterprises as apprentices, in order to produce skilled workers with

both higher professional skills and work-related theories. Again in Japan, the basic point of its “cooperation of industry and learning” vocational education idea emphasizes that only when learning is closely related to professional practice can the students’ professional ability be improved, which then in turn benefits both the country and enterprises as well as individuals. The “new apprentice plan” of Australia from 1999, under which an employer and a new apprentice often sign a training contract, in which the employer promises to provide the apprentice with working post and opportunity to be trained, is in fact to combine practical work with organized training, the apprentice, thereafter can receive a certificate which is accepted in the whole country. As you can see, the specific education pattern of one country may differ from that of another, under one country’s system one academic year may be divided into 3 terms, with work alternating with learning, under another there may be some days of learning and the rest working. In another pattern there may be a half day’s learning and also a half day’s working, and so on. No matter what the pattern is, one point they all share is that the students are required not only to learn professional theories but also to work. The work here does not mean the analogous one but the same paid work with average workers, with the help of which the students can really enter into the society and learn a lot from it. Under this kind of education system, the students’ work is part of their professional development program at school. In addition to the common principles and regulations of enterprises, the students also have to receive strict process management and examination, and then are scored comparatively. Despite the variety of its forms, the common point is to combine the theory education with work in enterprises, the core of this thought is “work-oriented, with the aim of improving the students’ employment competitiveness, on the basis of market demand”, to produce high-skilled professionals.

## **2 Origin and development of “Combination of Work and Learning” in China**

The “Combination of Work and Learning” education thought in China has a long history, and it surprisingly coincided with the “Sandwich Education” of western countries. At the turn of this century, to save the nation with industry became an inevitable demand. Meanwhile, there came out all kinds of industrial schools in the important commercial towns of the southern and northern parts of China. Peiyang Technological School (the precursor of Chengde Petroleum College) set up in Tianjin in 1903 was one of the earliest ones. At that time there were only two main departments, Machinery Department and Chemistry Department, as well as two speeded-up departments, Manufactory Department and Graphics Department. The attached workshop of Zhili Polytechnic School (another name of Chengde Petroleum College), built up in September of 1904, was the earliest school-run workshop. After that, Chengde Petroleum College changed its name several times, such as Hebei No. 1 Vocational School, the Higher Vocational Extension of Hebei Technology College, etc. Till now, the college has never given up its responsibility of higher vocational education for more than 100 years. In 2002, experts from the testifying group jointly set up by Ministry of Education of the People’s Republic of China and Education Department of Hebei Province declared that Chengde Petroleum College originated from Peiyang Technological School set up in 1903 with a history of more than 100 years.



At the very beginning, the school aimed at running both a vocational and technological school. The first president Zhou Xuexi, the prominent industrialist and educator in China, the headmaster of the technological bureau as well as the headmaster of Beiyang Technological School at that time, stated the inseparable relationship between "work" and "learning", namely "academic study is essential for a talent, technology is vital to improve people's living quality, and the two should supplement each other and both be paid attention to; technics without knowledge does not advance; knowledge without technics cannot be fruitful". Mr. Zhou Xuexi was born on Jan. 12<sup>th</sup>, 1866 (Nov. 26<sup>th</sup> on lunar calendar in Tongzhi's reign of Qing Dynasty) and became a successful candidate in the imperial examinations at the provincial level. In 1898, Zhou contributed to Houbudao (a kind of official position) and was assigned associate manager of Kaiping Bureau of Mine, then the next year he came to the general manager. In 1903, he was sent to Japan to make an on-the-spot investigation of its commerce and industry. In 1906 he started Qixin Lime Company and Luanzhou Mine Company and made great profit. Because of his great contribution in revitalizing industry, he got promoted several times. In 1908 he started the Capital Tap Water Company and then in 1919 Industrial Bank of China and undertook its General Manager. After that Mr. Zhou Xuexi cooperated with a Belgian merchant and started Yuehua Glass Company in 1922. Zhou became prominent as an industry runner and he became a par with the well-known industrialist Zhangqian in southern part of China. Mr. Zhou Xuexi died on Sep. 26<sup>th</sup>, 1947 at his apartment in Beijing. "Technics without knowledge does not advance; knowledge without technics cannot be fruitful" precisely generalized the early education thought of "Combination of Work and Learning", it clearly stated the dialectical relationship between theory study and field practice.

In order to run the attached workshop, the leaders of Beiyang Technological School presented to Yuan Shikai, the emperor in China at that time, that "The attached workshop and the school should be combined and work for each other", "the attached workshop should act as a trial plant for students and the school a researching institute for workers and apprentices in the workshop." This kind of workshop was not only a simulated coaching grid, it had its specific production item. It was the earliest higher-school attached workshop with productive ability. Thereafter, whenever a new major was set up, the school would attach the related workshop for it (There were workshops with productive ability and also the simulated ones.). There teachers and students could make laboratory equipments and make the same products with workers, most importantly, enrich their skills. Practical education then took up more than 40% of the total teaching.

In 1929, the school was promoted to be Hebei Provincial Technical College, the president Wei Yuan-guang proposed the theory that "students should not only learn academic theories, but also know well the implements essential for work." The theory enlarged the basic theme of "Combination of Work and Learning". The educational administration clearly demanded that "Besides academic study, the students of higher vocational education should spend enough time and know well how to use the machines". For this reason, there were physical laboratory, chemical laboratory, electrical machinery laboratory as well as attached electrical machinery workshop to provide students with more opportunities to experiment and practice. In 1948, the students were sent to practice in more than 28 enterprises like the First Machine Works of Defense, and they signed contracts with enterprises which then were written to the college and offered the students positions. The college set aim for them as "to develop new industry and to reform the old one". The style of study there