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# **Ways of Cooperation between Higher Vocational Institutions and Enterprises in Northeastern China**

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## Abstract

This thesis is based upon the case study of the ways of cooperation between higher vocational institutions and their partner enterprises in Northeastern China. Using Engeström's activity theory, Guile and Griffiths' six dimensions of work experience, the thesis analyzes the designed ways of cooperation, i.e. TQP, teaching staff cooperation, Dingdanpeiyang, and the compulsory way of cooperation, Dinggangshixi.

Concerning the designed ways of cooperation, the thesis argues that on the one hand, they prove that activity theory is a quite powerful analytical tool and conceptual framework for enquiry and consequently leads to expansive learning. On the other hand, the imbalance of power in the cooperative activity systems dominates throughout of the cooperative process. In terms of the compulsory way of cooperation, though Dinggangshixi offers work experience to students, it fails to connect the vertical and horizontal learnings due to the indifferent work context, less relevance between school learning and work, and less cooperation between vocational institutions and their partner enterprises compared with the designed cooperative ways.

It is recommended that in Dinggangshixi the cooperation between higher vocational schools and enterprises should be reconsidered by assigning supervisors both in higher vocational institutions and enterprises. Responsibilities should be clearly and

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reasonably divided between these two groups of supervisors. Meanwhile, these two groups of supervisors should keep contact to exchange ideas concerning students' performance in Dinggangshixi. In addition, Dinggangshixi, especially its aims, should be re-conceptualized in higher vocational institutions. By doing so, the cooperation between higher vocational institutions and enterprises will get further developed.

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## Chapter 1

### Introduction

#### 1.1 The focus of the research

*What is the fatal weakness of the vocational education in China compared to the developed countries? It is the cooperation between vocational institutions and enterprises ... The cooperation has been designated as the key point of the development of vocational education and the Chinese researchers should explore effective ways or at least discuss the possibly creative ways of the cooperation...*

*(Speech in the national conference on vocational education and adult education, 2010)*

In March 2010, Gui'ren Yuan, China's Minister of Education, made a speech on the developmental orientation of the vocational education in China. As quoted above, he answered his own question concerning the fatal weakness of the vocational education in China, that is, the cooperation between vocational institutions and enterprises. He urged the vocational institutions to take more initiatives to broaden as well as deepen the cooperation, through which students are expected to practice out their school learning in the workplaces and enrich their work experience that might consequently enhance their employability.

The intense media coverage has demonstrated great efforts made by vocational institutions (in this thesis, vocational institutions refer to higher vocational schools) as well as the problems yet to be solved. As reported by China Education Daily, at the

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beginning of 2009, 28 students from Zhejiang Textile and Fashion College gave up their work after two months' participation in Dinggangshixi (a way of cooperation between vocational institutions and enterprises) in Ningbo Yuren Knitting Machine Co., Lit. It has been presumed that these students got appropriate workplaces to conduct their Dinggangshixi because their specialty (Innovative electrical technology of textile) is identical with the job description offered by the company. This cooperation turned out to be a severe attack between students, who criticized that the exploitation is the essence of Dinggangshixi and had low opinion of the official workers, and the company, who was startled by students' inconstancy in work and their incapability of dealing with interpersonal relationship. As suggested by the company, the college starts to re-consider students' learning at school and, as the college presented publicly, the cooperative items in Dinggangshixi need to be further negotiated in details.

This case therefore highlighted the need for higher vocational institutions to re-examine their ways of cooperation with enterprises. Besides Dinggangshixi, the Ministry of Education also urges higher vocational institutions to diversify their ways of cooperation with enterprises. This thesis argues that, so far, the cooperative ways could be put into two categories. One is the flexible ways designed by the cooperative partners according to their supply and demand. The other is Dinggangshixi, which is enforced by the regulations from the Ministry of Education. As a matter of fact, Dinggangshixi is always included within the flexible ways in practice. In this way, the vocational institutions can "kill two birds with one stone" when they explain their

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work to the expert committee during the evaluation from the Ministry of Education. To scrutinize the cooperation between higher vocational institutions and enterprises, this thesis focuses on the northeastern area of China due to the fact that this area is an industrial base and consecutively goes through industrial reformations and consequently the cooperation is enforced and reinforced accordingly. It is necessary to point out that the ways of cooperation between vocational institutions and enterprises have attracted researchers' attention for many years, but none of them present students' real situation in Dinggangshixi, which plays the most important role in students' learning and training. Drawn on the data collected at the end of 2009, this thesis therefore focuses on both the optional ways and the compulsory way of cooperation conducted in three higher vocational institutions and their cooperative partners. Rather than superficially analyzing the regulations and rules that these vocational schools followed, this thesis reaches into the detailed execution of the optional ways of cooperation. In addition, it compares and contrasts the execution of Dinggangshixi in the three cases to figure out students' performance in the workplaces (via questionnaire and interview). By so doing, a real picture of the current cooperation is presented, problems are pointed out, and the improvement in the future cooperation is suggested.

## **1.2 Starting points**

The advantages of the cooperation between vocational institutions and enterprises have been debated for many years in China's vocational education. Critics have suggested that the vocational institutions are burdened with the cooperation due to the

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fact that enterprises take fewer initiatives and most of cooperative tasks are done by vocational institutions alone. Supporters of the cooperation argued that the cooperation enhances students' employability by exposing them to the real workplaces. For this point, it is a burden (even if) worthwhile to take.

Despite the arguments, the cooperation between vocational institutions and enterprises has developed during the last several decades with the intervention both from the central government and local government, especially in the northeastern area of China. It is for this reason my study focuses on this area in which industrial clusters as well as vocational education have seen their co-development in recent years.

Three organizations are involved in the cooperation, i.e. the vocational institutions (staff), enterprises, and students. It is necessary to point out that in order to examine the ways of cooperation, not only the roles of the vocational institutions and their cooperative partners, but also the students, who acted as the connective point of the cooperation, are studied. In this thesis, to begin with, optional ways of cooperation in each case is examined due to the fact that in these ways of cooperation, the roles of the vocational institutions are more salient as they conduct the procedures of design, execution, and evaluation of the cooperation. In Dinggangshixi, it is quite clear to see where students were positioned in the enforced cooperation and how they performed in the workplace. By examining both ways, a panorama of the general situation of the vocational institutions, their company partners, and students' performance is obtained in the cooperation.

### **1.3 The aims of the research**

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The research upon which this thesis is based is principally concerned with analyzing the ways of cooperation between higher vocational institutions and enterprises in northeastern China. This includes the optional ways of cooperation and the compulsory way of cooperation, i.e. Dinggangshixi. In other words, the study focused on the roles of the vocational institutions, their enterprise partners, and their students in the cooperation. This research is carried out in three higher vocational institutions and their enterprises partners in the northeastern area of China. This area underwent a series of deconstruction and reconstruction of the industrial bases recently and consequently led to the reformation of vocational education, through which technicians with updating technology are trained. Using Engeström's activity theory, the research explores the different ways of cooperation chosen by the vocational institutions and enterprises and the extent to which the cooperation carried on. In addition, using Guile and Griffiths' work experience, students' performance was studied and analyzed in order to see the essence of this compulsory cooperation between vocational institutions and enterprises. The ultimate aim is to draw conclusions about the general situation of the cooperation and figure out the weakness. Furthermore, suggestions to improve the cooperation are offered.

#### **1.4 Research questions**

In this thesis, both the optional ways and the compulsory way of cooperation between higher vocational institutions and their enterprise partners are investigated. The research questions are as the followings:

- What are the motivations of the cooperation in these three cases?

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- What are the roles of the higher vocational institutions and enterprises in the cooperation?
  - What are the roles of students in the cooperation?

### **1.5 A brief outline of how the research was approached**

Since my thesis aims to study the cooperation between higher vocational institutions and enterprises in Northeastern China, a case study approach is adopted due to the fact that case study is particularly suitable when the aim is to study phenomena in context (Robson, 1993).

The three case studies of higher vocational institutions and their enterprise partners were selected on a regional basis in three provinces in northeastern China, with one institution in each province. The case studies employed multiple methods of data collection. Firstly, there is documentary analysis, such as the cooperative policy, government policy, teaching and learning strategy, etc. Secondly, in-depth, 98 semi-structured interviews were conducted among teaching staff, students from vocational institutions and some employees from enterprises. Thirdly, 700 questionnaires were distributed among students who have already participated in Dinggangshixi and 648 were valid. This was designed to get an alternative perspective on students' performance in the compulsory form of cooperation. The multi-method approach was selected to ensure that the ways of cooperation were studied from a variety of angles. To ensure the anonymity for the participants, pseudonyms were assigned to the participant institutions. The names of the higher vocational institutions are Institute A, College B and College C, and their

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corresponding enterprise partners are named Company F, Company C and Company H respectively.

### **1.6 The structure of the thesis**

The present chapter provides an introduction to the thesis and describes the focus of the research, the starting points, the aims of the research, the research questions, the brief outline of how the research was approached, and the structure of the thesis.

The second chapter offers the research backgrounds of the thesis, including historical backgrounds and previous research on the relevant topic, and theoretical backgrounds, i.e. Engeström's activity theory, expansive learning, and Guile and Griffiths' work experience.

The third chapter provides detailed explanation of the research methods, consisting of the introduction, case study, pilot test, data gathering, including qualitative and quantitative approaches, the status of data, and the summary.

In chapter four, three case studies are presented in details. In each case, the first section is the optional way of cooperation between higher vocational school and enterprise(s), and the second section is Dinggangshixi, which is a compulsory way of cooperation that vocational institutions have to do as required by the Ministry of Education.

Chapter five makes summary as well as perspectives of the cooperation between higher vocational institutions and enterprises.



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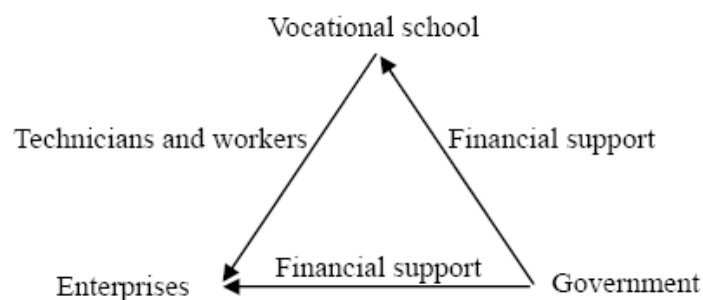
## Chapter 2

### Research backgrounds

#### 2.1 Historical backgrounds and previous research

##### 2.1.1 The national situation of the cooperation between vocational schools and enterprises

Nowadays vocational education can be categorized into two types in China, i.e. secondary vocational schools, paralleling to senior middle schools, and higher vocational schools, paralleling to colleges (Guo, 2006). (In this thesis, vocational schools refer to higher vocational schools). Though vocational education does not belong to the compulsory education in China, most of the vocational schools, except some workers' colleges established by state-owned companies, were financially supported by the Chinese government till the middle of the 1990s,. The triangular relationship among the government, companies and the vocational schools went regularly like Figure 1 (Guo, 2006):



**Figure1.** Triangular relationship within government, companies and vocational schools.

This triangle was broken up by the economic reformation in the middle of the 1990s. During this economic reformation, more than 70% companies were either reconstructed, annexed, or went bankruptcy (Zhou & Luo, 2007). The core of the

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reconstruction was to minimize the employees, and obviously it was impossible to recruit more employees into companies (Zhu, 2006). Consequently the graduates from vocational schools became part of the laid-off workers. This led to the shrinking enrollment of the vocational schools from 1995 to 2001. Statistics show that the professional technicians in the companies in China only make up 3.5% of all workers, far lower than the counterpart in the developed countries, which is 20% to 40% (Wu&Xia, 2006). Due to the reconstruction policy, the companies developed at an amazing speed. To cater to the technical requirement, the vocational training within the companies developed simultaneously.

While the companies enjoy the economic reformation, the Chinese government started to pay more attention to the vocational schools. In 2003, China's Ministry of Education announced that the Chinese government would like to put more effort to promote the development of the vocational schools. Over the next 5 years, China earmarked 14 billion RMB (around 2 billion US\$) in the financial budget to support the development of the vocational schools (Huang, 2004). Meanwhile, companies are encouraged in all kinds of ways to participate in the reformation of the vocational schools.

So far, the cooperation between vocational schools and the companies is divided into three levels (Liu& Yin, 2003). The first level is that the specialties in vocational schools are set up according to the requirement of their partner companies, and training bases for students are established in the companies. Committees such as Expert Steering Committee of Specialties and Steering Committee of Dinggangshixi

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are established and participated by members from schools and companies to make sure the cooperation, especially Dinggangshixi, goes well. The second level is that schools are able to offer the companies services such as consulting and training. A board of directors, including entrepreneurs, scholars, and experts, is set up to make sure vocational schools can get support from all walks of life in the society; the members in the Expert Steering Committee of Specialties are well-known experts who outline practical teaching plans and identify the professional and nonprofessional skills required during the work process. The third level is that schools and companies interact with each other. The academic activities at school mainly focus on the development of the companies, and the research results are applied into the techniques and products in the companies and in return, the companies invest money in schools to stabilize the beneficial relationship. Since the schools provide services such as techniques, marketing strategies, management, and consulting for the local government, the local government offers the first-hand materials on the development of local economy which is useful for the schools to be aware of the local economic environment.

### **2.1.2 Industry revitalization and vocational education in Northeastern China**

Geographically speaking, Northeastern area in China includes Heilongjiang province, Jilin Province, and Liaoning province. Being entitled as the “general armament department of China”, this area plays an important role in the development of China’s heavy industry. It is the first heavy industry base after the foundation of the People’s Republic of China due to its rich iron and steel, petroleum, machinery,

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chemical engineering, and equipment manufacturing. Compared with the fast development in the coastal cities in the southeastern China due to the open-door policy in 1978, the development in this area started to slow down since the 1980s. The strategic policies on how to revitalize this industry area were put into agenda since the 21 century and to develop the vocational education alongside in this area is one of the major strategic policy.

The basic goal of the revitalization is to deconstruct the existing traditional industry bases in order to reorganize and reconstruct it into a new industry base with reasonable structure and competitive products. The key part of the revitalization is to reconstruct the manufacturing base. In the northeastern area, the manufacturing base was characterized by its intensive capitals, intensive techniques, and intensive workforces. To develop the manufacturing in this area, it is important to develop the vocational education accordingly in order to guarantee the demands of various workforces, especially technicians possess practical skills. It is generally understood that the quality of the technicians play important roles in the manufacturing and till now the shortage of senior technicians is still an issue yet to be solved (Deng & Zhou, 2004). On this point, to develop the vocational education according to the requirement of the manufacturing becomes an important task for the vocational education in this industry area.

The vocational education in northeastern China was initiated at the end of the Qing Dynasty and a group of higher vocational colleges and secondary vocational schools were established in this area after the foundation of the People's Republic of

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China. These schools made contribution to the training of the technicians in this area. Meanwhile, the workers' colleges were set up by many state-owned factories in order to enhance the skill trainings as well as the cultural activities of the in-service workers. Since the 1990s, the technical innovation in the traditional industry led to the product upgrading and economic structure reorganization, which increased the demanding of the technicians. Graduates from secondary vocational schools could no longer meet the needs of the factories. More than 100 higher vocational schools were established and till 2010 the enrollment of the secondary vocational schools equals to the number of the high school and the enrollment of the higher vocational schools accounts for half of the higher education. The conditions of most vocational schools were improved and the teaching staff took part in further trainings. From 1995 on, Chinese central government started separating social functions from enterprises. The social functions of enterprises refer to the institutions and faculties built by enterprises, such as schools and hospitals, which are financially attached to the enterprises. The so-called separating social functions from enterprises tend to unload responsibilities and burdens of enterprises by transferring these attached hospitals, schools to their corresponding local governments. By doing so, the enterprises can focus on developing their business instead of distracting themselves in vocational education and the Education Bureaus of the local governments are in charge of the vocational schools that used to belong to the enterprises (Shao, 2006).

During the revitalization of the northeastern industry area, the intersection between industrial enterprises and vocational education was demonstrated clearly

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despite the fact that the separation of the social function brought benefits to the enterprises. Many workers in-service need to be trained in order to catch up with the upgrading skills and qualified employees need to be recruited to enrich the working group. It is under this circumstance that the cooperation between vocational schools and enterprise in this area became necessary as well as possible and the necessity and possibility were backed up by the fact of the directional service of vocational education to the social economy. It is argued that technicians needed by enterprises can be trained by vocational schools through accordingly-established courses, teaching methods, and practical process (Qian, 1999).

Now the revitalization in northeastern area steps into the substantive phase, in which the traditional industry layout ran out, but the construction of infrastructural facilities from the traditional industry and manufacture are still in this area and this is the advantage for the further development of this area. Meanwhile, the central government gives financial as well as policy support to the revitalization, which makes more investment chances possible in this area. The upgrading of equipment manufacturing and heavy industry accelerates the development in this area, and the development increases the demand of technicians and experts. It is under this circumstance the cooperation between higher vocational schools and enterprises is strengthened.

### **2.1.3 Previous research on the cooperation between higher vocational institutions and enterprises**

From September 2000 to September 2010, more than 300 papers on the

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cooperation between vocational schools and enterprises were published. Among these 300 papers, 167 were published in 2007 and 2008 when the central government issued policies and strategies to advocate the development of vocational education. The 300 papers can be categorized into four groups in terms of the subjects that touched upon:

Firstly, research on the patterns of cooperation between vocational schools and enterprises. It has been long time since experts and scholars argue about how the cooperation between vocational schools and enterprises should be initiated and sustained for long term. They believe that certain patterns should be followed. For example, Qin and Cao approached the pattern of cooperation from the aspects of the subjects (Qin & Cao, 2007). They suggested that in order to achieve successful cooperation, teachers, their counterparts in enterprises, and students should be closely connected and unified in the cooperative projects either from vocational schools or enterprises. The unity of the three can motivate the passive roles of enterprises. Unfortunately, the authors focused on the significance and importance for these three to be unified instead of showing how these three subjects should be unified.

Han (2006) insisted that no matter what kind of patterns, six elements should be fully considered, i.e. students' enrollment, the training centers inside and outside campus, teaching materials, researching contents of the teachers, ways of administration of the schools and enterprises, and students' employability. Partners in cooperation should make these elements move along harmoniously instead of contradicting each other. Yu (2006) argued that based on the current resources, creative forms of cooperation should be set up by connecting academic departments,

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groups of specialties, self-established economic entity, and technical services between partners.

Secondly, research on the denotation and connotation of the cooperation, the significance of the cooperation, and the distribution of benefits among partners in the cooperation. For example, He and Guo (2004) argued that the higher vocational education develops alongside the cooperation between vocational schools and enterprises because it is this cooperation makes the difference between the graduates from higher vocational schools and graduates from common college and universities. Hu (2004) pointed out that the essence of the cooperation is the virtual operation and elastic expansion for schools, and the schools get further developed due to the cooperation. The importance of the government's intervention in the cooperation is also emphasized.

Thirdly, research on the practical conduct of cooperation. Some scholars introduced special programs conducted in vocational schools and enterprises. For example, Gong (2007) introduced a well-known project, T-TEP, conducted between vocational schools and Toyota Ltd. He argued that the project is quite significant and can be regarded as a model program on the cooperation. Unfortunately, the ways of cooperation is less mentioned. Instead, the significance and the influence are emphasized frequently, which is a big problem in the above-mentioned research, and actually it is a big issue of all the vocational education research in China.

Fourthly, interdisciplinary research on the cooperation. Some scholars tried to analyze the cooperation from the aspects of institutional economics and game theory.



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For example, Zou (2008) analyzed the major institutional factors that influence the cooperation from the aspects of new institutional economics and pointed out the ways to reduce the costs of the training bases inside and outside campuses, which may consequently reduce the transaction cost and foster the buildup of institutional measures in the cooperation. Wang analyzed the cooperation from the aspects of game theory (Wang, 2008). He argued that companies take less initiative during the process of cooperation because they are cornered into the position of “prisoners”. Wang figured out how to get out of the “prisoners’ prison” from the aspects of industry association, government (local and central) and enterprises.

There are many holes in the above-mentioned current research. Firstly, the research stays on the suggestion level based on the empty imagination of the idealized ways of cooperation. Few on-site investigations are made and fewer statistics are presented to show the status quo. Secondly, there is still the shortage of the theoretical support in the research. Though some theoretical aspects are touched upon in previous study, scholars still insist that in this research area, sound theories are needed to conceptualize the essence of the cooperation. Thirdly, the previous research is either about one school or about one company. The characteristics of local areas are ignored in most of the research cases, which might foreground the different ways of cooperation.

## **2.2 Theoretical backgrounds**

### **2.2.1 Activity theory**

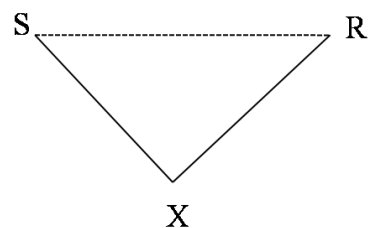
Activity theory is regarded as the “best kept secret of academia” (Engeström,

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1993) at the moment with a rapid expansion in the western world. The direction of development in activity theory is characterized by starting from individual personality development to interdisciplinary networked activity systems, outlined as connected activity triangles.

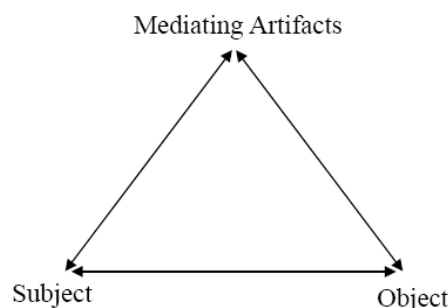
### 2.2.1.1 Three generations of activity theory

Founded by Leont'ev and Luria and rooted in Vygotsky's cultural-historical psychology, Engeström argues that activity theory has evolved through three generations of research (Engeström, 1996). Vygotsky's famous triangular model can be regarded as the first generation. As shown in figure2, stimulus (S) and response (R) is directly connected by the complex, mediated act.



**Figure 2.** Vygotsky's model of mediated act.

Normally, the concept of Vygotsky's cultural mediation of actions is interpreted as a triangle of subject, object, and mediating artifact in Figure 3.

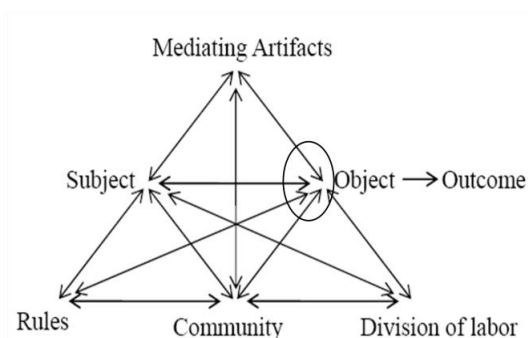


**Figure 3.** The triadic representation of actions.

In figure 3, the subject and object is connected by mediating artifacts, which is

revolutionary because the individual and social structures are inseparable now. The individuals are individuals with cultural and social backgrounds. The individuals could no longer be understood without their cultural means; and the society could no longer be understood without the agency of individuals who use and produce artifacts. This means that objects are no longer just raw material for the formation of logical operations in the subject. Objects become cultural entities and the object-orientedness of action becomes the key to understand human psyche.

Though mediated by artifacts, the analysis unit of the first generation is limited to be individually focused. Engeström argues that activity theory has been reduced to the simplified combination of subject, object and mediating artifacts (tools and signs). He suggests that the motives behind the actions have been obscured because the social basis of the actions remains unknown (Engeström, 1999b). Since it does not depict the actions in a collective activity system, the outcome of the actions is limited and situation-bound. This was overcome by Leont'ev's "primeval collective hunt" in the second generation through which the crucial differences between an individual action and a collective activity is explicated (Leon'ev, 1981). Engeström graphically expanded Vygotsky's original model into a model of a collective activity system as shown by Figure 4 (Engeström, 1999b).



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**Figure 4.** The complex model of activity system with societal basis.

In figure 4, elementary components of a unified activity system are outlined. The uppermost sub-triangle of this figure represents individual and group actions situated in a collective activity system. Participants in an activity are portrayed as subjects interacting with the object to achieve desired outcome. The object is depicted with the help of an oval indicating that object-oriented actions are always, explicitly or implicitly, characterized by ambiguity, surprise, interpretation, sense making, and potential for change. The human interactions with each other and with the object of the environment are mediated through tools, rules and division of labor. Mediators represent the nature of relationships that exist within participants of an activity in a given community of practices (Engeström, 1987). The central issues of the activity theory are the object, which connects the individual actions to the collective activity. Because the projected outcome consists of societally important objectified meanings and relatively lasting patterns of interaction, the projection from the object to the outcome functions as the motive of this activity and gives broader meaning to the actions.

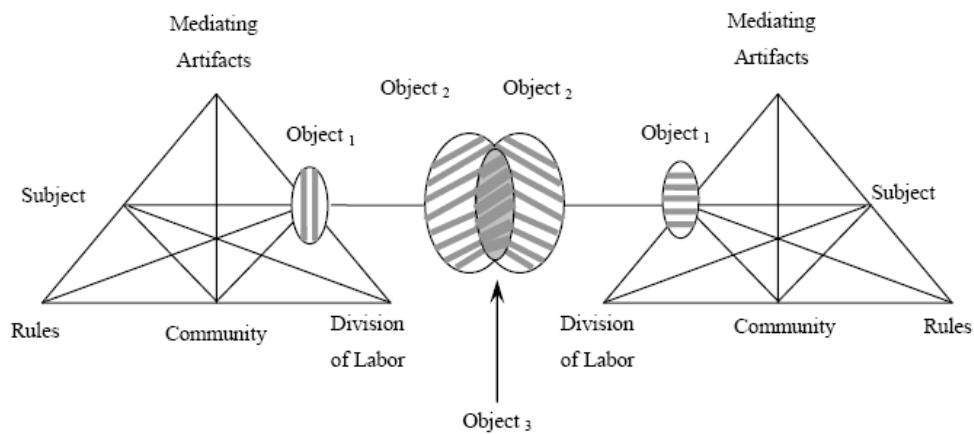
The models in Figure 3 and Figure 4 are defined as the first generation and the second generation of activity theory respectively (Engeström, 1999c). It is obvious that the core of the theory transforms from individual actions to the actions with solid social foundations. In the second generation of activity theory, the concept of activity takes a huge step forward because its focus on the complex interrelations between the individual subject and his/her community. It was argued that in Soviet Union, the

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research limitation of the activity theorists lies in the societal activity systems, which were mostly about children's playing and learning, and the contradictions within or between activity systems remained an extremely touchy issue (Engeström, 1987). Since the 1970s, radical researchers in the west started to re-construct the tradition (Chaiklin *et al.*, 1999; Engelsted *et al.*, 1993; Engeström *et al.*, 1999b). New domains of activity, including work, were opened up for concrete research. The diversified applications of activity theory began to emerge, as manifested in recent collections. The idea of internal contradictions as the driving force of change and development in activity systems, so powerfully conceptualized by Il'enkov (1977; 1982), began to gain its due status as a guiding principle of empirical research.

Ever since Vygotsky's foundational work, the cultural-historical approach was very much a discourse of vertical development toward higher psychological functions. Luria's cross-cultural research remained an isolated attempt (Luria, 1976). Griffin and Cole point out the deep-seated insensitivity of the second generation activity theory toward cultural diversity (Griffin & Cole, 1984). When activity theory went to international, questions of diversity and dialogue between different traditions or perspectives became increasingly serious challenges.

Based on this theoretical transformation, Engeström further developed the activity theory by concretizing the multiple activity systems between the divided communities. This is the third generation of the activity theory as shown by Figure 5 (Engeström, 2001).



**Figure 5.** Two interacting activity systems (divided terrains) with a partially shared object.

In the third generation of activity theory, the basic model is expanded to include at least two interacting activity systems. It has been increasingly applied by interventions in multi-organizational terrains of object-oriented activity because there are pressing societal needs for collaboration among divided communities. Figure 5 exemplifies the renegotiation and the reorganization of collaborative relations and practices between two communities involved. In Figure 5, the object moves from an initial state of unreflected, situationally given “raw material” (object<sub>1</sub>) to a collectively meaningful object constructed by the activity system (object<sub>2</sub>), and to a potentially shared or jointly constructed object (object<sub>3</sub>). The object of activity is a moving target, not reducible to conscious short-term goals (Engeström, 2001).

To identify activity theory in its current shape, Engeström illustrated the five principles (Engeström, 1999c). The first principle is that a collective, artifact-mediated and object-oriented activity system, seen in its network relations to other activity systems, is taken as the prime unit of analysis. Goal-directed individual and group actions, as well as automatic operations, are relatively independent but

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subordinate units of analysis, eventually understandable only when interpreted against the background of entire activity systems. Activity systems realize and reproduce themselves by generating actions and operations. The second principle is the multi-voicedness of activity systems. An activity system is always a community of multiple points of view, traditions and interests. The division of labor in an activity creates different positions for the participants, the participants carry their own diverse histories, and the activity system itself carries multiple layers and strands of history engraved in its artifacts, rules and conventions. The multi-voicedness is multiplied in networks of interacting activity systems. It is a source of trouble and a source of innovation, demanding actions of translation and negation. The third principle is historicity. Activity systems take shape and get transformed over lengthy periods of time. Their problems and potentials can only be understood against their own history. History itself needs to be studied as local history of the activity and its objects, and as history of the theoretical ideas and tools that have shaped the activity. The fourth principle is the central role of contradictions as sources of change and development. Contradictions are historically accumulating structural tensions within and between activity systems. The primary contradiction of activities in capitalism is that between the use value and exchange value of commodities. This primary contradiction pervades all elements of our activity systems. Activities are open systems. When an activity system adopts a new element from the outside (for example, a new technology or a new object), it often leads to an aggravated secondary contradiction where some old element (for example, the rules or the division of labor) collides with

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the new one. Such contradictions generate disturbances and conflicts, but also innovative attempts to change the activity. The fifth principle proclaims the possibility of expansive transformations in activity systems. Activity systems move through relatively long cycles of qualitative transformations. As the contradictions of an activity system are aggravated, some individual participants begin to question and deviate from its established norms. In some cases, this escalates into collaborative envisioning and a deliberate collective change effort. An expansive transformation is accomplished when the object and motive of the activity are reconceptualized to embrace a radically wider horizon of possibilities than in the previous mode of the activity. A full cycle of expansive transformation may be understood as a collective journey through the zone of proximal development of the activity, which means the distance between the present everyday actions of the individuals and the historically new form of the societal activity that can be collectively generated as a solution to the double bind potentially embedded in the everyday actions (Engeström, 1987).

#### **2.2.1.2 Boundary crossing and boundary object**

It is argued that in activity theory activity is organized in ways that require horizontal movement and boundary crossing. Activity systems need to interact in order to solve common problems or to coordinate perspectives (Star, 1989; Wenger, 1998). Thus, interaction and cooperation, or boundary-crossing, require common or complementary (at least partially shared) objects and goals. Tuomi-Gröhn et al. (2003) insisted that boundary crossing is a tool for promoting learning in different contexts. The contexts are neither containers nor situationally created experiential spaces:



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people' activity in a setting related to an arena itself is the context. According to Tuomi-Gröhn (2005), context is constituted through the enactment of an activity involving people and artifacts.

Engeström argued that the boundary-crossing activity is always two-way inter-actions; the relationship between them may be defined as cooperation. If only one community attempts to cross a boundary but receives no response from the counterpart, the action is incomplete and cannot be categorized as boundary crossing (Engeström, 2002a). The actions between these two communities should be characterized by mutual engagement and commitment.

There are three forms of boundary-crossing, and they are reification, participation, and a combination of both (Wenger, 1998). Reification refers to boundary objects, such as repositories, ideal types or platonic objects, terrains with coincident boundaries of forms and labels (Star, 1989; Star & Griesemer, 1989). Participation can take the form of brokering. Brokering means that people use their common membership in various activity systems to coordinate perspectives and to transfer ideas or to introduce elements of one practice into another (Wenger, 1998). The combining forms of reification and participation include boundary encounters, such as meetings, conversations and visits in the course of boundary-crossing, and practice. Practice is not a single or discrete event. On the contrary, it involves relevant activities engaged in over a longer period of time (Wenger, 1998). Different forms of practice can be distinguished: peripheries, boundary practice and overlaps. Peripheries refer to activity systems that offer people casual access to their own practice by letting

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them observe or engage in their activities. Boundary practices establish boundary encounters on a regular basis and build an ongoing forum for mutual engagement. Overlaps result from a direct natural and sustained overlap between two practices.

As shown in Figure 5, in activity theory the partially and potentially shared object<sub>3</sub> is the key factor that connects the divided communities. It is a boundary object, originally introduced by Star and Griesemer (Star & Griesemer, 1989). Boundary objects can be interpreted as mediating artifacts. Not every object is a boundary object. According to Star (1989), “boundary objects are objects that are both plastic enough to adapt to local needs and constraints of several parties employing them, and (they are) robust enough to maintain a common identity across sites” (p. 46).

Objects are only boundary objects if perspectives need to be coordinated (Wenger, 1998). Boundary objects serve as an interface between different communities of practice. It is important to point out that though shared by different communities as interface of practices, the understanding of the boundary objects can be different, or we may say, necessarily to be different. They are an entity shared by several different communities but viewed or used differently by each of them. As Star and Griesemer point out, boundary objects exist in organizational work because they necessarily contain sufficient details to be understandable by both parties; however, neither party is required to understand the full context of use by the other-boundary objects serve as point of mediation and negotiation around intent. Boundary objects are flexible enough to adapt to local needs and have different distinct identities in different communities, but at the same time they are “robust enough to maintain common

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identity across sites...They have different social worlds but their structure is common enough to more than one world to make them recognizable” (Star & Griesemer, 1989). Boundary objects are very useful to structure and frame a knowledge mapping project. When we identify and track boundary objects, we must be aware of issues around translation, closure, context, shared meaning. Boundary objects are not necessarily physical artifacts such as a map between two people: they can be a set of information, conversations, interests, rules, plans, contracts, or even persons. Engeström (1995) extends the notion of boundary object as an external representation to the effect that internalized cognitive artifacts, for example, the shared mental models can also be considered boundary objects. It is around boundary objects that communities of practice often gather. Boundary objects are used by members of different communities in very different ways, although the representation is shared. They are an important class of knowledge artifacts and center stage in the dynamics of knowledge exchange.

Boundary objects go across the boundary in the boundary crossing place. In this place, both groups negotiate norms, learning goals and working methods for systemic innovation. A special kind of this setting is that students can develop horizontal expertise across different subject domains and teaching skills in negotiation with their teachers. Boundary objects are forms of reification which coordinate the perspective of different communities of practice. They help groups to coordinate, but without “creating a bridge between the perspectives and meanings of various constituencies”. Often it is not easy to cross boundaries. Crossing boundaries “involves encountering

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difference, entering onto territory in which we are unfamiliar and, to some significant extent, therefore, unqualified” (Suchman, 1994). Obstacles to boundary-crossing can be such phenomena as groupthink (Janis, 1982) or fragmentation of viewpoints. The potential for boundary-crossing depends on several factors, such as the way boundary objects are used and whether they are communicated, discussed, and critically reflected by all involved parties (Engeström & Kärkkäinen, 1995).

In the cooperation between vocational education and enterprises, it is necessary to cross boundaries between schools and workplaces and their respective activity systems because both schools and workplaces share responsibility for fulfilling a common educational commission, and thus obliged to correlate teaching-learning processes. The correlation process requires teachers and trainers, as well as apprentices, to cross various boundaries either in the course of planning teaching-learning processes or in the course of learning itself: in planning the apprentices’ learning processes, teachers and trainers have to define objects/tasks, etc. which are interesting and important for both activity systems and could therefore initiate boundary-crossing. One can assume that the planning process first and foremost requires boundary encounters. One goal of the encounter could be developing boundary objects (such as repositories or ideal types) that are later used for the learning process in school or in the workplace and can be adapted to the needs of the activity systems, for example in a more situated or a more abstract way. In the course of their apprenticeship, students are members of several activity systems (departments, working groups, groups, courses, etc.). Thus, they have to cross

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different boundaries in order to cognitively combine different learning experiences and to form a holistic understanding of the subject matter. For the students, boundary-crossing occurs in all kinds of reification, participation or in combinations of both.

### **2.2.1.3 Expansive learning**

In his theory of learning, Gregory Bateson distinguishes three levels of learning. Learning I refers to the acquisition of the correct answers in the given contexts, such as students learn correct answers to mathematic questions in a classroom. Learning II happens simultaneously along with Learning I when people acquire the deep-seated rules and patterns of behavior characteristic to the context itself. For example, students learn how to behave a student: how to please the teachers, how to pass the exams, how to belong to groups, etc. Learning II may lead to Learning III if the participants in the learning context question the rules within the context and go against the rules and argue to construct a wider alternative context. Learning III is essentially a collective endeavor. As Bateson points out, “Even the attempt at Level III can be dangerous, and some fall by the wayside. These are often labeled as psychiatry as psychotic, and many of them find themselves inhibited from using the first person pronoun” (Bateson, 1972).

It is fair to say that in Learning I and Learning II, which correspond to Engeström’s standard theories of learning, subjects, including individuals as well as organizations, acquire identifiable knowledge or skills through which corresponding, relatively lasting changes in the behavior of the subject may be perceived. The

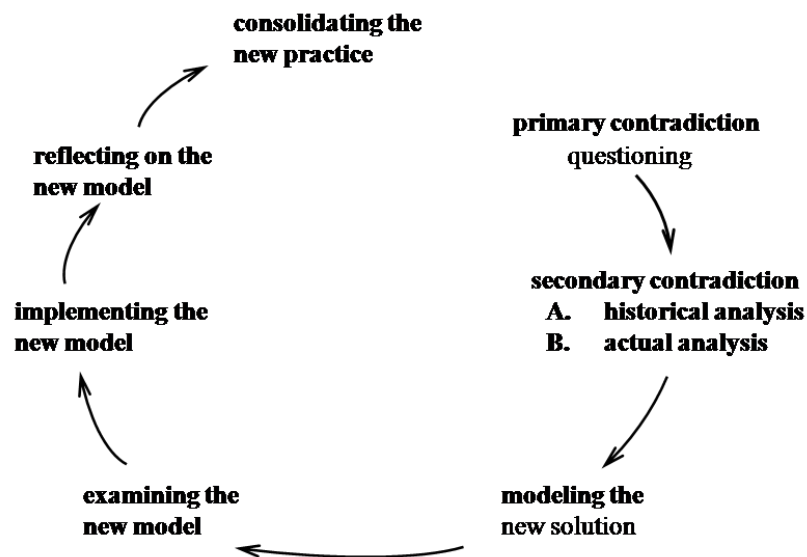
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subjects know what to learn because the knowledge that they intend to learn are stable and well-defined by a competent teacher who knows what is to be learned. The problem is that, as Engeström argues, most intriguing kinds of learning violate this presupposition. People and organizations are all the time learning something that is not stable, not even defined or understood ahead of time. In important transformations of our personal lives and organizational practices, we must learn new forms of activity which are not yet there. Since there is no competent teacher, the learning is literally learned as the learning itself is being created. Standard learning theories have little to offer if one wants to understand these processes.

Bateson's conceptualization of Learning III was a provocative proposal, not an elaborated theory. The theory of expansive learning develops Bateson's idea into a systematic framework. Learning III is seen as learning activity which has its own typical actions and tools. The object of expansive learning activity is the entire activity system in which the learners are engaged. Expansive learning activity produces new cultural patterns of activity and expansive learning at work produces new forms of work activity.

Expansive learning is initiated when some individuals involved in a collective activity take the action of questioning the existing practice. This can lead to an escalating process of debate and collaborative analysis of contradictions in the current state of affairs. A new form of activity within a projective modeling is set up in order to resolve the contradictions. The model and its implications are examined and implemented step by step in practice. This results in the consolidation and

proliferation of the new practice, and to reflective evaluation of the process. This is the cycle of expansive learning. Expansion happens substantively when subjects start to construct a more encompassing object for the activity. The activity is well organized; actually it is also the results of the interaction between the two object<sub>2</sub>s, which ends with the appearance of object<sub>3</sub>. Socially, expansive learning is carried out by recruiting a growing number of participants in the transformation effort. Engeström depicts the ideal-typical sequence of such actions may be shown as the in Figure 6(Engeström, 1999c):



**Figure 6.** Strategic learning actions and corresponding contradictions in the cycle of expansive learning.

In response to the challenges presented above, Griffiths and Guile suggest that learners must be supported to develop more future-oriented capabilities, such as seeing the limitations of existing forms of work practice and working with others to conceive alternatives. In addition, the challenge of preparing learners to relate different modes of knowledge and different contexts of learning to one another must

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be addressed (Guile & Griffiths, 2001). Attention must be paid to prepare young people to move between different types of work contexts and to relate formal and informal learnings.

In the cooperation between higher vocational institutions and enterprise, the expansive learning achieved enlightens the partners to reconsider or even renegotiate the cooperation in the near future. The significance of the expansive learning in the cooperation lies in the fact that it leads to the possibly sustainable cooperation.

### **2.2.2 Work experience**

According to Guile and Griffiths, work experience means the use of workplace in a way which supports learners to connect different types of knowledge, skills and experience. It covers apprenticeship as well as school-based programs. Work experience is highlighted in both general and vocational education because it is expected to “play a part in some way in supporting young people’s employability” (Griffiths & Guile, 2004).

#### **2.2.2.1 From six dimensions to see the typology of work experience**

Guile and Griffiths conceptualize the typology of work experience in general and vocational education in relation to six dimensions which are central to a consideration of how individuals learn through work (Griffiths & Guile, 2004):

- The purpose of work experience;
- The assumptions about learning and development (i.e. ideas about pedagogy and learning in workplaces);
- The practice of work experience (i.e. types of practice which facilitate learning



through work experience);

- The management of work experience;
- The role of the education and training provider (i.e. pedagogic strategies employed in vocational education to support students in learning);
- The outcome of work experience (i.e. forms of knowledge, skills of broader capabilities that students have developed).

Base on the above six dimensions, Guile and Griffiths categorize work experience into the following five type as shown in table 1 (Griffiths & Guile, 2004).

Model Dimensions	Traditional model	Experiential Model	Generic Model	Work process model	Connective model
Purpose of work experience	Bridge to work	Co- development between education and work	Key-skill/ competence assessment	Attunement to work environment	Reflexivity
Assumption about learning and development	Adaption	Adaption and self-awareness	Self- Management	Adjustment and transfer	Vertical and horizontal development
Practice of work experience	Managing tasks and instruction	Managing contributions Plus recording experiences	Managing action-plan and learning outcomes Plus managing situations	Managing work processes, relationships and customers Plus adding value for employer and supporting employability	Developing the connective practices Plus Entrepreneur- ial ability
Management of work experience	Supervision	Arm-length supervision	Facilitation	Coaching	Developing and resituating learning
Role of education	Provide: formal	Facilitate: briefing and	Build: Portfolio of	Support: reflection-in	Develop: Partnerships

and training provider	preparation program	debriefing for work experience	achievements	and on-action	with workplaces to create environment for learning
Outcome of work experience	Skill acquisition knowledge of “work readiness”	Economic and industrial awareness	Assessed learning outcomes	System thinking	Poly-contextual and connective skills

**Table 1.** A typology of work experience.

Table 1 shows the information of each type of work experience in details. In the traditional model, the bridge of work has a role for formal learning in acquiring knowledge and skills and work-based learning of tasks. The experiential model attempts to develop this traditional model further in response to the need for students to acquire specific knowledge and skills and more generic knowledge and understanding about the content of work. With the growth of interest in “key skills”, there is an attempt to develop an alternative to the traditional model which emphasizes the use of work-based experience to acquire and accredit learning outcomes, and this is the generic model. The work process approach is an attempt to address the omissions of the latter two approaches and to develop further the interface between the vocational school and the workplace. Finally, there is an interest in developing a connective model of pedagogy and learning in work-based contexts. This model integrates and goes beyond the principles of reformist, alternative and dualist models and makes a fundamentally different assumption about learning and development, accepting that all forms of learning are situated and involve the use of knowledge that may be external to the context.

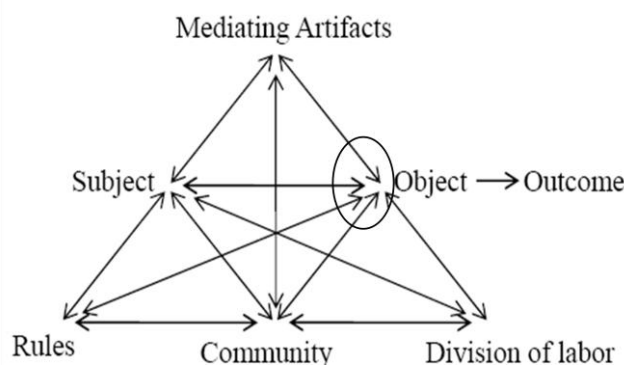
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Guile and Griffiths emphasize that these models of work experience are analytical rather than descriptive and have been formulated to identify the dominant assumptions about learning through work experience. The first four models reflect the influence of different economic, technological and social factors as well as different ideas expressed over the last two decades about learning and development through work experience in vocational education. The models reflect different periods of economic and technological development and changing educational ideas about the process of learning. It is important to point out, however, that no specific work experience program fits neatly into any of the models and some programs may contain elements of more than one model. The main purpose of these models is to reveal aspects of work experience to researchers, policymakers and practitioners which may otherwise remain obscure, perpetuating problems which need to be addressed. The fifth, connective model displays innovatory features which are relevant to future approaches to effective learning through work experience and provides a basis for different explorations.

#### **2.2.2.2 The practice of boundary crossing in vocational education**

In work experience, one of the main challenges is to learn how to cross the social and cultural borders between education and work. In the learning in formal settings, the goals of instruction are clearly stipulated, the learning processes clearly identified and educators' responsibilities for intervening to support learning clearly defined. However, in the process of boundary crossing, the form of learning in which individuals engage between education and work involves a process of horizontal

development, learning how to mediate between different forms of knowledge and performance in different contexts. The concept of boundary crossing provides a fresh perspective on the question of the knowledge and skill transfer between education and work. This implies that educators have to support learners to overcome the situated nature of their learning by supporting them to resituate that learning in the wider contexts of their formal program of study. The changes of context lead to the changes of identities and the changes of contexts themselves. The transition from education to work or from one work context to another are mediated by the extent to which learners can generate theoretical formulations which help them to connect the workplace they are about to enter and their formal program of study (and *vice versa*). For Engeström, the starting point of boundary crossing is to expand the concept of mediation, the idea that learners use artifacts to mediate their understanding of the object of any activity in which they are engaged, into a model that could be used to analyze learning in workplace or educational institutions – in his terminology, an activity system (Engeström, 1999b) (see Figure7).



**Figure 7.** An expanded concept of mediation in an activity system.

As shown in Figure 7, an activity system refers to a way of analyzing a specific

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community of workers who share a common object and motive over time in relation to the set of rules, division of labor and range of tools they share and which characterize their organization. It is regarded as a theoretical lens which allows us to train our gaze in different directions and different levels of magnification to help us answer the questions that concern us. According to Engeström, most approaches of learning are designed for classroom settings and can not deal with the problem of learners moving from education to work or from one work context to another. It is simply assumed that learners can guide their own activities in a variety of situations to acquire knowledge and skill. The assumption is less effective when trying to take account of the learning that occurs when individuals move between two contexts, such as education and work.

To cross boundary, learners should be supported to go beyond the limitations of traditional approaches of learning. They have to identify not only the location of the knowledge which they need to participate effectively in the traditions of practice but also how to question and transform the rules and division of labor which characterize an activity system if they are to work collaboratively to explore the possibilities of practice. This is only likely to be achieved if the problems that learners are asked to address are not preset by educators. Learners should be encouraged as well as supported to analyze problems and identify solutions for by themselves. This challenge leads to a radically new approach of learning defined by Engeström as “expansive learning” (see chapter two, 2.1.3). Engeström argued that individuals and groups should be supported to identify the contradictions within and between activity

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systems. This is the first step of expansive learning, the questioning of the existing forms of practice. The cycle of questioning, modeling, implementing and reviewing any proposed innovation is a form of “developmental transfer” (Tuomi-Gröhn & Engeström, 2003).

### **2.2.3 Why both activity theory and work experience are theoretically employed?**

Langemeyer argues that Engeström pays more attention to the learning processes that result in collective mastery of social issues and his ideas are to grasp learning in social rather than individual terms (Langemeyer, 2006). She also points out that both activity systems and individuals are involved in terms of the social contradictions in learning process, since individuals have to deal with the fact they are unable to resolve social contradictions, they have to figure out the compromise ways of behavior which “are likely to obscure the fundamental problematic” (Langemeyer, 2006). In my thesis, activity theory is employed to analyze the optional ways of cooperation in each case, in which the activity of the cooperative partners are investigated and analyzed. Activity theory focuses on how the subjects in each system cross the boundary in order to make the cooperation work, but it does not explain the concrete situation of the objects in activity systems. The further research on the performance as well as the concrete situation of the objects is mainly theoretically supported by Guile and Griffiths’ work experience, through which the cooperation between higher vocational education institutions and enterprises can be analyzed indirectly due to the six dimensions of work experience. By employing both activity theory and work experience, the cooperation between higher vocational institutions

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and enterprises are researched not only through the aspects of the cooperative partners, but also through the aspects of the objects, which made the cooperation possible and tied the cooperative partners together. The research on the objects can be, to certain degree, the sound verification of the cooperation.

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## Chapter 3

### Methodological framework

#### 3.1 Introduction

This chapter outlines the methodological framework of the research that forms the basis of this thesis. It begins with a reminder of the aims of the research, before moving to a discussion of the suitability of the case study approach, in which the selection of the cases is discussed in details. To make sure the feasibility of the study, the pilot test was conducted and validated. In the three cases, both qualitative and quantitative approaches are employed to gather data. Then the status of data is discussed and finally, the summary is made.

As mentioned previously, the research upon which this thesis is based is principally concerned with analyzing the ways of cooperation between higher vocational institutions and enterprises in northeastern China. In other words, the study focused on the roles of the vocational institutions, their enterprise partners, and their students played in the cooperation. Using Engeström's activity theory and expansive learning, the roles of higher vocational institutions and enterprises are analyzed. Using Guile and Griffiths' work experience, the performance of students in the workplace is analyzed. This research is carried out in three higher vocational institutions and their enterprises partners in the northeastern area of China. This area underwent a series of deconstruction and reconstruction of the industrial bases recently and consequently led to the reformation of vocational education, through which technicians with updating technology are trained. The research explores the



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different ways of cooperation chosen by the vocational institutions and enterprises and the extent to which the cooperation carried on. In addition, acting as the connecting point in Dinggangshixi, students' performance was studied and analyzed in order to see the essence of the compulsory way of cooperation between higher vocational institutions and enterprises.

### **3.2 Case study**

Robson (1993) argues that case studies provide “a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context”. In my research, three higher vocational institutions in northeastern China were chosen as cases to understand their ways of cooperation with enterprise partners. According to Stake (1995), these three cases are instrumental cases (instead of intrinsic case, which means it is given and needs to be learnt without choice) which serve as instrumental devices to understand the cooperative situations between vocational institutions and enterprises in this area.

The northeastern China includes three provinces, and the researcher chose three higher vocational institutions, one from each province. As Stake argues that the first criterion for the selection of cases should be to maximize what we can learn from them. If we can, we need to pick cases which are easy to get to and which are hospitable to our inquiry, perhaps for which a prospective informant can be identified and with actors (the people studied) willing to comment on certain draft materials. Meanwhile, the representative characteristics should also be taken into consideration and balance and variety are important. The researcher started with “Is there any higher

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vocational institution trying to deal with their cooperation with enterprises in an interesting way?” Several came to mind and the researcher started to get in touch with them. One vocational college in Liaoning Province claimed that the timing was inappropriate because they were under the every-four-year evaluation from the Ministry of Education. The inaccessibility made the researcher to consider the characteristics of the rest colleges. There is one in Jilin Province, which has gone through lots of reformations and recently just been localized due to its specialties relevant to the local industry- autos. The one in Heilongjiang Province has diversified specialties and develops lots of Dingdanpeiyang classes. However, these diversified specialties include fewer social science specialties, which is the weak point of vocational education. The researcher asked the questions such as “Is there a higher vocational college with many social science specialties? Is it hard for students to find place to conduct Dinggangshixi”? These questions led the researcher to the vocational college in Liaoning Province, and of course, there was no problem with accessibility. Then the three cases are settled as mentioned previously, one in each province. The one in Jilin Province has close connection with company F (the biggest automobile manufacture), the one in Liaoning Province has diversified specialties, especially social science, and the one in Heilongjiang Province developed many Dingdanpeiyang classes. In this way, both uniqueness and different contexts of the cases are considered and balanced.

### **3.3 Pilot test**

Ary et al (1990) states that trial run or pilot study will help the researcher to

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decide the study is feasible and whether it is worthwhile to continue. It provides the opportunities to access the appropriateness and practicalities of the data collection instrument.

The pilot test was conducted in a vocational college in Jilin province. Relevant documents and materials concerning the previous cooperation between this college and its partners were collected from the college faculties. The documents as well as the materials point to the interviews among the faculty members and the enterprise staff, through whom the unidentified information in the documents and materials is elaborated. The semi-structured interviews were conducted among 5 faculty members and 4 enterprise staff. The students' role in the cooperation was investigated through questionnaire. A set of standardized questionnaires were developed. The questionnaire is comprised with three parts. The first part is about personal information. Variables are age, gender, major, duration of the work in workplace and planned post-school destination. The second part is their performance in workplace, and the third part is about the links between their school study and workplace learning. The SPSS (statistical package for the social science) software was applied to measure the validity and reliability of the survey instrument. The Cronbach Alpha values are 0.865 and 0.832 for the two parts involved in the survey, which indicate the reliability of the test is quite high.

### **3.4 Data gathering**

Silverman (2000) suggests that fitness for purpose is an important consideration when selecting research tools. The chosen methods should help in addressing the

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chosen research topic and in addition, the “analytic position” must be “appropriate” to the “practical concerns”. In my research, both qualitative and quantitative approaches are employed to analyze the roles of the higher vocational institutions, enterprises, and students in the cooperation. The qualitative approach includes document analysis, semi-structured interview, on-site observation, and the quantitative approach refers to questionnaires delivered to students.

#### **3.4.1 Qualitative approach: document analysis, interview, on-site observation**

The qualitative or interpretive approach, broadly defined, means "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification" (Strauss & Corbin, 1990). It explores the richness, depth, and complexity of phenomena which deal with human perception, action and interaction, and recognizes the “immense complexity of human nature” (Cohen, Manion, & Morrison, 2003). It allows the researcher to study the ways in which people interpret and represent particular situations and provides an opportunity to probe social meanings. All in all, qualitative research searches for understanding the complex interrelationships among all that exists. In my thesis, the qualitative approach is applied to the first part of each case while the aim is to learn the roles that the vocational institutions and their enterprise partners have played in their optional ways of cooperation, which involves complex interrelationships. The research is done thoroughly in order to have a panoramic view of the cooperation. Data are mainly collected by document analysis, interviews, and on-site observations. Document analysis refers to the analysis of the basic information of the cooperative partners

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(vocational schools and enterprises), materials concerning the previous cooperation, policies issued by the central and local governments, etc. By analyzing the above-mentioned written and visual materials, the general situation of the cooperation was clearly presented. Since interview is well-known for its flexibility in collecting in-depth information, the unidentified issues foregrounded in the materials were categorized into groups of questions for the following semi-structured interviews conducted among the faculty members and staff from enterprises who are relevant to the cooperative programs. Interviews were also conducted among students who volunteered to further clarify and elaborate the questions from the questionnaires. The on-site observations were conducted during the faculty staff meetings on the execution of the cooperation and students' performance in their workplace due to the fact that on-site observations bring the researcher closer to the actual steps, techniques, and procedures compared to the interview.

### **3.4.2 Quantitative approach: questionnaire**

As Stake argues, quantitative research searches for an explanation. The quantitative approach is to determine the relationship between one thing (an independent variable) and another (a dependent or outcome variable) in a population. In this aspect, students' performance in workplaces during Dinggangshixi is expected to be depicted in details through questionnaires. The standardized questionnaire is designed after Guile and Griffiths' six dimensions of work experience. It includes three parts. The first part is about students' personal information, including age, gender, major, duration of the work in workplace and planned post-school destination.

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The second part is their performance in workplace, and the third part is about the links between their school study and workplace learning. Altogether 700 questionnaires were delivered in three higher vocational institutions and 645 are valid. The SPSS (statistical package for the social science) software was applied to measure the validity and reliability of the survey instrument.

The above-mentioned qualitative and quantitative approaches tend to reveal not only the roles of two activity systems, i.e. higher vocational institutions and their enterprise partners, but also the roles of students who acted as “shared objects” in the cooperation. There were many other research methods that could, in principle, have been selected in pursuit of answers to the research questions but these methods were ultimately deemed less suitable. For instance, information about students’ participation in Dinggangshixi could have been readily obtained from each vocational institution. Instead of doing so, the researcher distributed questionnaires to students who have participated in Dinggangshixi to get first-hand materials due to the consideration of the validity of the information. Since Dinggangshixi is an important item in the every-four-year assessment from the Ministry of Education, there might be the possibility of exaggerating the good aspects and problems might be blurred. Practical constraints also led to the rejection of certain methods. It was not feasible to expect that key members of staff could be gathered together for a focus group discussion within a case study institution. This would represent a considerable cost to the institution, particularly where participants were at a senior level within the organization. This information was most readily available via detailed analysis of

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documents (such as prospectus documents, cooperative strategies etc.), first-hand observation and in-depth interviews with key members of staff.

### **3.5 The status of data**

Even where a strong theoretical framework is used to guide the research, there are still many questions about the epistemological status of the data gathered. There are well rehearsed competing views, for instance, about interview data. Ethnomethodologists reject the idea that data pre-exist. They see the interview as a two way sense-making process, rather than as “time out” from the social world (Baker, 2002). Similarly, constructionists see the interaction of the interview as a topic in its own right. Positivists seek an objective truth from interviews, whilst emotionalists are interested in gathering “authentic accounts” (Silverman, 2001). Gudmundsdottir draws attention to the ways in which the interview process can distort the reality that respondent is trying to express. She suggests that there is no “one to one” correspondence between the reality that respondents are trying to express and their actual words: “interpreters” of data apply their own interpretations to the information, so that the information is being continually distorted (Gudmundsdottir, 1996). This is true of observational work and documentary analysis, as well as of interviews. There is no way of knowing whether the interpretation is accurate. This leads what Gudmundsdottir calls “an endless hall of faulty mirrors”. Indeed, Kvale suggests that “recognition of the pervasiveness of interpretation throughout an entire interview enquiry may counteract a common overemphasis on methods of analysis as the one way to find the meaning of interviews” (Kvale, 1996). This suggests that there are

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many ways in which the data can be read and it is, therefore, important that researchers are explicit about the status that they attach to the data. The reading of the interview data within this research project is informed by Miller and Glassner (Miller & Glassner, 2004), who suggest that data gleaned from interviews will only ever be partial because the story is told with a particular audience in mind. Miller and Glassner argue that the story may have taken a different form if someone else were the listener and they highlight the idea that the interviewer can impact on the narrative, either by appearing too deeply committed, or as too distant, from the interests being expressed. An awareness of this is therefore critical when carrying out and analyzing interviews. However, despite their provisos, Miller and Glassner maintain that interviews are nonetheless capable of offering insights into the worlds experienced by interviewees. This awareness should also be applied to observational work, where the message and interactions that are observed are directed at particular audiences. This leads to the situation in which perception of audience heavily influences the nature of the message.

A number of researchers have drawn attention to the fact that interviews are “socially structured accounts” and this further impacts upon the status of the data (Prior, 2003). It is therefore important, as a researcher, to recognize that there is no “truth” to be found. The best that can be hoped for is that the interviewee responds to questions in a way that accurately reflects his or her thoughts, feelings and perceptions of a situation at a given time. Walker suggests that to the case study researcher “...what seems to be true is more important than what is true. For the case



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study worker as opposed to the psychometrician, the internal judgments made by those he studies, or who are close to the situation, are often more significant than the judgments of outsiders” (Walker, 1986).

Therefore, when analyzing the interview data that has been gathered in the course of the cases, a narrative rather than realist approach is applied. In keeping with Miller and Glassner, this involves seeing the answers that respondents give as cultural stories, possessing ecological validity, rather than as a window on the “truth”.

### **3.6 Summary**

All in all, the combination of qualitative and quantitative can provide a richer contextual basis for interoperating and validating results (Cook & Campbell, 1979). Collecting different kinds of data by different methods from different sources provides a wider range of coverage that may result in a fuller picture of the unit under study than would have been achieved otherwise (Bonoma, 1985). Moreover, using multiple methods increases the robustness of results because findings can be strengthened through triangulation-the cross-validation achieved when different kinds and sources of data converge and are found congruent ( Benbasat, Goldstein, & Mead, 1987) or when an explanation is developed to account for all the data when they diverge (Trend, 1979).

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## Chapter 4

### Case studies: analysis and results

According to the Ministry of Education in China, higher vocational education distinguishes itself from general higher education by its closer connections with its partner enterprises. The connections can be further explained as the cooperation through which higher vocational institutions and their enterprise partners get co-developed. This Chapter presents the findings and analysis derived from the synthesized quantitative and qualitative data through document analysis, interviews, on-site observation, and questionnaires. The research is located in three higher vocational institutions and their enterprise partners in three cities in northeastern China, i.e. Changchun, Shenyang, and Harbin. Theoretically supported by Engeström's activity theory and expansive learning, work experience, in each case both the optional and the compulsory (Dinggangshixi) ways of cooperation are analyzed in details.

#### 4.1 TQP and Dinggangshixi in Institute A (Changchun)

##### 4.1.1 TQP

This section is intended to give an overview of the case study on TQP, which falls into the range of Dingdanpeiyang pattern and is characterized by the intensive partnership among Company F, its franchised dealers, and the Institute A. This case study began with a series of exploratory interviews with key informants, backed up with desk research into the executive reports documented the conduct of this program. After this preparatory work, the researcher visited the department of human resources

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of Company F, its accessible franchised dealers, through which detailed information was obtained. Later on 16 two-hour semi-structured interviews were conducted among the institute faculties who involved in this program, and all these interviews were audio recorded with the permission of the interviewees. The transcripts were interpreted, analyzed, and finally conclusions were made.

Initiated by Company F, TQP, the acronym of “technician qualification program”, aims to assist Company F’s franchised dealers to recruit auto professionals, especially technicians and after-sales assistants, by making full use of the resources of vocational education in the institute with the supervision of Company F. Started by the company, the whole program includes two parts, “the pal program” and “the selection program” with the former as the core of the whole. “Pal” here refers to Company F, its dealers and the institutes bind together like pals to work this program out. The goal of the program is designed that within 5 years, 5300 graduates specialized in auto services and techniques will be trained in 5 pal institutes of Company F, Institute A in Changchun is one of them, and recruited by franchised dealers located in Changchun, Beijing, Chengdu, Shanghai and Guangzhou respectively. Thus the essence of this program is that Company F helps its franchised dealers train and recruit qualified employees from the institutes, who have great potential yet should-be-trained accordingly employees (Luo, 2009). Based on this goal, the responsibilities of participant partners, i. e. the dealers, Company F and the institutes were drafted out. The partnership among the three connected partners can be understood as expansive learning developed within the frame work of cultural-historical activity theory.

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As Engeström suggested, any activity of learning must answer at least four central questions (Engeström, 2001):

- Who are the subjects of learning and how are they defined and located?
- Why do they learn, what makes them make the effort?
- What do they learn, what are the contents and outcomes of learning?
- How do they learn, what are the key actions or processes of learning?

The above-mentioned four questions will be answered step by step by examining the partnership among Company F, its pal Institute A and its franchised dealers during the execution of TQP (Technician Qualification Program).

#### **4.1.1.1 Who are the subjects and why do they learn?**

Company F is the first modern passenger sedan industrial base in China. Founded in 1953, now it has 46 subsidiary companies, among which 28 are wholly owned subsidiaries and 18 are partially owned ones (controlling interest). In addition, Company F has three manufacturing bases in northeast, north, and southwest China respectively. As an automobile manufacturer, the company's total assets are valued as 109.85 billion Yuan (14.27 billion US \$). Through continuous expansion, Company F has become a company with 133,000 employees around the world, a daily production capacity of over 1000 motor vehicles with additional capacity for export of assembled vehicles, power train and component parts.

It was estimated that the company has altogether 320 franchised dealers and the sales were up to a record of 1200 pro year for each franchiser in 2008 (Shen, 2009). A franchised dealer is defined as an automotive dealer which sells a particular brand as

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well as provides service for this brand vehicle. The franchised dealership system is the independent link between the manufacturer's assembly line and the consumer. Experts point out that nowadays franchised dealers lead from the front of the auto industry---lifeline or lifeblood of the automakers'. According to CASESA SHAPIRO GROUP, far from being a burden to the manufacturer they represent and support the manufacturer's efforts by providing a vast distribution channel that allows for efficient flow of the manufacturer's products to the public at virtually no cost to the manufacturer (2008). The relationship between dealers and manufacturer is mutually beneficial. As an extension of the manufacturer, franchised dealers serve as the link between the assembly line and the consumers. Though not owned by the manufacturer and self financed, the dealer body is a critical asset to auto manufacturers. The dealer's significant investment allows the manufacturer to spend its resources on research and development of product while the dealer spends its resources on sales, marketing, and customer handling. Each group benefits from the other and neither could afford all the expenses of the total value chain.

The brutal competition in auto industry has entered into a new era in China, which blurred the clear-cut roles between manufacturer and the dealers. According to *China Industry Report Research*, the so-called post-competition characterized by increasing demand of auto experts and technicians who play more and more important roles in the sales market and after-services, makes the aftermarket service a strategic imperative(2009, July). Some manufacturers, keen to compete in the face of difficult economic headwinds, are focusing on help dealers improve the quality of their

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post-sales services to enhance customer satisfaction, while others are moving aggressively to turn post-sales service into a profit center. All dealers are aware of the fact that professionals are the core of the services and after-services, who help keep the old customers and dig out the potential ones. This is what most of the dealers demand besides policy and economic supports from manufacturers, and this will decide the sales and services at the final market.

Locating close to the Company F area, the institute was founded in Changchun by the company in 1978 and solely financial-supported by Company F till 2000. The majors in this institute are mainly about the maintenance and repair of autos, auto trade, and logistics, etc. Till 2000 altogether 10297 graduates became Company F's employees. In 2000, after being merged with four other institutes from the company, which was initiated by Company F due to the reconstruction and reformation within the factory, the institute became a branch of the company inwardly and a socially independent institute outwardly, with the agreed financial compensation in the following consecutive 3 years from the company to the institute, each year decreasing from previous year. It is reported that none of the graduates got hired by Company F in this year. For the institute, who has enjoyed the comparatively high employability so far due to its historical relationship with the company, whose students mostly major in auto techniques, lower employability will inevitably lead to the decrease of the student enrollment. It is under this circumstance that the linkage of Company F, its dealers and Institute A becomes visible.

#### **4.1.1.2 What do they learn?**

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As analyzed above, the learning contents of each partner is pretty obvious:

- For Company F, how to help its franchisers recruit skilled professionals from the Institute A in order to enhance their services?
- For the franchised dealers, how to get the professionals from Institute A, who should master the brand knowledge of cars theoretically and possess well-trained practical skills?
- For Institute A, how to get its students theoretically and practically trained and finally get employed?

#### **4.1.1.3 How do they learn, what are the key actions or processes of learning?**

##### **4.1.1.3.1 Job fair --a trial**

Documents show that a job fair, being sponsored by Company F and joined by its 25 dealers, precluded this program. There were 358 intern positions widely open to 200 graduate visitors who were solely trained and disciplined by Institute A. Faculties from the institute argued that this so-called job fair in 2007 was actually a trial of the ability of the academic products of this institute - the graduates, as well as the partner, the institute, to test out the practicability of this program. The intern recruitment ratio was 42.5%, that is, 85 graduates were recruited as first group interns by dealers. This number gave the partners, especially the dealers, credit for the feasibility of this program. Doubts were cleared up and actions were undertaken to bring rules and principles into force.

##### **4.1.1.3.2 Committee of dealers**

Based on the long partnership and located as geographical neighbors to each other,

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both Company F and Institute A figured out the responsible departments of TQP even before the program was drafted out. In Company F, it is personnel from human resources in charge of this program. As initiator of this program, they act as facilitator who informs and bridges the other two partners. Meanwhile, they serve as after-sales consultants of Company F's franchised dealers from all over China. In Institute A, the responsible counterpart is the dean's office of the department of auto engineering, due to the fact that this department gathers the most sophisticated faculties and practical majors.

Suggested by the above-mentioned two agencies, a committee of Company F's franchised dealers was set up to assume full responsibilities and to speak for all dealers' wills and decisions for this program. 320 franchised dealers were represented by 18 advanced managers, that is, one represents all dealers from one province, as the 320 dealers are located in 18 provinces of China. It is important to point out that this committee quickly got close connection with its counterpart in Company F, who acts as consultants of skills, services and policies for all dealers as mentioned previously. The establishment of this committee simplifies and quickens the process of communicating and negotiating among three partners and leads to better execution of this program.

#### **4.1.1.3.3 Adjustments and reformations**

The executive process of TQP mainly focuses on *how to train the students according to the requirements of the dealers*. Adjustments and reformations were undertaken by the three partners in order to get the program better executed, including



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laying down and revising required skills by the committee of the dealers, improving the student training by Institute A and Company F, and enhancing the capability of the faculties and staff by Company F and the dealers.

**a) Laid down and revised required skills**

As the terminal of this program, i.e. final employers, the committee of dealers outlined the skills and qualifications that their expecting employees should possess, including theoretical knowledge of auto structures, body design, electrical devices and chassis; awareness of the dealer's business process of the after-services; command of the general and professional instruments, mastery of car care and beauty of all brands of Company F; ability to disassemble and assemble engines and transmissions, and diagnose breakdowns, etc. Requested by Company F and the pal institutes, the committee put the above-mentioned skills into a report, which was delivered both to Company F and Institute A. This report was severely criticized by faculties and staffs from the institute, who argued that some of these skill demands were irrelevant to their academic syllabi, and it is impossible for the institute to take huge change at once, because as a vocational institute, first and foremost, academic duties and responsibilities must be fulfilled. In the interview of faculties, some of them pointed out that the institute was cornered and put into a passive position since the program got started.

The argument was weakened since news is come to the institute that 61 out of the 85 interns recruited by the dealers got their official contracts after six months. The other 24, who complained about low salary and poor management of the dealers, plus

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not used to the local customs (most students are from northeastern parts of China), left for another Japanese manufacturer and a subsidiary of Company F in Shenyang (a city in Liaoning Province). All in all, dealer employers are satisfied with the recruitment of the first group students. Suggestions and advices were sent to the committee from dealers, indicating that skill demands should put more emphasis on hands-on experiences on campus even before on-the job training.

Due to the dissatisfaction of Institute A and the request of dealers, the committee revised the required qualifications by highlighting hand-on experiences, proficiency in dealing with automobile malfunction, including skills of testing, diagnosing, and repairing automobiles. Besides, effective communication with workmates and customers and professional accountability were also demanded.

#### **b) Student training**

Student training plays an important role in the adjustments and reformations. It consists of the organization of F Classes, course adjustment, and construction of the training center.

##### **● Organization of F Classes**

The required skills and qualifications from the committee served as references both to Company F and Institute A. Being well-informed about these requirements and after detailed discussion with Company F, the institute decided to organize special classes for this program annually. The dean of department of auto engineering said that this is a compromise between what the dealers have demanded and what the institute could offer. To honor the involvement and support of Company F, these classes are entitled

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as “F Classes”. Students enroll in “F Classes” should meet the demands listed by the institute:

- Healthy, regular-featured
- No failure in any courses, excellent scores will be preferred
- No violation penalty records
- Hard-working, communicative and expressive

Meanwhile, students must go through interviews conducted by experts from Company F’s human resources, who are in charge of this program as mentioned above. These interviews tend to make sure that both the students and Company F get general impressions of each other, though they are not employees and employers to each other. The first group of “F Class” consisted of 4 classes with 145 students, among whom 130 were sophomores and 15 were juniors. Since students in this institute are required 6 semesters, i.e. three academic years altogether to finish their study, the 130 sophomores have two academic years left and the rest 15 juniors have just one academic year. It is required that as members of “F Classes”, students must attend their classes, finish assignments and take exams as regular students do. Additionally, some extra courses, including engine, chassis, electrical devices, car care, testing and repair of automatic transmission, which were co-developed by experts from Company F and faculties from Institute A, should be attended. After these extra courses are finished and exams are taken, there might be possible chances for students to work in Company F’ dealership as contracted interns as in the job fair of July 2007. After six months’ internship, they will be recruited as official employees before or upon

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graduation provided that the dealers are satisfied with their performance.

The organization of “F Class” was highly praised by Company F and the dealer committee. But after examining the files of these students, the committee suggested that it might be better if the next group of “F Classes” all be freshmen, who have more flexible time to adopt themselves to the training schedule compared with sophomores and juniors. In addition it complicates the dealers’ work to figure out who could be hired immediately after their interns and who have to go back to school to finish their study if interns are from different grades. This advice was taken into consideration by Institute A. The second group of “F Classes” were composed of 200 freshmen specialized in automotive testing and repair, automotive electric technology, and automotive services and sales. It is worth to mention that in September 2009, instead of the faculties from the institute, personnel from Company F, who acted as interviewers for the first two groups of “F Classes” and after-sales consultants of dealers, became the organizer of “F Classes”. It was explained that there are two reasons for the change of the organizer. One is that the transfer of the institute to the local government in June, which made experts from vocational education assume that the cooperation between Company F and Institute A will be weakened since the institute is owned by the local government from then on. To prove this assumption wrong the organizer is being changed. The other reason is that most TQP teachers in this academic year will focus on developing new teaching materials, through which course adjustments will take a further step.

- **Course Adjustment**

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The new course plan was elaborated with course description, which is mainly carried out by experts from Company F, who co-evaluated the current courses with faculties from Institute A in order to meet the skill requirements of dealer committee. The new course plan emphasized course types rather than course contents as special auto knowledge and hands-on experiences is required by dealers. The ratio of each course types is as the followings:

- Basic courses 25%
- Specialized courses (auto structure of Company F, including engine, chassis, electrical devices, car care, testing and repair of the automatic transmission) 45%
- Internship in the dealership 30%

But this new course plan was not brought into action due to the preparation for separation of Company F's social functions. From 1995 on, Chinese central government started separating social functions from enterprises. The social functions of enterprises refer to the institutions and faculties built by enterprises, such as schools and hospitals, which are financially attached to the enterprises. The so-called separating social functions from enterprises mean to unload responsibilities and burdens of enterprises by transferring these attached hospitals, schools to their corresponding local governments. The original school of this institute was built by Company F, later was merged with four institutes in 2000. In 2005, Company F was categorized into the second group of enterprises whose social functions should be separated within 3-5 years. 2008 was a tough year for Institute A, since in this whole year, lots of assets and evaluations were enforced in order to prepare for the total

separation of Institute A from Company F. It was reported that the official transfer took place on 9<sup>th</sup> June 2009, and since then the institute becomes an institute of the local government, i.e. Changchun city, instead of being attached to Company F.

The real course adjustment got started after Company F became the organizer of “F Classes”. The training schedule was updated and became comparatively systematic.

The following table elaborated the training schedule:

Time	Contents	Trainers	Place
September, 2009	Publicity and organization of F classes	Trainers from training team of after-sale services from F	Science and technology museum
10 <sup>th</sup> December 2009(Thursday)afternoon	History and culture of F	Trainers from training team of after-sale services from F	Science and technology museum
24 <sup>th</sup> December 2009(Thursday)afternoon	Present and future of F’s after-sale service systems	Trainers from dealers	Science and technology museum
7 <sup>th</sup> January 2010(Thursday)afternoon	Fault features of JETTA and its repair cases	Trainers from dealers	Science and technology museum
18 <sup>th</sup> March 2010 (Thursday)afternoon	Fault features of JETTA and its repair cases	Trainers from dealers	Science and technology museum
25 <sup>th</sup> March 2010 (Thursday)afternoon	Structural features of Sagitar, tips for driving	Trainers from training team of after-sale services from F	Science and technology museum
8 <sup>th</sup> April, 2010 (Thursday)afternoon	Fault features of Sagitar and its repair cases	Trainers from training team of after-sale services from F	Science and technology museum
6 <sup>th</sup> May, 2010 (Thursday)afternoon	Structural features of Magotan, tips for driving	Trainers from training team of after-sale services from F	Science and technology museum
13 <sup>th</sup> May, 2010 (Thursday)afternoon	Automotive BUS, Fault features of Magotan and its repair cases	Trainers from training team of after-sale services from F	Science and technology museum
20 <sup>th</sup> May, 2010 (Thursday)afternoon	Repair of new type engine and automatic transmission of F’s cars	Trainers from training team of after-sale services from F	Science and technology museum

**Table 1.** Training schedule.

Table 1 is part of the training schedule for specialized courses, which take the proportion of 45% of the “F Class” courses. It is noticeable that the trainers are either

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from the dealers or from Company F. Trainers from the dealers act as the instructors of the latest knowledge of several brand cars and practical cases. The rest of the courses will be conducted by trainers from Company F. The instructors from Institute A will focus on the basic courses. Meanwhile, TQP teachers are assigned to edit new teaching materials in order to meet the needs of modularized course by co-working with experts from Company F and dealers. The major subjects of these teaching materials focus on:

- Characters and car care of F's cars
- Diagnostic kit of F's cars
- Engine testing and repair of F's cars
- Manual transmission testing and repair of F's cars
- Automatic transmission testing and repair of F's cars
- ABS, ASR/ TCS, ESP
- Testing and repair of steering systems of F's cars
- Electrical systems overhaul of F's cars
- BUS of F's cars

The above-mentioned 9 subjects will be finished by 16 TQP teachers, among whom 4 are instructors, 5 are assistant professors and 7 are professors. The deadline for the publishing of these materials is the end of March 2010.

Besides taking extra courses, "F Class" students are also expected to attend seminars hosted by experts from dealers, twice a month on different specialties. These seminars serve as supplementations to the main courses and to help students be fully exposed to the latest techniques in the automotive industry. The topics of the seminars include:

- Automotive testing: Basic Automotive Systems, after-sales management

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- Automotive technology: financial management, customer relationship management, auto sales, after sales
  - Automotive electricity: automotive technology, automotive SCM technology (Single-Chip Microcomputer)

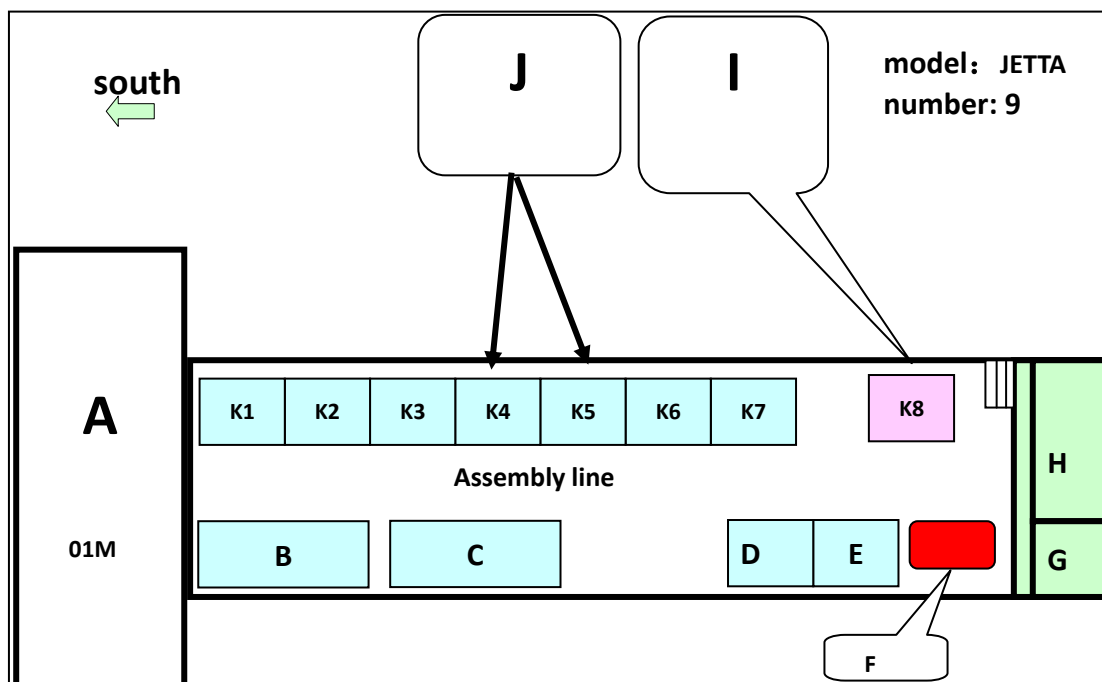
The academic atmosphere in the institute was enriched by all kinds of contests, which were held in different departments regularly by student volunteers. Most of these contests focused on automobile fundamentals, repairing skills, etc. The department of auto engineering hosted a speech contest titled “My Career, My Life” when the second job fair was around the corner. 145 students from “F Classes” and more than 500 regular students attended this contest. Leaders from Company F and managers from dealers were invited to be judges. After two rounds of competition, 6 students from “F Classes” came to the final and they were asked by the judges to deliver impromptu speeches after they drew lots for their specific topics on their career design. It was exciting both for the contestants and the judges, and the speeches were interrupted frequently by the dealer judges, who regard effective communication with workmates and customers as an indispensable qualification of their potential employees. As the dealers later said, this was a good chance for them to preview the speech talents of the students.

#### ● **Construction of the training center**

As major supervisor of the program and as promised, Company F provides all necessary support to the institute, such as training consumables, training materials, tools, equipments, etc. Though there are several labs and a training center in the



institute already, the instruments, tools and machines should be updated. Since hands-on experiences could not be emphasized more by dealers, after numerous investigations discussions and negotiations among partners, a new training center for students was blueprinted by experts both from Company F and Institute A and started to be built up. The final draft of the training center is as Figure 1:



- A--- The work line of automatic transmission testing and repair
- B--- Disassemble and assemble of transmission ASSY
- C--- Dissemble and assemble of engine ASSY
- D&E --- two-column lift
- F--- Fire protection system
- G--- Teachers' foyer
- H--- Multimedia classroom
- I--- Station for testing: scissor lift, 4-wheel aligner, emission analyzer, trouble detector
- J --- Station for lifting: engine ASSY, front and rear axles, wheels
- K 1-K 8 --- stations

**Figure 1.** Final draft of the training center.

The construction of the center is supervised by experts from Company F and Institute A. According to the information, this training center will be finished in 2010

and up to now 9 model cars (Jetta) have been put into use for teaching and training. This training center will be accessible to all students from the institute. It will be a training base for students before they start their on-the-job trainings outside the campus.

**c) Faculty and staff training**

The sub-program “Training the Trainers” was launched in order to ensure TQP teachers in the institute qualified enough for ‘F Classes’ and to keep up with the latest technology. 11 senior engineers from Company F went to Institute A regularly and acted as lecturers of 16 TQP teachers. As mentioned previously, among these 16 TQP teachers, 4 are instructors, 5 are assistant professors and 7 are professors. The engineers gave lectures on the latest technology in different subjects, such as engine performance, chassis system, and electronics. The first round of training turns out to be very successful and the second round is carried on in Changchun, Beijing, and Dongguan. See the table below.

Time	Training content	Trainer	City	Trainee
October, 2009	New cars Engine, chassis, electrical systems BUS	Trainers from training team of after-sale services from F	Changchun Beijing Dongguan	8 teachers from auto engineering department
December, 2009	Co-training with students from F classes			8 teachers from auto engineering department

July-August, 2010	New cars Engine, chassis, electrical systems BUS	Trainers from training team of after-sale services from Company F	Changchun Beijing Dongguan	8 teachers from auto engineering department
August-December, 2010	Co-training with students from F classes			8 teachers from auto engineering department

**Table 2.** Training the trainers.

Table 2 is a training schedule for the teachers from the institute. Clearly this training schedule aims to improve the specialized knowledge of the teachers. It is also noticeable that in this schedule, there are chances for teachers and students to be co-trained by experts from Company F.

#### **4.1.1.3.4 Meet-and-greet and video interview**

The above-mentioned adjustment and reformation, including laying down and revising required skills by dealer committee, students training, and faculty and staff training, aim to get students better trained by qualified teachers as required by dealers. The meet-and-greet, hosted by Company F and participated by “F Class” students and dealers from all over China, set up a stage through which students meet their possible employers who select their interns out of student participants. The meet-and-greet was warmed up by dealers’ employees, who graduated from this institute and were hired as official employees after six months’ internship. These employees introduced their work in dealers’ to the students, and answered students’ questions concerning working contents, environment. In June 2008, the first meet-and-greet attracted 145 “F Class” students and 56 dealers, and finally 131 students signed their intern contracts with 45

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dealers. After this meet-and-greet, a meeting was held to discuss the problems existed so far. The institute pointed out that the construction of the training center should be accelerated and the insufficiency of the teaching instruments, professional tools, was still a problem yet to be solved. Experts from Company F suggested the courses should be further adjusted as required by the dealers, and new courses and teaching materials should be developed by TQP teachers after co-research with their counterparts in Company F. Consequently concrete adjustment in courses should be reported to the dealers to make sure the practicability of new courses. Dealers who did not find appropriate students from the job fair suggested that there might be some other ways instead of meet-and-greet or job fair to help them recruit students as interns.

On 31<sup>st</sup> May 2009, instead of job fair, a video interview was conducted as required by dealers in order to save time and money. 214 intern positions were offered by Company F's 35 dealers. The video interview lasted for 10 days, consisting of 8 parts of theoretical and practical tests and exams. During this process, trainers and instructors from Company F and Institute A voluntarily assisted student interviewees. Finally, 144 students signed their intern contracts with 35 dealers and made a closure for the first video interview in this institute.

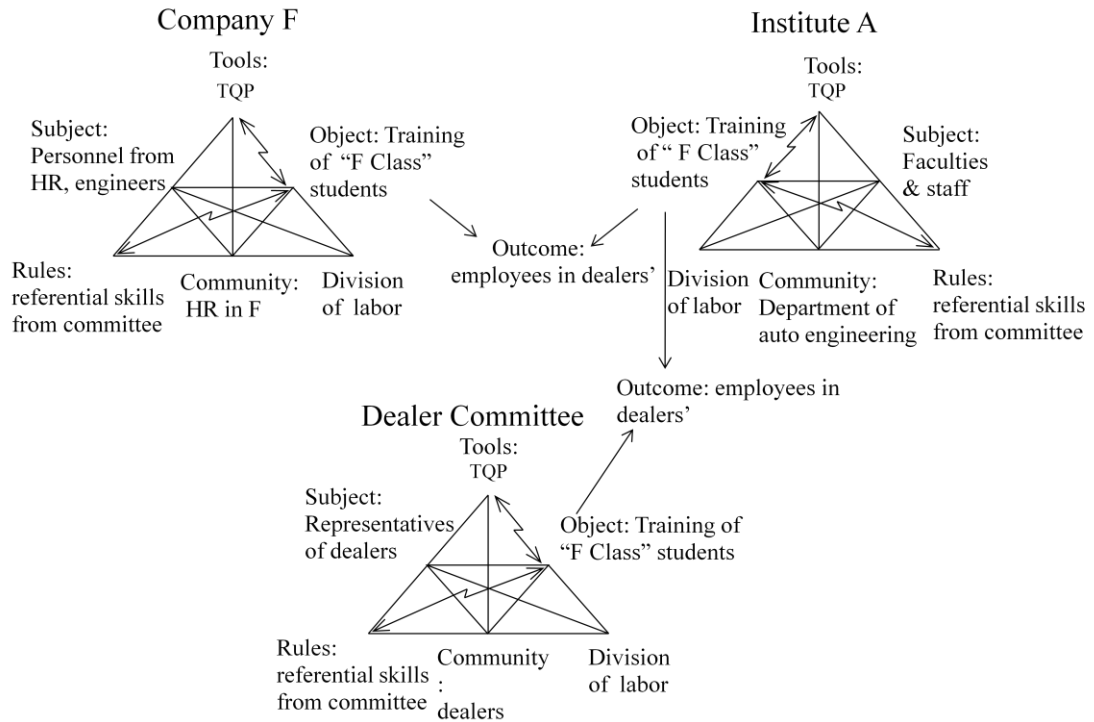


**Figure 2.** Video interviews for F Classes students.

The video interview minimizes dealers' spend on time and money, is the turning point of the whole program. It helps the partners put more efforts on how to improve teachings and trainings in the institute. Meanwhile, it encourages Company F and its dealers to take more initiatives in this program.

#### **4.1.1.4 Summary**

In TQP, the relationship among Company F, Institute A and the dealer committee was closely knitted by the final outcome of the program, which was clearly defined before the program got started. It is this final outcome, i.e. qualified employees in dealers', that bridges the activity systems up. Engeström put forward that the minimal model for the third generation of activity system consists of two interacting systems (Tuomi-Gröhn & Engeström, 2003). In this program, the number of activity system is three. The relationship of these three partners could be exemplified by the following figure.



**Figure 3.** Relationship of Company F, Institute A and the dealer committee.

As shown in Figure 3, the interaction of the program was conducted by the pair of Company F and Institute A and the pair of the dealer committee and the institute. The community in each activity system is the appointed departments that in charge of this program. They are human resources in Company F, the department of auto engineering in the institute, and the dealer committee to represent the wills and decisions of all franchised dealers respectively. For each activity system the rules that they must obey are the referential skills required by the dealer committee who decides whether the trainees are qualified or not. The division of labor depends on specialties and professions in each activity system.

In the horizontal interaction between the company and the institute, the subject personnel from human resources and some advanced engineers in Company F co-worked with the subject faculties and staff in the institute mediated by the artifacts

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of TQP. The mediating artifacts conducted by Company F can be elaborated as visiting lecturers (advanced engineers), course adjustments, constructing of the training center, and “training the trainer”. The mediating artifacts utilized by the institute more or less correspond to Company F’s, as none of these interactions could be accomplished without each other. The exception lies in the fact that in the institute the TQP teachers, among whom 4 are instructors, 5 are assistant professors and 7 are professors, are assigned to edit new teaching materials in order to meet the needs of modularized course suggested by experts from Company F and the dealers. Being aware of the definite rules and mediated by clear-cut artifacts, the subjects in both activity systems co-worked on the object, i.e. “F Class” students and aimed to work the final goal out.

It is not exaggerating to say that the interaction between the institute and the dealer committee is much less active than the previous pair, which seems to be strange since the starting point of this program aim to recruit auto professionals for the dealers. Subject representatives of dealers in dealer committee participated in the whole program through hosting seminars regularly to inform students the latest techniques in automotive industry and taking part in the course adjustments by sending trainers to F Classes, which should be regarded as the biggest step of dealers’ involvement in this program so far. It is important to point out that the rules obeyed by these three participating activity systems were laid down by dealer committee and the outcome of the whole program goes to the dealers’.

As analyzed above, instead of vertical processes aiming at elevating human

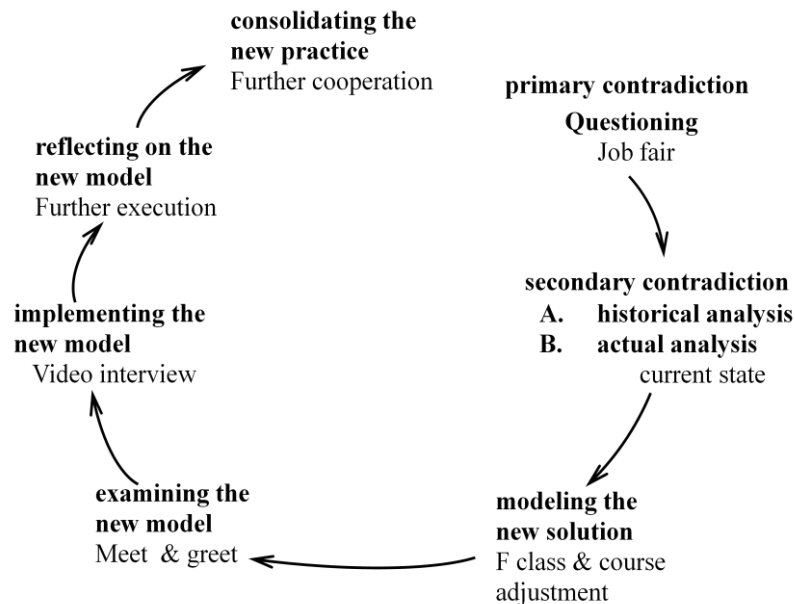
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upward to higher levels of competence, the directionality in learning and development in this program is horizontal and sideways, as Engeström suggested when he tried to conceptualize the term “expansive learning” (Tuomi-Gröhn & Engeström, 2003). In particular, the execution of TQP by the participants of Company F, the institute and the dealer committee is a useful example of developmentally significant sideways learning. Instead of trying to merge the possible incompatible worlds among partners as Company F and the institute used to do, the practitioners presented a series of alternative conceptualizations.

The sideways move started with job fair that serves as the dealers’ questioning on the skills and qualifications of the graduates. This corresponds to Engeström’s argument that expansive learning is initiated when some individuals involved in a collective activity take the action of questioning the existing practice. This can lead to an escalating process of debate and collaborative analysis of contradictions in the current state of affairs (Tuomi-Gröhn & Engeström, 2003). In TQP, the analysis of the contradictions was actually done subconsciously by all partners due to the fact that before this program got started, there were certain gaps between the skills acquired by students and the skills required by dealers. It is this contradictory fact that highlights the necessity of the execution of this program and leads to a projective modeling of a developmentally new form of the activity, in which the contradictions are resolved. The core of this program is F Class and the accordingly course adjustments supplemented by staff and faculty training conducted in the institute. This model was examined by the meet-and-greet through which the conduction of the previous work



was examined and confirmed and qualified students were recruited as interns in dealers'. The meet-and-greet was replaced by video interview since during the process of examining the new model, the improving model was implemented and certain changes were made accordingly. The model and its implementation are examined, and it is implemented step by step in practice. This leads to consolidation and proliferation of the new practice, and to reflective evaluation of the process. The whole progress of this program matches with Engeström's strategic learning actions and corresponding contradictions in the cycle of expansive learning as shown in Figure 4.



**Figure 4.** Strategic learning actions and corresponding contradictions in the cycle of expansive learning.

All in all, as analyzed and showed by the figure above, this well-organized activity leads to the expansive learning; actually it is also the results of the interaction among three partners, which ends with the appearance of the outcome, the employees in the dealers'. This corresponds to Engeström's suggestion that expansion happens

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substantively, by constructing a more encompassing object and motive for the activity, and socially, by recruiting a growing number of participants in the transformation effort.

#### **4.1.2 Dinggangshixi (顶岗实习)**

In China normally three academic years are required in higher vocational schools. It is universally acknowledged that higher vocational education used to put greater emphasis on theoretical learning at school. In 2006, according to the Ministry of Education's *suggestions on improving the teaching quality in higher vocational education* (Nr. 16, 2006), students in higher vocational schools are required to get six months' work experience in the form of Dinggangshixi. This becomes an official requirement for the evaluation of vocational schools as well as the students' learning and training.

Literally, "Dinggangshixi" is an adjective phrase combined four Chinese characters, 顶岗实习, in which "Dinggang" (顶岗) means students work in the positions of official employees, and "Shixi" (实习) equals to internship. On the whole Dinggangshixi means students work in the factories or companies in the positions of official staff. They must obey the rules and principles in the workplace and take all responsibilities and duties as regular staff do. The only difference is that they are less paid than official ones since it is Shixi, a sort of internship as work experience. Dinggangshixi is regarded as a way to offer chances for students to step into real work contexts in enterprises. It is meant to enrich students' work experience in real work positions outside campus and consequently to increase the employability of the

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graduates. According to Griffiths and Guile, work experience means the use of workplace in a way which supports learners in connecting different types of knowledge, skill and experience. It covers apprenticeship as well as school-based program. Dinggangshixi is the workplace-based program. As a kind of work experience, it identifies benefits for students (including motivation, career clarity, enhanced employability, and vocational maturity), employers (labor force flexibility, recruitment/retention of trained workers, and input into curricula) as well as the educational institutions and society.

Dinggangshixi is carried out by the cooperation between vocational institutions and enterprises. The extent to which the cooperation goes decides the ways of the cooperation, which decides the artifacts that students utilize during their performance in Dinggangshixi.

This section sets out to examine Dinggangshixi conducted by students in Company F. To analyze the situation in detail, firstly 15 person-to-person interviews were conducted among the faculties in Institute A, trainers and personnel from human resources in the Company F. The interviews were audio-recorded with the permission of the interviewees. Furthermore, a questionnaire was developed to collect data from students. The questionnaire was piloted and corrected, after which the 200 questionnaires were distributed to and collected from respondents, by hands. In all, the 191 responses represented more than 17% of all participants (1008) in this institute. A high response rate is attributable to the fact that the questionnaires were distributed and collected by hands. Finally, a research tool used to collect data is the

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use of open and unstructured interviews of 15 students. It involves the voice recording of the subjects with minimal influence from the interviewer and then letting each data set stand on its own, without collapsing the collected data together.

In Institute A, the work-integrated learning splits the three academic years into two parts to foreground Dinggangshixi in Company F. The first part consists of theoretical learning and practical training at school, which lasts for two academic years; the second part is Dinggangshixi, which is conducted in the last academic year in Company F. Dinggangshixi in the third academic year tends to link academics and work. It was estimated that in 2006 818 students undertook Dinggangshixi in Company F, 790 in 2007, 1427 in 2008, and 1008 in 2009. Students conducted their Dinggangshixi in three branches of Company F.

As Guile and Griffiths suggested, new curriculum frameworks are needed in all of its forms as the basis for the development of both knowledge and skills. The challenge of assisting students to relate their “horizontal” development to their “vertical” development therefore involves overcoming the limitations of the “technical – rational” model of education and training. Instead of viewing them as separate and distinct, there is a need to develop curricula frameworks which encourage students to make links between work experience, its underlying knowledge and skill and its contexts (cultural, social, and technological).

In fact, this chronological arrangement of learning and training always causes schedule conflicts both at school and in workplace. The following sections will show why conflicts are caused and how problems are solved by the partners.

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#### 4.1.2.1 DL in Institute A

DL, the acronym of “doing by learning”, is a learning framework designed for students who participate in Dinggangshixi. Compared with the normal learning schedule in Institute A, DL tends to be more flexible and optional and aims at solving the time conflicts between the learning and training in the institute and Dinggangshixi in Company F.

Dinggangshixi is expected to be conducted in the last academic year since it is convenient for the institute to arrange the learning and training schedule. But in Company F, there is the so-called production season, in which more working staff is needed since more products are expected in the market. Personnel from Company F’s human resources explained this situation as the followings:

*...we used to recruit temporary working staff from labor market during production season, but it turned out to be unwise since firstly, these people are not as easily administered as we expected and secondly, the production season would be finished soon before these temporary employees got used to their work...*

The Dinggangshixi participants (students from the institute) can fill the flexible working positions, but the instability of the production season conflicts with the learning and training schedule in the institute. The institute plans finish all learning and training before the students start Dinggangshixi, which makes the institute convenient to arrange its syllabus. The production season of Company F forces Institute A to adjust its normal learning and training schedules since during this season more working staff is needed and more Dinggangshixi positions are available.

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Complaints have been made among students in the past years due to the mismanagement between the schedules of the school and the company. *How to guarantee the learning and training in the institute and do not miss the opportunity of Dinggangshixi in Company F as well?* The DL learning and training framework is created along with the normal learning schedule and tries to solve the schedule conflicts without disturbing the normal learning and training in the institute.

In DL (doing by learning) framework, the original formal syllabus is modularized to cater to the schedule of Dinggangshixi in Company F. The curricula include basic courses, specialized courses, and the training in the training center on campus, which is a supplement to Dinggangshixi. Besides, knowledge such as production information during the productive process, basic skills, and on-site management is delivered during the learning process, and accountability in work is highlighted in order to enforce the rules and principles in Dinggangshixi.

#### **4.1.2.1.1 Learning forms**

The learning forms include learning in classes, learning through materials, and learning through internet. In this part of learning, students are expected to acquire theoretical knowledge as suggested by Guile and Griffiths.

- Learning in classes. Students finish their courses in designated time and place with their teachers.
- Learning through materials. Printed learning materials are distributed to students, through which students are expected to finish 90% of the learning by themselves, and the rest 10% will be the question and answer time participated by teachers

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and students in designated time and place.

- Learning through internet. Teachers put the learning contents on the designated internet pages, through which students can learning the contents and ask questions and be evaluated.

#### **4.1.2.1.2 Execution**

The academic affairs office is in charge of the arrangement and enrollment of the basic courses. Students are encouraged to enroll these courses as early as they can despite their grades, majors, and departments in order to get ready for Dinggangshixi.

The specialized courses are arranged by each department, which should guarantee that during Dinggangshixi the total class hours in one week should be around 30, and each week around 28 class hours, otherwise it is impossible for students to have enough time to rest.

The training in the training center is arranged by each department according to the syllabus. As commented by a teacher from Institute A,

*“... Students work on the training on campus much harder than the basic courses and specialized courses since they regard it as a preparation for Dinggangshixi...”*

#### **4.1.2.1.3 Exams and assessment**

In DL framework, experts from Company F are encouraged to involve into the exams and assessment. The exams and assessment are divided into two types due to the time schedule of Dinggangshixi.

**When students participate in Dinggangshixi throughout a whole semester, four ways of assessment are optional:**

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- Make no adjustments of the formal curricula, and complete the learning and training with DL modules. Divide the learning contents during Dinggangshixi into modules, which should correspond to the courses in the formal curricula. The assessment should be conducted according to the modules since each module corresponds to the course. It should be:

$$ZJ_i = DJ_i \quad i=1, 2, 3 \dots n$$

$ZJ_i$  is the course numbered as  $i$  in the curricula,  $DJ_i$  is the module numbered as  $i$  in DL framework, and  $n$  is the total course number in the curricula.

- After certain adjustments are made, the formal curricula will be carried out through DL framework. The correspondence between the formal curricula and the DL framework will be reduced due to the adjustment, which is obvious because the designated learning time is reduced by Dinggangshixi. The adjustments are made according to the time schedule of Dinggangshixi in Company F. All these adjustments should be reported to the academic affairs office in order to keep files and records.
- Postpone the courses that should be attended during students' Dinggangshixi till it is finished.
- Use the score of Dinggangshixi as the substitute of the final scores for the courses. It is optional for the teachers to take the "Dinggangshixi report" and Company F's assessment of the students' performance as the final score of the courses. It is acknowledged that this is a new way of evaluation and it requires the involvement of the mentors in Dinggangshixi. The students should be informed about the



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assessment standards beforehand by teachers and the final scores should be recorded as 95, 90, 85, 80, 75, 70, 65, 60, or 55.

**When students participate in Dinggangshixi less than a semester due to the production needs of Company F (for example, Dinggangshixi starts in the 10<sup>th</sup> academic weeks), two ways of assessments are optional:**

- If the learning contents so far can cover the whole curricula, then a phase assessment will be arranged, which will be regarded as the final score of the courses. If students fail in this phase assessment more than 3 courses, students will not be allowed to participate in Dinggangshixi.
- If the learning contents cannot cover the whole curricula, the rest of the learning contents can be finished by DL framework (DJ) or substituted by the assessment of Dinggangshixi (SJ).

**DJ:** The unfinished part of learning contents will be modularized as mentioned previously. The final score of one certain course (ZJ) will be:

$$ZJ = BJ \times n_1 + DJ \times n_2$$

$n_1$  and  $n_2$  are weight coefficients of the two parts,  $0 < n_1, n_2 < 1$

**SJ:** The unfinished part of learning contents will be substituted by the final assessment of Dinggangshixi (SJ). This assessment will be regarded as practical parts of learning and will be combined with the previous theoretical learning. The final score of one certain course (ZJ) will be:

$$ZJ = BJ \times n_1 + SJ \times n_2$$

$n_1$  and  $n_2$  are weight coefficients of the two parts,  $0 < n_1, n_2 < 1$

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#### **4.1.2.2 Dinggangshixi in Company F**

##### **4.1.2.2.1 Administration office of Dinggangshixi**

In the institute, there is an “administration office of Dinggangshixi” in charge of the student practitioners. Besides superintend the campus internet, the office functions to bridge the institute and Company F for the co-training of the students. It drafts the documents concerning Dinggangshixi and signs contracts with its counterpart (department of human resource in Company F) on behalf of the institute. It supervises the execution of Dinggangshixi, training the instructors from different departments and sends them to the workplace to solve problems that students encounter and accidents that happen to them. Finally it evaluates Dinggangshixi with Company F together and sends out certificates to students.

##### **4.1.2.2.2 Two documents**

It is important to point out that two documents involved three parties will be signed before Dinggangshixi get started. The documents signed between company and the institute are called “Shixi contract”, and the documents signed between students and the institute are called “Student Shixi agreement”. The three involved parties are the company, the institute and the students. The contracts come first and the students sign the agreements accordingly. In the interviews, some students said that they never saw any contracts or agreements concerning their Dinggangshixi. Some said that, even they did see the agreements, they really doubted about it. The doubt lies in that if the institute takes some of their pay as intermediary. By the institute it was explained that students have double identities during the process of

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Dinggangshixi, i.e. students in their third academic year in the institute and workers in the factories or companies, but basically they are still students in the institute, and the institute has the right as well as responsibilities to sign contracts with Company F. In the contract of 2009, the duration of Dinggangshixi is from April 21<sup>st</sup> to August 20<sup>th</sup>. As noted in the contract, the duration is alterable based on the negotiation between Company F and the institute. It was stated that the students must obey rules and principles in Company F, otherwise “they will be transferred back to the institute”. If the students ask for leave, they must get permission from both F and the institute. Being absent of consecutive ten working days or accumulatively more than 30 ones, the students will be transferred back to the institute. Meanwhile, this is also a violation of “student Shixi agreement”, according to which absence from work equals absence from class. Being fired or quitting means a failure in Dinggangshixi. During Dinggangshixi Company F offers labor protection appliances, insurance, free lunch, employee bus, and 1000 RMB pro month pro person. Meanwhile, knowledge and skills concerning their positions must be informed by master workers in Company F, whose name list has been delivered to the instructors in the “administration office of Dinggangshixi” before Dinggangshixi get started. As mentioned above, these instructors are the ones who are sent to the workplace to supervise students on behalf of the institute. Their counterpart in workplace is master workers, who play an important role in supervising as well as evaluating students. As stated in “student Shixi agreement”, these students will be co-evaluated by master workers from Company F and instructors from the institute.

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#### **4.1.2.2.3 “Learning pages”**

As the students have double identities mentioned above, they must finish their “learning pages” brought by their instructors. The so-called “learning pages” are assignments for students from the institute while they undertake Dinggangshixi. It requires students to prepare, self-test, and self-evaluate before, during and after Dinggangshixi. Students are supposed to finish one task from one “learning page” every two weeks, and then hand them to their instructors, who will evaluate these “learning pages” and put the evaluation into files. It is important to point out that the contents of the “learning pages” focus on capacity rather than detailed skills that students conduct in their work. For example, one assignment in the “learning pages” for students specialized in logistics and conduct their Dinggangshixi in assembly workshop in Company F is “JIT” (just-in-time) from TPS (Toyota production system). It is really questionable to assign students with such contents. The final assessment is co-conducted by the institute and the company, in which the assessment of the company takes the account of 80% and the institute takes of 20%. Company F focuses on students’ working attitude, skills, and attendance, while the institute pays more attention to “learning pages” and the final paper on Dinggangshixi which is no less than 3000 words. The final scores will be put into students’ files as references for Dinggangshixi credit.

#### **4.1.2.2.4 Students’ performance**

In Dinggangshixi, the work context refers to the workplaces in enterprises, and in this case, most students took part in Dinggangshixi in Company F.

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Students' Dinggangshixi was studied through questionnaires. The questionnaire consists of three parts. The first part is the personal information of the participants in Dinggangshixi. Variables are age, gender, major, duration of Dinggangshixi, planned post-school destination. The second part includes 9 questions concerning students' performance in Dinggangshixi,

- Whether the staff from workplace delivered information concerning the work
- How many students shared one mentor?
- The frequency of discussion between students and master workers
- Ways of learning in Dinggangshixi
- Clarity about the tasks in Dinggangshixi
- The importance of the tasks in Dinggangshixi
- Whether it is difficult to adapt to working environment
- The ability promotion in Dinggangshixi
- Whether satisfied with Dinggangshixi

The third part consists of four questions on the links between Dinggangshixi and school learning as the followings,

- Whether kept contact with school teachers during Dinggangshixi
- The connection between school courses and work in workplace
- Whether learned anything useful in Dinggangshixi to school study
- The impact of Dinggangshixi on career choice

200 questionnaires with the above questions were handed out and 191 were collected back. The statistics were gathered. The data analysis process was aided by using

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quantitative data analysis computer program, that is, Statistical Packages for Social Sciences (SPSS). The measurement of the validity and reliability of the feedbacks given by respondents in the return questionnaires was carried out. The Cronbach Alpha of the second part and third part was calculated accordingly. In the following sections, tables and figures were drawn in order to analyze the conduct of Dinggangshixi.

Based on the responses to the questionnaire, students' personal information is obtained as shown in Table 3. The data in Table 3 appear to suggest some characteristics of the Dinggangshixi participants:

- The vast majority expect to complete their last academic year as shown by their age, which indicating the fact that most students conduct Dinggangshixi in their third academic year.
- They are more likely to be male than female. The 6 female students major in computer, accounting, and marketing and service.
- Though specialties are diversified, the majority of them are about or relevant to autos.
- The duration of Dinggangshixi conducted by most students fails to meet the requirement of the Ministry of Education. More than half of the students undertook Dinggangshixi less than six months.
- They are far less likely than the average school student to aspire to further study in university. Some of them have no idea about their post-school destination.

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Profile of the 191 respondents to the questionnaire	
<b>Age</b>	19 years old-0.5% (1 student); 20 years old-6.8% (13 students); 21 years old-22.5% (43 students); 22 years old-31.5% (60 students); 23 years old-23.0% (44 students); 24 years old-13.6% (26 students); 25 years old-1.6% (3 students); 26 years old-0.5% (1 student)
<b>Gender</b>	Male-96.9% (185 students); Female-3.1% (6 students)
<b>Major</b>	Computer-6.3% (12 students); Accounting-5.8% (11 students); Automobile styling-13.0% (25 students); Numerical control technology-5.8% (11 students); Electromechanical integration-16.7% (32 students); Automobile testing and maintenance-12.6% (24 students); Automobile manufacturing and setting-13.0% (25 students); Mould design-6.3% (12 students); Logistics-7.9% (15 students); Marketing and service-6.3% (12 students); Electrical automation-6.3% (12 students)
<b>Duration of Dinggangshixi</b>	1-2 months - 33.5% (64 students); 2-4 months - 24.6% (47 students); 4-6 months – 18.8% (36 students); No less than 6 months – 23.1% (44 students)
<b>Planned Post-school Destination</b>	University-9.4% (18 students); Continue the current work-27.7% (53 students); Find another work-23.1% (44 students); Not sure-39.8% (76 students)

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**Table 3.** The profile of the 191 respondents to the questionnaires.

Ghererdi et al. suggest that in the cooperation, the host organizations should actively provide opportunities for learners to observe, discuss, and try out different practices with members of the communities they have temporarily joined (Gheredi, Nicolini, & Odella, 1998). Lave and Wenger have also demonstrated how the process of “legitimate peripheral participation” in fairly stable and well-bounded communities of practice enables individuals to acquire knowledge and skill and develop their

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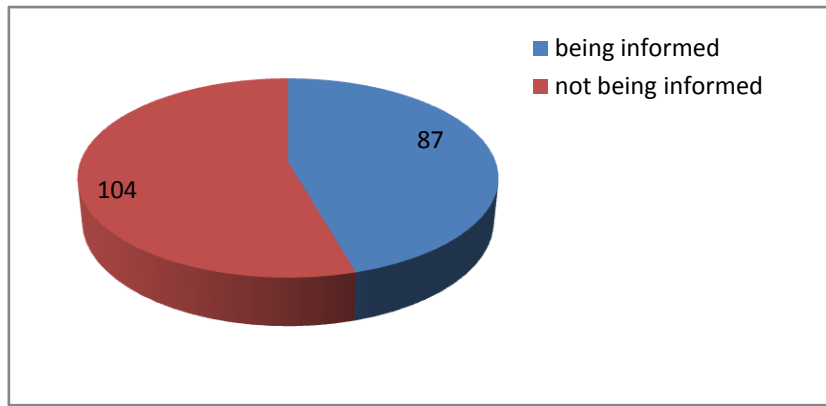
understanding through contact with more experienced others (Lave & Wenger, 1991).

In this case, the affordance from Company F is analyzed through the following questions:

- Whether the staff from workplace delivered information concerning the work
- How many students shared one work mentor?
- The frequency of discussion between students and master workers
- The importance of the tasks in Dinggangshixi
- Whether it is difficult to adapt to working environment

Guile and Fonda put forward that students have to learn how to enter unfamiliar territory and learn to work collaboratively with workers in work context (Guile & Fonda, 1999). In the contract between Institute A and Company F, it is required that before Dinggangshixi gets started the staff from Company F must inform student participants the basic knowledge such as rules and principles to be obeyed, security knowledge during work, and job description that helps students get familiar with their work. These information deliveries tend to give students a general impression of their work environment and work contents. It is the first lesson for students who just step out of the campus and get into the factory. Figure 5 shows that among 191 students, 87 of them were informed the above-mentioned knowledge and 104 of them were not informed anything at all. We can obviously figure out that those were being informed were around 9% less than those were not being informed.





**Figure 5.** Information delivery to students by staff from workplace.

The problem was elaborated in the interview through the question “is there someone there to inform you some basic knowledge before Dinggangshixi get started”? The following excerpts are the answers of two of the student interviewees:

***Excerpt 1 (Interview)***

*Student: Is there (looked at his classmate besides him)? I don't think so. I was just brought to the workplace and was told where exactly my position is. And then I looked around to see what other workers doing there. I have to try what they do, because my work is the same as theirs...*

***Excerpt 2 (Interview)***

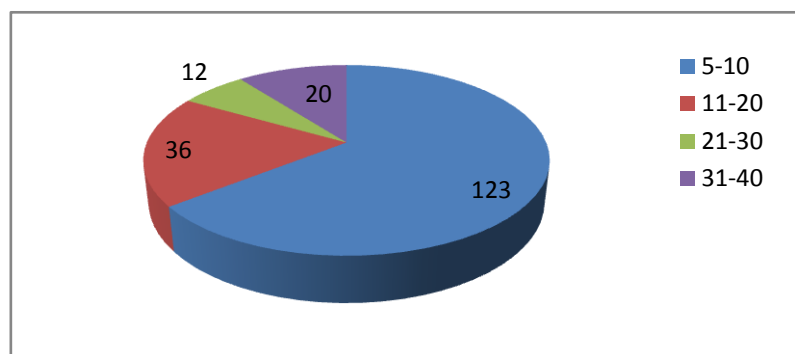
*Student: Nobody gave any information, but our department did send us some manuals before we started Dinggangshixi. We were told to read those manuals, but actually it is not necessary. What we did is just to follow suits of the master workers. Plus there are lots of blackboards in our workplace and there are lots of “attentions” on them.*

The interview excerpts and Figure 5 show that the student participants were not well informed concerning the basic knowledge in the workplace before Dinggangshixi. It seems that this doesn't affect the conduct at all since students figured out ways to overcome the problem by reading “attentions” on the blackboards in workplace or by

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“following suits of the master workers”, which were confirmed by the interviewees that these are the two major important methods for them to get the first general impression of the workplace before they started their works.

When Dinggangshixi got started, students were divided into groups in which the student number is decided by the work position. Each group shared one master worker who acted as a mentor of this group. The mentor’s main job is to deliver detailed job descriptions, answer students’ questions, and assist them to act their tasks out. Figure 6 shows the distribution of the student number mentored by one master worker. The pie chart clearly shows that among 191 students there are 123 students every 5-10 students shared one master worker. These 123 students account for 64.4% of all. 36 students involved in every 11-20 students sharing one mentor, 12 students in every 21-30 students, and the rest 20 students in 31-40 students which equals the number of a big class and these 20 students account for 10.5% of all.



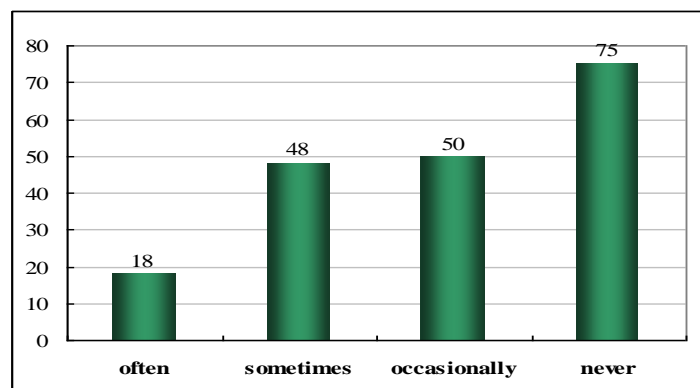
**Figure 6.** Distribution of student number mentored by each master worker.

It is generally understood that the less in the group the better, because it is more convenient for mentor workers to supervise and there are more chances for students to communicate with their mentors.

The fact is that the communication and discussion between students and mentor

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workers did not go well. Figure 7 shows the frequency of the discussion between students and their mentors from work. 75 students, accounting for 39.3% of all, describe the frequency as “never”. The number of students “occasionally” discussed their work with mentors almost equals those “sometimes”.18 students described their frequency of discussion as “often”.



**Figure 7.** Frequency of discussion between students and master workers.

It is interesting to notice that one student picked “never” and added a footnote to his choice “the work is too easy to be discussed”. Some student interviewees mentioned that their mentors did not intend to communicate or discuss with them at all.

***Excerpt 3 (Interview)***

*Student: Maybe they felt threatened by newcomers? In fact we might be potential employees... I don't know, but my mentor is really reserved and sometimes just gave me several words for my long-sentenced question...*

***Excerpt 4 (Interview)***

*Student: We all know that there are lots to learn from the experienced workers, not just the work itself...Lots of them graduated from our institute, you know, in fact we might be like them someday...I was very happy when I was put into 5-10 student group, but it turned out that there*

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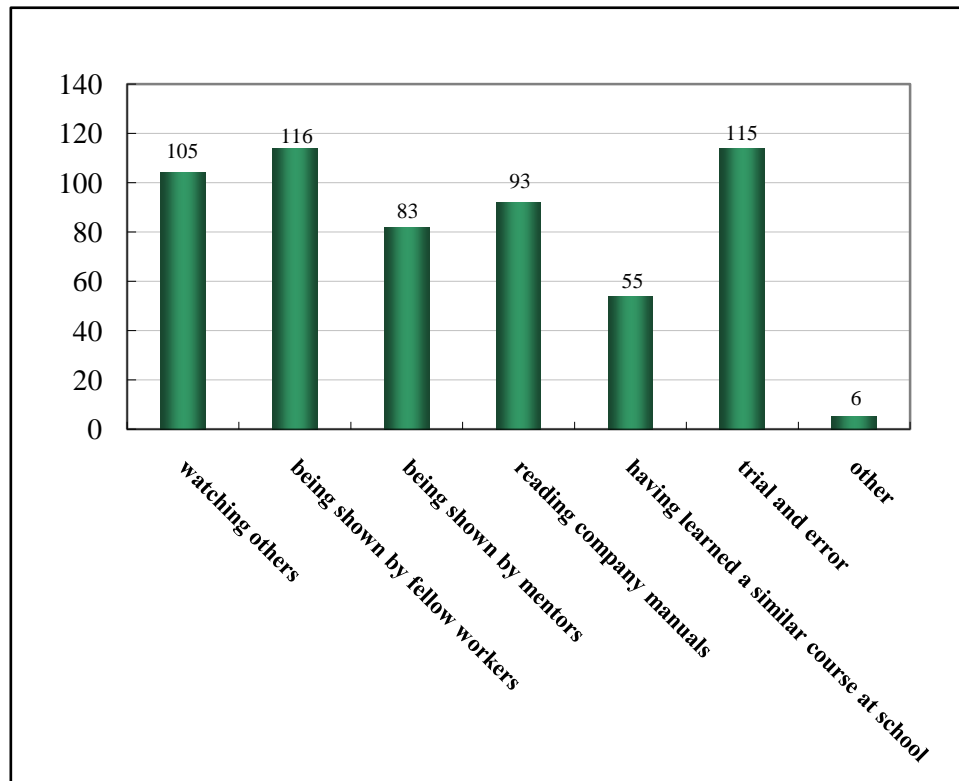
*was rarely chances to communicate with my mentor at all...*

This mentor-student relationship confused some students who insist that the teacher-student relationship is much easier to be handled. Students said that here lies the difference between school and workplace. In the institute, asking questions is always highly respected by teachers; in workplace, most of the time students have to figure out how to solve problems by themselves.

Beach and Vyas put forward that education and training providers of work experience must recognize that students need to learn in ways different to those in which they learn in school or college (Beach & Vyas, 1998). It is important to get to know the students' ways of learning since most of the time they solve problems by themselves during Dinggangshixi. In the questionnaire, students were asked to tick three most important ways of learning during Dinggangshixi among the choices of "watching others", "being shown by fellow workers", "being shown by mentors", "reading company manuals", "having learned a similar course at school", "trial and error", and "other". Figure 8 unfolds the fact that "being shown by fellow workers", "trial and error", and "watching others" are the most important three ones. This question is supplemented by student interviewees who said that actually most of them firstly have to observe the fellow workers around them. Some of the fellow workers are really nice and willing to show them how to carry the task out. Then the students will give a try and to see if there are any problems in the trial. If something is wrong, they have to start over and watch the fellow workers again and then try the task again. In Figure 8 the item "having learned a similar course at school" is chosen by 55

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students, which subtly indicated the connection between the study at school and the work in Dinggangshixi.



**Figure 8.** Distribution of learning ways in Dinggangshixi.

By these three most important ways of learning, students went through the whole process of Dinggangshixi. Obviously some fellow workers play more important roles than those mentor workers.

Despite the natural ability of students and the relative complexity of tasks, students were asked whether they were fully aware of the working tasks in Dinggangshixi. Table 4 shows that 68 students chose “I am always clear about how to carry out tasks”, which are more than twice as those “I am usually unclear about tasks” as shown by the following table. More than half students chose “sometimes I am not clear about how to carry out tasks”, which compels the researcher to presume the

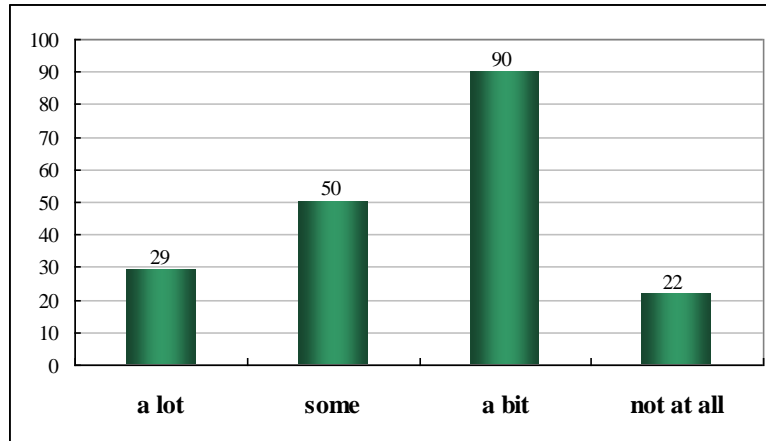
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reason since nobody answered this question during the interviews.

Type of comment	No.	%
I am always clear about how to carry out tasks	68	35.6
Sometimes I am not clear about how to carry out tasks	96	50.3
I am usually unclear about how to carry out tasks	27	14.1
<b>Total</b>	<b>191</b>	<b>100</b>

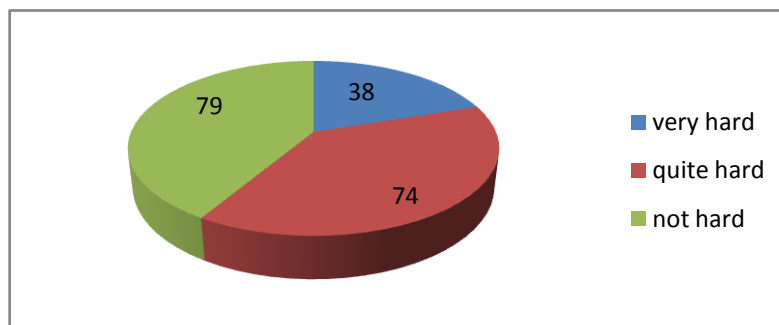
**Table 4. Students' clarity about the tasks in Dinggangshixi.**

Kindermann and Skinner argue that the development of an individual is affected by the task or activities which he or she is asked to undertake in a specific context (Kindermann & Skinner, 1992). As mentioned previously by a student who said that the task is “too easy to be discussed”, students were asked to evaluate the importance of their tasks. Figure 9 reveals that though the degree varies, 169 students describe the work they conducted in Dinggangshixi as important, among which, 90 students declared that it is “a bit” important, the rest are “a lot” important and “some” important respectively. The remaining 22 students chose no importance at all.



**Figure 9.** Importance of the task.

Theoretically Dinggangshixi serves as a transitional point between the school study and the work. The key point is that whether the students can adapt to the working environment smoothly. Figure 10 shows that all in all, it is hard for students to adapt to the working environment. Altogether 112 students, accounting for 58.6% of all, felt it was hard for them to fit in the working environment. 79 students said it was “not hard”, who were more than twice as those 38 students who said it was “very hard”.



**Figure 10.** Difficulty of adapt to working environment.

Student interviewees explained that it was difficult to fit into the working environment mainly because of the interpersonal relationship and the strong intensity of work.

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***Excerpt 5 (Interview)***

*Student: ...The interpersonal relationship is tough to deal with, but not as tough as the strong intensity of work... I worked in the final assembly workshop...I smoke, but during work, there is no enough time for a cigarette because of the production chain, that is, 66 seconds for a car, and every second counts. During the lunch time, we must hurry up since we have altogether 30 minutes to finish the lunch and it took us almost 10 minutes to get to the canteen...*

Though the work is tough and environment is hard to adapt to, students still believe that they learned a lot and their generic abilities have been promoted in various ways. As in most cases of VET, discussions have tended to concentrate upon the contribution which work experience can make to the development of students' occupational competence and identity (Vikers, 1995; Stern & Wagner, 1999b). The ability promotion is designed as a free option in the questionnaire. Students were asked to choose among "communicating in writing", "oral communicating", "planning and organizing", "using initiative", "solving problems", and "how to behave at work" freely.

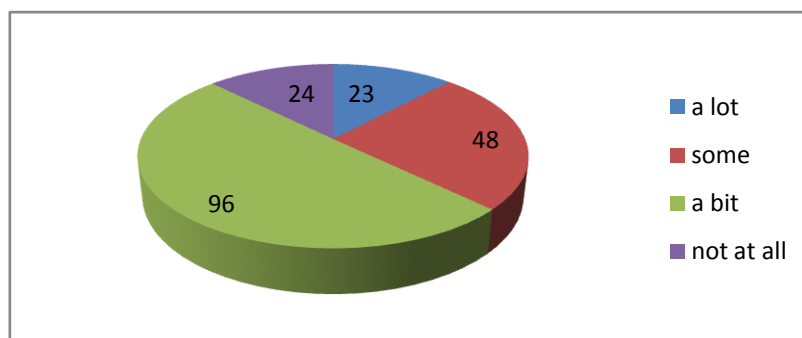
Table 5 reveals that altogether these options were chosen 393 times which indicates that an average of two options was chosen by each student. Table 3 shows "oral communicating" and "solving problems" rank first and second respectively. "How to behave at work" follows up. "Planning and organizing", "Using initiative", and "Communicating in writing", the three might be highly expected from the school as well as the students themselves, are comparatively less promoted.



Type of comment	No.	%
communicating in writing	25	6.4
oral communicating	103	26.2
planning and organizing	56	14.2
using initiative	43	10.9
solving problems	97	24.7
how to behave at work	69	17.6
<b>Total</b>	<b>393</b>	<b>100</b>

**Table 5.** Distribution of ability promotion in Dinggangshixi.

By Figure 11 we may figure out that all in all, 167 students are satisfied with their Dinggangshixi, though the degree varies. Those who satisfy “a lot” almost equals those don’t satisfy at all. 96 students were a little bit satisfied with Dinggangshixi, exactly as twice as those chose “some” to describe their satisfaction.



**Figure 11.** Distribution of students' satisfaction with Dinggangshixi.

The above figures, tables, and excerpts draw pictures of Dinggangshixi conducted by students. Most students, who major in auto or auto-relevant specialties, undertook

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Dinggangshixi in their third academic year for several months, which are either less or more than six months as required by the Ministry of Education. Though not well-informed of the rules and principles in the factory before Dinggangshixi was started, students got these problems solved by following suits of fellow workers and reading blackboards in the workplace. During Dinggangshixi, most of the students were divided into groups consisting of 5-10 members, which seems to be convenient for students to communicate with their mentor workers, but actually the discussion between students and mentor workers did not go well. Students insisted that this is because these master workers felt threatened by the Dinggangshixi students who might be official workers, which means to be the colleagues of the master workers. With less coaching from their mentor workers, the students' three major ways of learning are "being shown by fellow workers", "trial and error", and "watching others". The ways of learning led to most students' unclarity about their tasks in the work. They felt difficult to adapt to the working environment because of the interpersonal relationship and strong intensity of the work. They admitted that their work is important and their abilities got promoted during Dinggangshixi, especially abilities such as "oral communicating", "solving problems", and "how to behave at work".

All in all, students are satisfied with their Dinggangshixi despite the fact that there are lots of problems in it. It is important to point out that most of these problems are solved by students themselves and they felt really good about this.

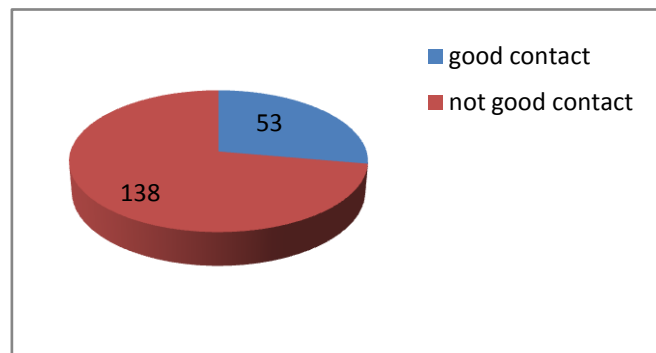
#### **4.1.2.2.5 Links between Dinggangshixi and school learning**

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It was reported that in Company F, technicians are divided into three levels. The first level, which is the lowest, consists of demobilized soldiers and contract employees who handle the easiest work. The second level includes those graduated from vocational schools. The third level, which is the core of all technicians, is the graduates from the institute (Wang, 2009). From the institute's point of view, the idealized conception of Dinggangshixi is to practice students' school knowledge accordingly in workplaces. Obviously this conception is based on the presumption that the school study and the work in workplace are relevant to each other. In order to test the relevance out, both in the questionnaire and interviews, students were asked whether there are connecting points between school study and work in workplace.

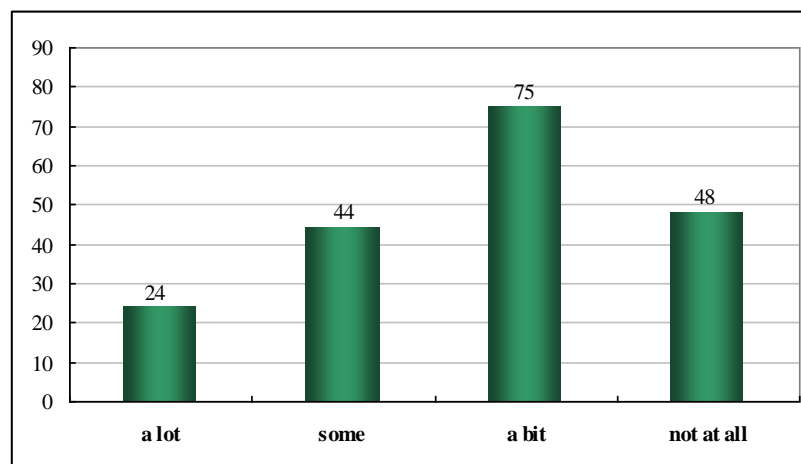
Previously DL curriculum framework conducted in the institute has been introduced. As Guile and Griffiths suggest, new curriculum frameworks are needed to take work in all of its forms as the basis for students' development (Guile & Griffiths, 2001). In this sense, DL is a curriculum framework in order to solve the time conflicts caused by Dinggangshixi. Besides, in order to keep in touch with the Dinggangshixi participants, the institute sent teachers to the workplace to solve problems and to supervise students to finish their "learning pages" during their temporary away from school. These teachers took the same shifts as students did as scheduled by the institute and the workplace, and they were expected to keep good contact with students who participated in Dinggangshixi. But the comments from students are not optimistic as we can see from Figure 12. 138 students, accounting for 72.3 % of all, chose their contact with teachers as "not good contact". The remaining 53, accounting

for 27.7% of all, depict their contact with school teachers as “good contact”.



**Figure 12.** Students’ contact with school teachers during Dinggangshixi.

To test out the relevance between school study and work in workplace, students were asked to figure out whether there is any relevance and to what degree the relevance is. The starting point of the question is whether there is a possible chance to apply school knowledge to Dinggangshixi. Figure 13 is the result, and we can see that most students chose there is relevance, though the degree varies. Those who chose “not at all” are twice as those picked “a lot”.



**Figure 13.** Connection between school courses and work in workplace.

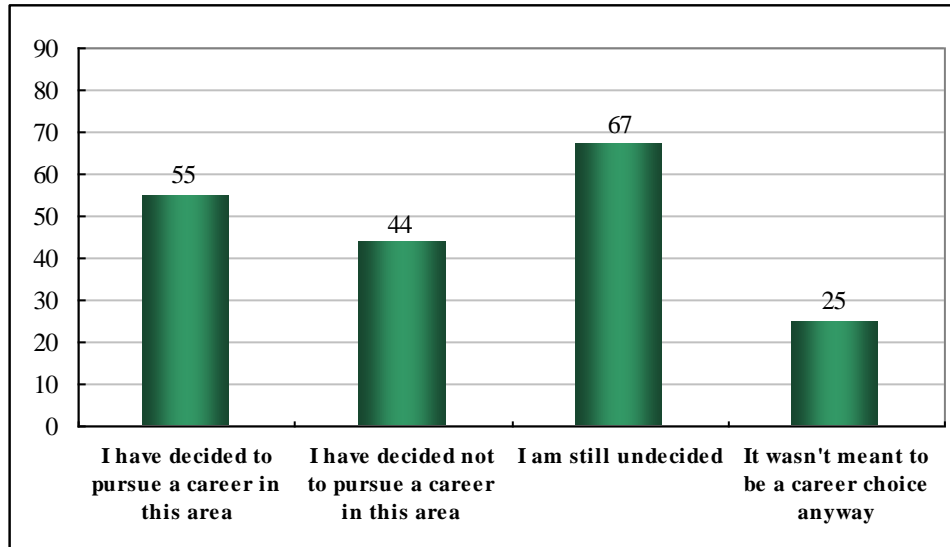
Likewise, the question “whether in Dinggangshixi you’ve learned something useful to school study” was also asked. Table 6 shows that 165 students, accounting for 86.4% of all, admitted that from Dinggangshixi they learned something useful to

school study. 8 students, accounting for 4.2% of all, said that they already knew what they did in workplace from school. And the rest 9.4% said that they learned nothing useful at all.

<b>Type of comment</b>	<b>No.</b>	<b>%</b>
a lot	22	11.5
some	69	36.2
a bit	74	38.7
knew it already from school	8	4.2
not at all	18	9.4
<b>Total</b>	<b>191</b>	<b>100</b>

**Table 6.** Did you learn anything useful in Dinggangshixi to your school study?

As mentioned previously, the idealized conception of Dinggangshixi, from the institute's stand, is to get students' school knowledge accordingly practiced in workplaces. For students themselves, Dinggangshixi may have some impacts on their career choice. Figure 14 shows the impact of Dinggangshixi on students' career plan. It reveals that 55 students decide to choose their career in the area of their Dinggangshixi, against which 44 students decide not to choose a career in this area. 67 students are not still sure about their decision, and 25 students declared that Dinggangshixi has nothing to do with their career choice. All in all, 99 students made it clear whether they will choose their career in the area or not.



**Figure 14.** Impact of Dinggangshixi on career choice.

In the interview, students said that all Dinggangshixi participants in F wish that they would have chances to continue their work after graduation. The problem is that those positions are limited and are only accessible to those best performers both in school and in workplace.

***Excerpt 6 (Interview)***

*Student: Though the work is mechanical, I do wish that I could have a chance to be an employee here after graduation. F is a big manufactory offers good salary and wonderful working environment, it will be an honor to work here...*

***Excerpt 7(Interview)***

*Student: I don't care how much they pay for my Dinggangshixi... I really worked hard during the whole process in order to get a good evaluation which might help me get a position in the potential employee list...I guess that is why most of us take part in Dinggangshixi here...*

**4.1.2.3 Reliability statistics of the respondents**

The details of Cronbach Alpha are shown as Table 7.

No.	Description	No. of items	Cronbach Alpha
1	Performance in Dinggangshixi	9	0.867
2	Links between school learning and work	4	0.841

**Table 7.** Reliability statistics.

The computed Cronbach Alpha result indicated that each item in the questionnaire has quite high reliability.

#### **4.1.2.4 Summary**

The overall impression gained from the analysis of the 191 questionnaires and some interviews is that undertaking Dinggangshixi seems to be a highly positive work experience for the majority of those involved. It does need to be acknowledged that those returning the questionnaires might not be entirely typical of the full population of Dinggangshixi, but it is reasonable to assume that the responses may be indicative of Dinggangshixi as a whole.

##### **4.1.2.4.1 What kind of work context did Company F offer during Dinggangshixi?**

In this case, students' motivation for undertaking Dinggangshixi was found to be regular employees. As we discussed before, the host workplace should ensure students to learn about the context in which they are working and are presented with opportunities to learn and develop within that context by adjusting or varying their performance as required. From the preceding figures we get the facts that when students entered into the workplace, the information delivery did not go well. Students got this problem solved by reading manuals and blackboard news. During Dinggangshixi, students were divided into groups with reasonable members sharing

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the same mentors, who actually did little help to students' work. There was no good discussion concerning work between students and their mentors, which really disappointed students. Concerning the tasks being assigned in Dinggangshixi, though mechanical and intensive, students thought high of the value. All in all, students found it hard to adapt to the workplace mainly due to the interpersonal relationship and the intensity of the work.

#### **4.1.2.4.2 What type of work experience did students obtain?**

For students, though difficult to adapt to the working environment, their work experience was enriched during Dinggangshixi. This is a big progress confirmed both by the teachers and the students themselves who admitted that they had had little work experience before they participated in Dinggangshixi.

Guile and Griffiths argue that no specific work experience program fits neatly into any of the five models of work experience and some programs may contain elements of more than one model (Guile & Griffiths, 2001). In this case, Dinggangshixi was part of Chinese vocational education reformation. The six-month practice is required by the Ministry of Education and the outcomes of students' Dinggangshixi are regarded as one of the assessment elements on vocational schools. In this sense, Dinggangshixi belongs to the generic model that values the outcomes. Meanwhile, the DL learning framework undertaken in the institute made an effort to help students adjust to the work context in F, which is an obvious characteristic of the work process model in which the collaboration between vocational institutions and the workplace is important. From students' point of view, the work context offered an



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experiential model of work experience as the results of the questionnaire show that their abilities in “oral communicating”, “solving problems”, and “how to behave at work” are developed. This is what emphasized in experiential model of work experience, that is, interpersonal development and social development.

#### **4.1.2.4.3 Can work experience help students figure out their career choice in the future?**

The students undertaking Dinggangshixi were found to be more likely than average to be male, with auto or auto-relevant specialties, in their third academic year. The participants in Dinggangshixi in a large proportion of cases confirmed their career choice for them, although in some cases it gave them the chance to try out, and reject, the industry area. All in all, Dinggangshixi is a chance for students to figure out whether they will choose their career in the area.

#### **4.1.2.4.4 What problems remain in Dinggangshixi?**

It was argued that there is a tradition of employers caring for and mentoring young workers in such contracts of training (Smith, 2000). There were, however, some misgivings, when school-based Dinggangshixi were introduced, about whether such arrangements could combine with schooling. This study has found that in most cases this combination appears to have been not very successful. Some problems exist, as the analysis revealed. These include:

- During Dinggangshixi, most students were divided into groups consisting of 5-10 members to be more convenient for the learning and training supposedly. The fact is that mentor workers from F and teachers the institute, who both were in charge

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of the students' training during Dinggangshixi, did not communicate or keep good contact with students as expected. Despite the natural ability of students, the feelings of being less cared and being ignored throughout the whole Dinggangshixi made them feel difficult to adapt to the working environment.

- Students' duration of Dinggangshixi varies. According to the follow-up interview, faculties from the institute and the staff from Company F both admitted that the duration of Dinggangshixi is confined to the production season in Company F. Clearly when the production season comes, there will be more Dinggangshixi positions available. Some faculties insist that for this reason, the institute is put into a comparatively passive role in Dinggangshixi.
- Both the previous TQP case study and this Dinggangshixi show that the main partner of Institute A is Company F. Obviously the advantage is that since most students work in the same factory due to the long partnership between the two, and it is more convenient for teachers to communicate with students, which turned out unfortunately not as well as expected. Partnering with only one partner brings a lot of problems, and the above-mentioned no guarantee of the duration of Dinggangshixi is just one of them.

## **4.2 Teaching staff cooperation and Dinggangshixi in Polytechnic College B (Shenyang)**

### **4.2.1 Teaching staff cooperation between College B and Company T**

As mentioned in previous chapter, Engeström suggests that any activity of learning must answer at least four questions, i.e. who are the subjects of learning, why

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do they learn, what do they learn, and how do they learn. Unlike the cooperation between Institute A and Company F, which is based on long yet complicated relationship, the Polytechnic College B has altogether 86 cooperative partners and the cooperation is built up under certain circumstances. An introduction of the general contexts of the cooperation will help us understand the partnership between College B and Company T. So this section starts with Engeström's second question in learning activity, that is, why do they learn.

#### **4.2.1.1 The reasons of learning – general context**

The essence of vocational education reformation nowadays in China focuses on practical skills. Technical skills are emphasized not only among students, who are required to participate in skill training in the training center on campus and Dingnagshixi in workplaces outside the campus to improve their practical skills, but also among full-time teachers. Since 1985, numerous policies and regulations have been made concerning the further training of professionalized teaching staff both in higher vocational education and in secondary vocational education. The dual requirements of the students, i.e. possessing theoretical knowledge and practical skills, require the teaching staff must be both theoretically and technically equipped. It is under this circumstance the term “dual qualified teacher” turned up, and for long time, this term is quite arguable. Up to now two opinions on this term prevailed. One insisted that the “dual qualified teacher” refers to the full-time teachers who are “dual certificated”, that is, they hold the teaching certificates as well as the certificates of technicians. The other insisted that nothing but the capabilities of the teachers count.

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The ability of teaching theories and mentoring students' skill trainings is emphasized rather than the certificates (Huang, 2006). Scholars argue that misunderstandings of the concept lead to the mismanagement in executions. Then the term is further conceptualized by two documents from the Ministry of Education, *suggestions on the development of teaching staff in secondary higher vocational schools* (Department of Higher Education, 2002, 5) and *plans on the assessment of teaching staff in higher vocational schools*.

According to the documents, the “dual qualified teachers” refer to the full-time certificated lecturers (or above) who fulfill one of the four requirements:

- hold middle title (or above) of technical certificates relevant with their lectures in school;
- have more than two years of working experiences in enterprises over recent years, or have taken part in the technical trainings organized by the Ministry of Education and got the certificates, and are capable of mentoring students' practical skill trainings;
- have been in charge of two technique research program over recent years, and the techniques have been effectively applied into enterprises;
- have been in charge of designs and constructions of at least two training facilities to improve technical skills on campus, and the results have been proved to be effective.

The training of “dual qualified teachers” was enhanced by the training bases located in several authorized institutes, through which short-term practical and

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technical trainings are conducted, modern concepts in vocational pedagogy are lectured, and teachers' further education is carried out. It is reported that in 2008 the "dual qualified teachers" in northeastern vocational schools on average account for 25.5% of all full-time teachers in this area (Wang & Zhang, 2010), but the percentage is much lower compared with 70 % as required by the Ministry of Education.

Suggested by scholars and authorized by the Ministry of Education, a new document, *suggestions on the development of teaching staff in higher vocational schools*, was issued. It puts forward that engineers and managers, who possess advanced skills and can lecture specialized courses or carry out training tasks independently, should be invited into the campus to perform as part-time teachers. In this way, the whole teaching group, including full-time teachers and part-time teachers, will be enriched and dual qualified.

It is under this circumstance College B established its cooperation with its 86 local partners, and Company T is just one of them.

#### **4.2.1.2 The subjects of learning- introduction of College B and Company T**

The Polytechnic College B, located within Shenyang, the capital of Liaoning Province, is a provincial vocational college founded in 1980. Supported by the huge industrial clusters of equipment manufacturing in Shenyang, College B is entitled as national training base of numerical control technology, computer application and software technology by the Ministry of Education of China. Being equipped with the modern virtual information technology, the 36000-square-meter training center on campus equals to a medium-sized equipment manufacturer. Meanwhile, the skill

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training is supplemented out of question by the college's partnership with 86 Dinggangshixi workplaces outside the campus. In the college there are more than 10 thousand students, and altogether 475 full-time teachers, among whom 40% of them used to work in enterprises and 42% of them are associate professors or professors. The teaching staff is diversified by 160 part-time teachers, who are either engineers or directors of factories in Shenyang.

These part-time teachers are assigned as deans or vice deans in some departments in the college. Meanwhile, they are lecturing specialized courses and in charge of training issues. Needless to say, these part-time teachers play crucial roles in the college.

Company T (Shenyang), a transformer manufacturer, was established in 2003 based on reorganizing the previous transformer manufacturer (Shenyang) by Company T Electric Apparatus Company, the first company in transformer manufacturing industry to go public in China. In October 2008, Company T becomes a subsidiary of T Electric Apparatus Company. Now it has the ability to design and produce transformers of the highest voltage level and the largest capacity, reactors, and DC converter transformers and to test 1000 KV and to design special transformers with the productivity of 40 million KVA. Company T is authorized to produce China's national important equipments, such as the National Debt Project, the Guiguang DC Power Transmission Project (cooperated with Germany), and Longtan Hugauglic Power Project. Meanwhile, the products are exported to the Southeastern Asia, the Gulf Region, Africa and Western America. Now Company T has become an

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international industrial base with more than 2000 employees, and the total assets are valued as 6 billion RMB (0.88 billion US \$). In 2009, Company T has finished the contracts of 10 billion RMB (1.48 billion US \$).

#### **4.2.1.3 The contents of learning**

In the teaching staff cooperation between the College B and Company T, the basic idea is to enrich and diversify the teaching group in the college by recruiting qualified employees from Company T.

#### **4.2.1.4 The ways of learning**

##### **4.2.1.4.1 Pre-screening**

There are 6 academic departments, a department of basic courses, an attached second vocational school, and a technical training base in College B. The teaching staff cooperation is conducted in the 6 academic departments. Though each department is authorized to develop their own ways of cooperation, it is required that the basic rules and principles set up by the personnel department of the college cannot be contradicted. According to the rules, the intention of cooperation gets started when the academic departments deliver their plans of recruiting part-time teachers to the personnel department in the college. In each academic department, there are several teaching and research sections, which are the smallest academic units who are responsible for drafting out the recruiting plan of part-time teachers. In the plan, besides number, the qualities of part-time teachers should be elaborated. For example, the department of mechanical engineering requires the part-time teachers should

- be technicians, engineers, or managers in T

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➤ have the ability of teaching and lecturing

➤ have the accountability

The above qualities are quite normal, and there are also special qualities required, such as

➤ For basic course lecturers, they must have master degrees and more than one year of teaching experience and practice in engineering project

➤ For specialized course lecturers, they must have more than five years of working experiences in enterprises and hold intermediate or advanced certificates in professional and technical positions

➤ For training mentors, they must master relevant technical skills and hold technician certificates

After receiving the recruiting plan, the personnel department will check if there is anything inappropriate or contradicting to the rules and principles, if not, the plan will be faxed to the human resources department in Company T, which is the counterpart in charge of teaching staff cooperation in Company T. In this department, there is a name list on the database to show the employees in Company T who have registered for part-time job wishes. By clicking the names on the list, the personal files of these employees will be shown, including age, gender, technician titles and certificates, working experiences, and part-time job wishes. Based on the name list in the database, the staff will single the suitable ones out, and then the human resources department will hold a meeting for the literally qualified candidates to explain the part-time jobs. Meanwhile, the contract signed by the college and Company T in 2008 will be



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interpreted in details. It is necessary to point out that the cooperation between the college and Company T is not just confined to the teaching staff cooperation. This is just one of the cooperative items and all part-time teachers' final contracts will be attached to this contract. This is a must-to-do for the human resources department, as it is the department's obligation to remind the candidates not to do overburdened jobs which will affect their jobs in the company as well as jobs that will be unfavorable to the company, such as things that go against the benefits of the company or things that will give away know-how secrets in Company T.

After the "pre-screening" and the meeting, the human resources department will hand the candidates' personal files over to the personnel department in the college. The personnel department will check one by one to see if these candidates are literally qualified. Based on these personal files, the academic departments will be informed whether their original requirement has been met. If yes, they must prepare for the lecturing trials for the candidates.

#### **4.2.1.4.2 Lecturing trials**

The lecturing trial is an important way for the college to decide whether the candidates are qualified. The lecturing trials are conducted on the scale of the college, but it is the academic departments' obligation to decide the contents of the trials because the departments are the initiator of the requirement of part-time teachers as well as the final workplaces for these teachers. Normally one lecturing trial lasts for 30 minutes. Each candidate is required to present a lecture to students, who are actually judges including the full-time teachers from the relevant teaching and

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research sections, deans of the relevant departments, staff from the personnel department in the college, and staff from the human resources department in Company T, concerning certain topics designated by corresponding departments. The candidates choose their lecturing topics according to the positions that they apply for. If they can get 60% votes from the judges, they will be officially hired after their certificates being checked and copied by the personnel department in the college. These certificates will be used for setting up their personal files as part-time teachers as well as the teaching staff cooperation database in the college.

After checking the certificates, the part-time teachers will sign contracts with the college. As mentioned previously, these contracts will be attached to the contract between the college and Company T or we can understand that these contracts are supplementary items added to the contract signed between the college and Company T. The contracts are triple and the part-time teacher keeps one copy, the personnel department keeps one, and the rest one will be handed over to the human resources department in Company T. Meanwhile, these part-time teachers must hand in the permit from human resources department of Company T to the personnel department in the college to show that their involvement in the teaching has been permitted by Company T. The department has the right to check on this permit with the human resources department of Company T. This is conducted frequently because in Company T, there are rules for employees to obey concerning part-time jobs in other institutions. Anything inappropriate will affect the cooperative projects between the college and the company, and this has become a mutual understanding between the

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college and the company.

#### **4.2.1.4.3 Training**

Since these part-time teachers mostly are technicians and engineers from Company T, comparatively speaking, they have less teaching experiences and command less teaching skills. After the recruitment of the part-time teachers, the pre-job training will be conducted in each department to help these teachers fit into the teaching roles. The pre-job training includes two parts. One part is to inform these part-time teachers their duties and responsibilities during, including

- Participate in the construction of training center and the curriculum development
- Give lectures on specialized courses or direct practical skill trainings according to the syllabuses
- Take part in the specialty reformation, hold seminars for further professional discussion

The other part of training is the teaching skill training, such as how to adjust them to the right teaching manners, how to prepare their lectures for big class and small class, how to finish the teaching plan as required in the teaching and research sections. This part of training is supervised by full-time teachers from each department. The teaching skill training is arranged according to the needs of different departments. Scholars have argued that the training of the part-time teachers should not be the same as the training of the new full-time teachers, which is characterized by routine schedules and large scales. This explains why the so-called “invisible training” is very popular in some departments.

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The “invisible training” prevails because of its two advantages. One is the flexibility of time. In each semester the teaching and training schedule in each department is really around the clock. It is not easy for the full-time teachers to find plenty and fixed time to conduct teaching skill training for the part-time teachers. In fact lots of full-time teachers complain about the training has added their amount of work without being extra paid. The so-called “invisible training” is based on the union of “academic couple”, in which one is a full-time teacher and the other is a part-time one. Before the part-time teachers start their classes, the full-time teachers are expected to communicate with the part-time teachers on how to carry out the classes concerning the teaching skills and techniques. Or, the part-time teachers can come to their “couples” and ask for help when they meet teaching skill problems. These problems might be solved over lunch or over chitchat. The other advantage of the “invisible training” is that it shows respects to the part-time teachers since the training is conducted actually through free chatting by tactful words. If the full-time teachers have found out problems in the class, they will inform the part-time teachers in tactful ways in order to make them clear about the problems, yet not to embarrass their feelings. Compared with being trained as if they are new teachers, the “invisible training” somehow encourages the part-time teachers work harder to improve their teaching skills in more active ways.

#### **4.2.1.4.4 Administration**

As more and more schools have put the employment of part-time teachers into agenda, the administration becomes an issue. Scholars argue that it is not an

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exaggeration to say that the administration of the part-time teachers can reflect the administration of the whole vocational school.

In the college, the personnel department sets up files of these part-time teachers after their certificates have been checked. Meanwhile, the personal files will also be set up in the department that they work for, through which the assessment of the teachings will be recorded.

The administration of the part-time teachers focuses on the teaching quality control. The teaching process is overseen by the supervision committee consisting of experienced full-time teachers and the classes will be randomly visited by the committee members. It is important to note that this committee is also in charge of the teachings of the full-time teachers. As mentioned above, the members of supervision committee have the right to go to the class as random auditors to check out the teaching process. It is also required that all part-time teachers must attend the full-time teachers' class as auditors no less than 5 times. Meanwhile, part-time teachers must have open class every semester, through which the teaching quality will be evaluated.

Since every part-time teacher is a member of teaching and research section, which is the smallest academic unit in each department, the director of the section is the direct leader of part-time teachers. The director is expected to communicate with the class messenger, who is selected among the students and responsible for delivering the comments of students for part-time teachers. Before the end of each semester, students will get questionnaires to give comments on their part-time

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teachers. The basic job of the class messenger is to organize the whole class to give comments of their part-time teachers and deliver the final comments to the director of the teaching and research section. The comments will be important references for the re-employment of the part-time teachers. The communication between the director and the messenger will be concluded as a final report to the administration office of teaching staff, which will play an important role in the final assessment of the part-time teachers.

Finally all comments, including the ones from the supervision committee, the ones from the full-time teachers, and the ones from the students will be handed over to the dean of the department, who will review all these comments and add his/her own. Then these will be delivered to the personnel department who are the final judge to decide whether the part-time teachers will be re-hired in next semester. If the comments are positive, the part-time teachers will be hired in next semester and the contracts will be re-signed.

#### **4.2.1.5 Teaching staff cooperation between electrical engineering department and Company T—the “four doubles”**

The previous sections have introduced the general process of teaching staff cooperation. As mentioned previously, each department is authorized to develop its own ways of cooperation preconditioned by the confirmation of the personnel department. In the following sections, the teaching staff cooperation in electrical engineering department will be elaborated.

The electrical engineering department has established teaching staff cooperation

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with 6 companies, including Company T. Now there are 15 senior engineers and managers from Company T serve as part-time teachers, and some of them are appointed as deans of the department or directors of the teaching and research sections.

The model of teaching staff cooperation in the electrical engineering department is well known for its “four doubles”. “Double” here refers to the union of the full-time teacher and the part-time teacher shares tasks in each project. The so-called “four doubles” include double academic leaders for each specialty, double teachers in the curriculum development, double identities of the full-time and part-time teachers, and double guarantees of the department and Company T.

#### **4.2.1.5.1 Double academic leaders for each specialty**

In the department of electrical engineering, it is required that each specialty must have two academic leaders, that is, one is the full-time teacher in the college, and the other is the part-time teacher from Company T. For example, the specialty of electric automation in this department is led by associate professor Gao and manager Su. Professor Gao not only has published many papers on control technique, but also supervised and participated in some important projects on the technical reformation in the factories of Shenyang. He obtained many patents by cooperating with technicians and engineers from Company T and plays an important role in the specialty of electric automation. Mr. Su is an expert of electrical products manufacturing and management, who has published many papers on *Robot* and holds the patent of “the casting robot with 3 rotational degrees of freedom”. Mr. Su serves as the part-time academic leader

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of the department of electrical engineering. Professor Gao and Mr. Su focus on different duties and responsibilities. Professor Gao is mainly in charge of the development of curriculum system, key curricula, teaching group, and the training center on campus; Mr. Su is responsible for the analysis of work process, the confirmation of work competency required during the work process, the design of project teaching cases and practical courses, and the buildup of training centers outside campus.

These two academic leaders supplement each other by optimizing their own resources in each workplace, and bring the new techniques and information to where these are needed.

#### **4.2.1.5.2 Co-working on the curriculum development**

As mentioned previously, the work process knowledge is analyzed by Mr. Su from Company T. After analyzing the whole technical process, including the whole production process and its key parts, four key working competencies during work are confirmed. They are, the ability of identifying components, welding, and assembling, the capability of reading blueprint, wiring, and testing systems, the ability of maintaining production lines and diagnosing tackling breakdowns, and the capacity of developing the control system and upgrading technology respectively. Four key courses are developed accordingly, and they are *PLC technology and application*, *producing and testing of the electrical products*, *control technology of mechanical and electrical equipment*, and *control technology of computer*. These four courses are co-developed by full-time teachers from the department and the part-time teachers



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from Company T. Each course is co-edited by two teachers, who is either professor or senior engineer. They share different tasks on curriculum standards, layout of textbooks, design of teaching software, reformation of teaching methods, and teaching contents of network platform.

- The curriculum standards include the analysis of work process knowledge, the design and organization of on-campus training, the theoretical knowledge that students must master, and the ways to assess the above-mentioned three standards. The part-time teachers are in charge of the analysis of work process knowledge, and the full-time teachers are responsible for the theoretical knowledge that students must master. The design and organization of on-campus training, the ways to assess these three standards are co-developed by them.
- The layout of the textbooks includes practical training part, examples of project cases, the training of the project cases, and the theoretical parts. The teachers from Company T are in charge of the practical training part, examples of project cases, and the training of the project cases. The teachers of the department are in charge of the theoretical part.
- In the designing of teaching software, the teachers from Company T are responsible for designing and developing the training, and the teachers from the department are responsible for the designing and developing the teaching.
- In the teaching method reformation, the teachers from Company T are responsible for the training module, project cases, and the ways of assessment,

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and the teachers from the department are responsible for the design of teaching (what, who, where, how to teach) and the ways of assessment.

- In the teaching contents of network platform, the teachers from Company T offer materials such as the models of real work-situated operation, the production process, equipment and components, work process and the production lines, technical specifications, and operation constructions. The teachers from the department design the internet platform, offer technical support, teaching materials and training materials, design the systems concerning the online teaching, interaction between students and teachers, and online assessment and evaluation.

#### **4.2.1.5.3 Double identities of the part-time and full-time teachers**

It is important to point out that not only the engineers or managers from Company T involve in the teachings in the department, but also some teachers from the department participate in the workings in Company T. These persons have double identities due to their part-time and full-time jobs. According to the rules in the department and Company T, part-time employees should have professional titles, clear-cut responsibilities and duties, and authentic projects to do in their part-time job.

- Professional titles. It is regulated that the part-time employees should have professional titles in their part-time workplaces. For example, professor Gao is the director of the electrical department as well as the vice manager in the branch of Company T. Mr. Su is the branch manager of Company T as well as vice director of the electrical engineering department. He has his own office in the

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department and is required to participate in the regular meetings in the department every Wednesday afternoon. As mentioned previously, there are altogether 15 persons from Company T serve as part-time teachers in the department, and one of them serves as the vice director of the department and the rest 14 are teachers who play important roles in the development of the specialties in this department. Currently, there are 11 teachers serve as part-time employees in Company T. Most of them serve as engineers or senior engineers who focus on the design and problem-solving of the equipment in Company T.

- Clear-cut responsibilities and duties. The department and Company T have come to an agreement that part-time employees must have clear-cut responsibilities and duties in their part-time workplaces instead of just being nominal. For example, professor Gao is the vice manager of the branch Company T who in charge of design and evaluation of the technical arts, and he is required to work in the branch two days a week (Sunday included), attend the central meetings, and make sure that his project in Company T is progressing. Mr. Su, who is the vice director of the department and in charge of the practical training and teaching, is required to work a whole day in the department besides his lecturing time (Sunday excluded), attend the regular meeting in the department every week, supervise the execution of the practical training and teaching plan, syllabus, and approval of the projects, and the evaluation and assessment of the practical training. Generally speaking, college teachers serve as engineers in Company T and engineers serve as teachers in their part-time workplaces, both are expected to bring their

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expertise into new working environment. They are assigned peculiar responsibilities and duties in their part-time workplaces before they start their work. Finally their work will be assessed and evaluated according to the rules and principles in their contracts.

- Authentic projects to do. It is regulated that the precondition for the part-time employees is that they have projects of their own or projects cooperated with their partners and these projects must have been initiated and approved. For example, professor Cao serves as a senior engineer in Company T and is supervising the project on “electrical control system of automatic welding workstation”, and the results have been applied in the welding production lines in Company T. Mr. Lu serves as a part-time teacher in charge of the curriculum development. His “PLC technology and application” becomes a classic course in Liaoning province.

#### **4.2.1.5.4 Double guarantees**

To further the teaching staff cooperation between the department and Company T, several documents have been issued, including *plans on developing the dual-qualified teaching staff team, regulations on hiring part-time directors in teaching and research sections, notice on the workday in Company T*, etc. Based on these rules and principles, Company T and the department co-developed agreement, responsibilities, payment, and ways of evaluation on the cooperation.

- Agreement. The agreement, *co-developing the teaching staff team*, has been signed between the department and Company T. To protect the cooperation legally, the agreement includes the name lists of part-time employees in each

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other's workplace, duties and responsibilities that they must follow and finish, paycheck that they should be rewarded accordingly, and the ways of evaluation and assessment.

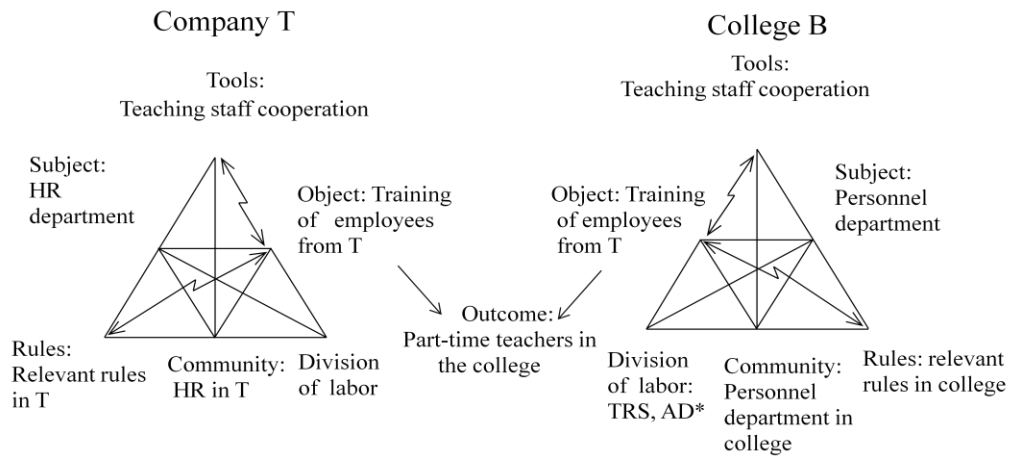
- Responsibilities. Based on the agreement between the department and Company T, to be hired as part-time employees is not something personal, rather it must be allowed and confirmed by two communities. In this way, the two communities, i.e. the department and Company T, have to create conditions which are helpful for them to carry their work out and make sure that the part-time employees are able to deal with the schedule conflicts.
- Pay accordingly. According to the regulation, part-time employees should be rewarded accordingly. The directors in teaching and research sections get their salary every month and the part-time teachers are paid according to their workload in the department. The part-time engineers in Company T get their one-time payment when the projects are finished.
- Ways of evaluation and assessment. The ways of evaluation and assessment are co-designed by the department and Company T. There are offices in charge of the evaluation and assessment both in the department and Company T, and the offices are responsible for the management and evaluation of the part-time employees. The results of evaluation will decide whether the employees could be re-hired, or get a raise. Meanwhile, the employees are required to fill in the workbook every week in their workplaces. They must hand their work reports to the human resources department semi annually for the evaluation of the mid-year assessment.

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The final work report will be handed in at the end of each year, which is the important reference for the human resources department to re-evaluate the performances of the whole year. The final evaluation report will be delivered to the directors for the final confirmation.

#### **4.2.1.6 Summary**

In the teaching staff cooperation between the college and Company T, the basic idea is to enrich and diversify the teaching group in the college by recruiting qualified employees from Company T. The qualified part-time teachers from Company T are the final goal of the cooperation and bridge the cooperation up. The cooperative counterparts involved mostly are the personnel department in the college and the human resources in Company T. Of course, there are other participants in the college, such as the teaching and research sections and the departments that recruit part-time teachers. Since these two units are within the college, they can be understood and put into the division of labor in the college. The cooperation between the college and Company T on the whole consists of two interacting systems, as Engeström put forward in the minimal model for the third generation of activity system. The cooperative partners' relationship in this case could be exemplified by Figure 15.



**Note: TRS: teaching and research section; AD: academic department**

**Figure 15.** Relationship of Company T and College B.

As shown by Figure 15, the interaction of the cooperation was conducted by Company T and College B. The community in each activity system is the appointed departments that in charge of this cooperation. For each activity system the rules that they must obey are the relevant rules concerning the cooperation in each system. In Company T, the relevant rules refer to the rules the employees must obey when they take part-time jobs, such as they can only take part-time jobs offered by the institutions cooperate with Company T, they are not allowed to take overburdened jobs which will affect their works in Company T, and their part-time jobs may have some connections with their work in Company T, but they are not allowed to give away intentionally top secret techniques in Company T. In College B, the relevant rules refer to the rules and principles made for the recruiting, training, and administrating part-time teachers. As mentioned previously, these rules and principles are adjustable according to the specific needs in each department, but the basic regulations are fixed and non-negotiable. The division of labor in Company T is the

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human resources department, and the division of labor in the college contains the personnel department, the teaching and research section in each department, and the departments that offer part-time positions.

In the horizontal interaction between Company T and College B, the subject human resources department in Company T co-works with the subject personnel department in the college to single the literally qualified part-time teachers out. The mediating artifacts used by the college include the lecturing trials, training, including the pre-job training as well as the so-called “invisible” training, and ways of administrating after the official recruitment. The mediating artifact utilized by the company is mainly the “pre-screening”, though the company also participates in the lecturing trials and involves in the final confirmation of the employment. It is quite obvious that in the cooperation the college is much more active than Company T. It is understandable since the teaching staff cooperation is mainly about the college recruiting part-time teachers from Company T, and in the cooperation the college benefits more compared with Company T. This was further explained during the interviews of the staff from Company T. According to the interviewees, honestly Company T is reluctant to let its employees get part-time jobs as Company T insists that the jobs in one way or another affect their jobs in Company T. The teaching staff cooperation can be built up because there are some important technical programs conducted in Company T and certain departments in the college. Some full-time teachers co-work with the engineers in Company T in these programs, and as an exchange, the college asked for the teaching staff cooperation. This might explain



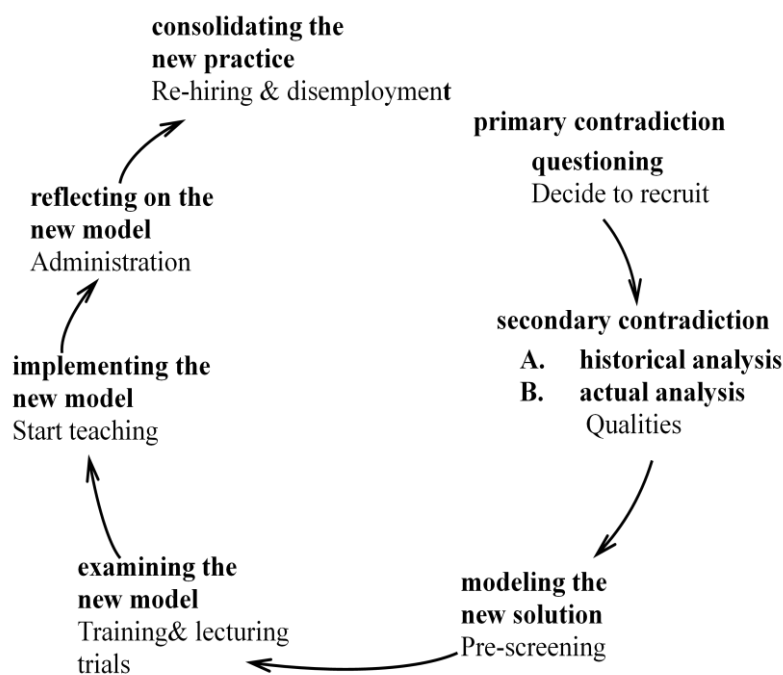
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why Company T is not very active in the cooperation yet has to cooperate with the college on this point.

In the principles of activity theory, Engeström identifies internal contradictions as ‘the driving force of change and development in activity systems’ (Engeström, 2001). Company T’s internal requirement of advanced technical cooperation with the college and the college’s requirement of the part-time teachers who are familiar with the production lines made this teaching staff cooperation possible. Though Company T’s requirement is not exemplified in the teaching staff cooperation, without this requirement and the technical cooperation the teaching staff cooperation will be impossible.

The teaching staff cooperation gets started when the departments decide to recruit new part-time teachers from Company T, which is based on the questioning of the existing structure of the full-time teachers. This is exactly what Engeström’s “questioning the existing practices” (Tuomi-Gröhn & Engeström, 2003). The recruiting plan that the departments made contains the qualities of the expecting teachers, which are outlined based on the analysis of the historical and actual situations. These qualifications are not possessed by the full-time teachers in the departments. Because of this, the cooperation becomes necessary, and through the teaching staff cooperation, this contradictory situation can be solved. The real cooperation starts when the human resources department in Company T pre-screens the registered employees in their database. This action is actually a process of “modeling the new solution”. Since these pre-screened candidates are literally

qualified, they are further examined in the college by lecturing trials as well as pre-job trainings, through which qualified candidates will be singled out more carefully. When these part-time teachers start teaching in the college, the teaching staff cooperation is practically implemented. The detailed administration and supervision of these teachers are the concrete measures taken by the college to reflect and consolidate the cooperative practice. On the whole, the teaching staff cooperation corresponds to Engeström’s strategic learning actions and corresponding contradictions in the cycle of expansive learning as shown in Figure 16.



**Figure 16.** Strategic learning and actions and corresponding contradictions in the cycle of expansive learning.

It is important to point out that the steps of “implementing, reflecting, and consolidating the new models” are not accomplished separately; instead, these steps are completed by training and administrating these part-time teachers on the whole.

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As mentioned previously, Company T's action in this cooperation is not as active as College B, but none of this cooperative steps could be accomplished without Company T's involvement, especially when we keep in mind that the object of the cooperation is from Company T. To the point, the teaching staff cooperation between the college and Company T can be defined as expansive learning.

#### **4.2.2 Dinggangshixi (顶岗实习)**

Dinggangshixi in College B is arranged quite differently from Institute A in previous case. In Institute A, most of the students go to Company F to conduct their Dinggangshixi due to the fact that their specialties are mainly about or relevant to autos and Company F is capable of offering enough positions for students' Dinggangshixi based on its long-standing partnership with the institute. College B has 86 partners altogether as mentioned previously. Though these partners can offer enough positions for students' Dinggangshixi, the students are entitled to take the priorities of choosing workplaces of Dinggangshixi by themselves besides these 86 partners due to the consideration of the relevance between their specialties and the positions. If they don't find appropriate positions by themselves, the college will help them out by arranging them into the partners, who cannot guarantee the relevance between the specialties and the positions they offer. The free-choice of the workplaces brings some troubles to the management of Dinggangshixi, as the students scatter in different workplaces and it is inconvenient for the college to send teachers to oversee students' performance, or solve problems in their work. The whole process of Dinggangshixi, comparatively speaking, is a process of self-discipline for students,

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who are required to finish their Dinggangshixi reports and hand them back after Dinggangshixi is finished.

During the research, the questionnaire was designed to collect the data from the students who participated in Dinggangshixi outside the college. Altogether 300 questionnaires were handed out to students and 289 were collected back, in which 286 are valid because the rest 3 forgot the questions on the back of the questionnaire. The high response rate is attributable to the fact that the questionnaires were distributed and collected by hands with the assistance of the chairman in the students' association. Meanwhile, 20 interviewees, who volunteered to join the interviews and who are members of the 286 respondents participated in the following interviews. These 20 interviewees were divided into two groups. The interviews were conducted after the analysis of the questionnaires' results. The interviews were audio-recorded with the permission of the interviewees, and the transcripts were made and analyzed.

#### **4.2.2.1 Dinggangshixi report**

In College B, there is no special department in charge of Dinggangshixi. Instead, each academic department is responsible for the arrangement of its own. If anyone doesn't find a workplace, the human resources department in the college will be informed by the academic department and will contact with the cooperative partners to figure out whether the partners can offer positions for students. According to the investigation, this rarely happens because more than 95% students found their workplaces by themselves instead of being arranged by the college.

Since there is no special department in charge of Dinggangshixi and the students

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scatter in different workplaces, they are required to finish Dinggangshixi report. It is very important assignment through which the college gets to know the general situation of students' performance in Dinggangshixi. The portfolios of the Dinggangshixi report are distributed to students before they start their work. The students are requested to hand them back after they finish Dinggangshixi. Normally Dinggangshixi report includes four parts:

- The introduction of the workplace
- The contract that student signs with the workplace
- The process of Dinggangshixi (detailed description of the working content, one journal a week to record the work)
- The conclusion of Dinggangshixi

The academic department will assess students' performance in Dinggangshixi and it is free for the department to get contact with the reference workplaces to know the detailed information about students' performance during their work. But according to students' information, this never happened.

#### 4.2.2.2 Students' performance

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Profile of the 286 respondents to the questionnaire	
<b>Age</b>	19 years old-2.4% (7 students); 20 years old-28.0% (80 students); 21 years old-44.8% (128 students); 22 years old-16.8% (48 students); 23 years old-5.9% (17 students); 24 years old-2.1% (6 students)
<b>Gender</b>	male-58.7% (168 students); female-41.3% (118 students)
<b>Major</b>	Computer-14.7% (42 students); Accounting-24.5% (70 students); International trade-8.0% (23 students); Electrical automation-8.7% (25 students);

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	Management-8.0% (23 students);
	Mechanical engineering-30.8% (88 students);
	Social services-5.3% (15 students)
<b>Duration of Dinggangshixi</b>	1-2 months – 35.4% (101 students);
	2-4 months –40.2% (115 students);
	4-6 months – 11.5% (33 students);
	No less than 6 months – 12.9% (37 students)
<b>Planned post-school destination</b>	University-18.5% (53 students);
	Continue the current work-45.1% (129 students);
	Find another work-21.0% (60 students);
	Not sure-15.4% (44 students)

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**Table 8.** The profile of the 286 respondents to the questionnaire.

Through the questionnaire, students' basic personal information was collected and Table 8 is the profile of the 286 respondents who participated in Dinggangshixi outside the college. Through the profile, the personal information of these students could be summarized as the followings:

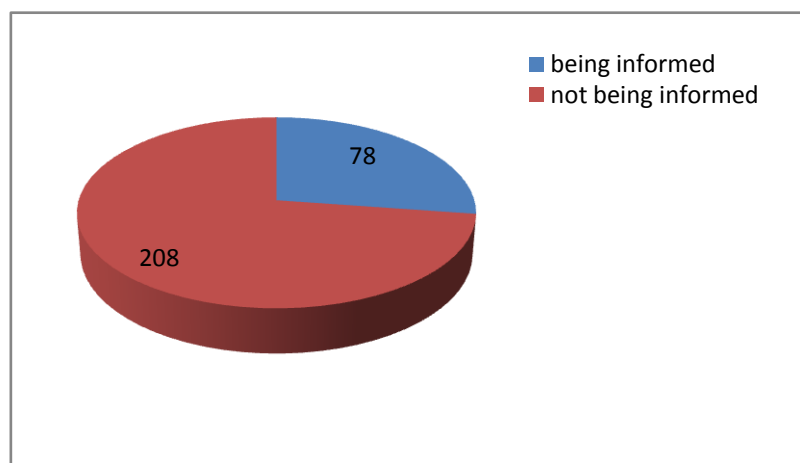
- The profile of the age shows that most students are at the age of twenties, which means that they participated in Dinggangshixi in their last academic year as required by the Ministry of Education.
- Male students are more than female students, but the number is not as big as the one in previous case, in which there are 6 female students among 191 respondents.
- The specialties are diversified, and some belong to social science which explains why the number of female students is close to the number of male ones because traditionally speaking female students are more likely to major in social sciences.
- 12.9% students participated in Dinggangshixi no less than 6 months, as required

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by the Ministry of Education.

- Almost half of the students decided to continue their current job after graduation compared with 27.7% students in previous case determined to continue their job after graduation. 18.5% students decided to further their study and most of these students major in social science. According to their explanation in the interview, it is harder for student major in social science to find jobs after graduation compared with those major in natural science.

Normally before Dinggangshixi gets started officially, students are expected to be informed concerning rules and principles that they should obey in the workplaces as well as the skills used in the working process. In the questionnaire, students were asked whether there was information delivery before they started their work. Figure 17 shows that 78 students, accounting for 27.3% of all, got general information of their work before they started Dinggangshixi.



**Figure 17.** Information delivery to students by staff from workplace.

In the follow-up interview students were asked whether they were informed on the basic knowledge before Dinggangshixi began. The following excerpts are the

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answers of the three student interviewees:

***Excerpt 8 (Interview)***

*Student: ...I major in accounting in the college...When I participated in Dinggangshixi, I was a cashier in the mall and I was shown by another cashier, who has worked in the mall for five years, how to use the cashier register for about half an hour...then I was told that whenever I have questions, I can ask her. Actually the work is quite easy. The half hour introduction is enough for me to get familiar with my work ...after that she gave me a pamphlet. It is actually an employee manual. I was told to read it by myself...*

***Excerpt 9 (Interview)***

*Student: I worked as a fitter in a partner factory of our college during Dinggangshixi. The duration of Dinggangshixi was 6 months, but actually I spent a whole month on training, and I was not paid in this month. Most of trainees said that the training was a waste of time, because most of time our trainers were telling stories about themselves...I didn't think the training was totally a waste of time, but I did think that the trainers should know something about us because we were already quite familiar with the information that they were offering, they should know that...and the relevant information should be delivered instead of chitchatting on personal stuff...*

***Excerpt 10 (Interview)***

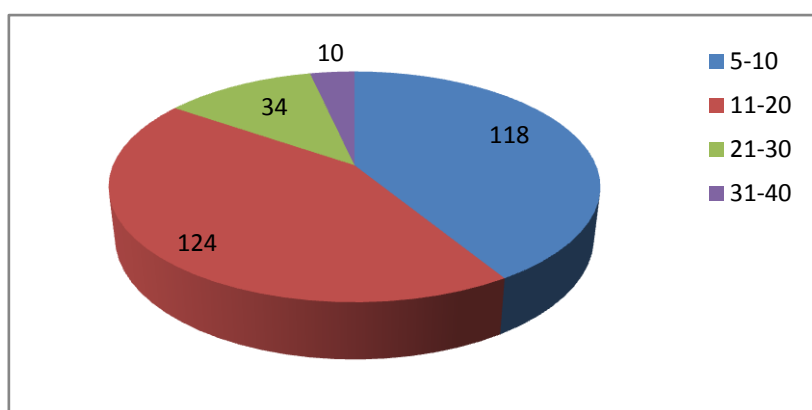
*Students: I would say that nobody on purpose gave me any information on rules and principles that I must obey, but the information was delivered randomly. For example, during the meeting, my boss will remind all staff, especially the ones who conducted*



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*Dinggangshixi in the company, should pay attention to certain tasks. I regard it as a kind of information delivery, which is much better than the formal one because that will make me nervous...*

Excerpt 8 shows that though the information delivery lasted for half an hour, the student felt it enough since his job was not so complicated. In excerpt 9 the student showed his impatience to the one-month training before he started his work. The impatience is due to three reasons. Firstly, this one month is unpaid. Secondly, the trainers were always talking about something irrelevant to the training. Thirdly, it seems the trainer knew nothing about the students. In excerpt 10, the student was quite comfortable with the unofficial way of information delivery during his Dinggangshixi. These three excerpts show that for students, the ways and time of information delivery are not important. Instead, practical and specific information delivery is always preferred compared with large scale, irrelevant trainings.



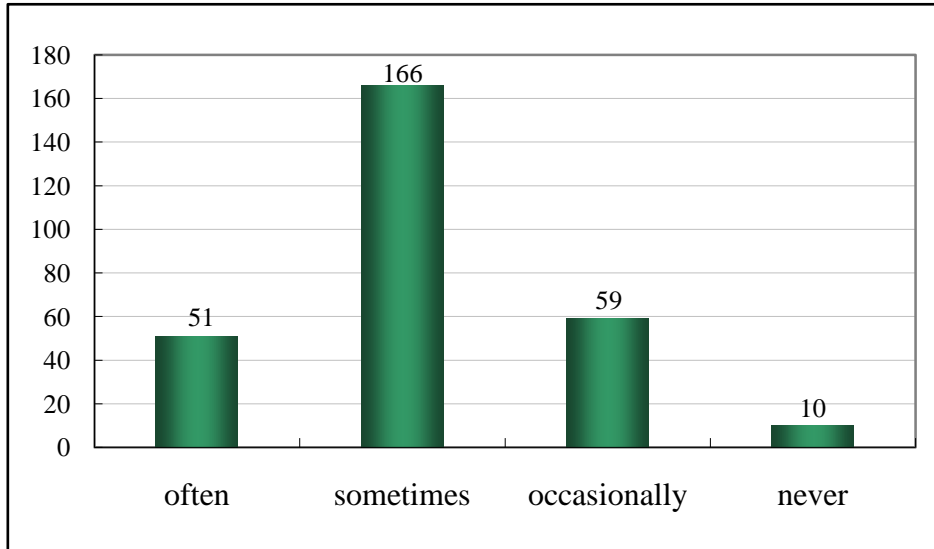
**Figure 18.** Distribution of student number mentored by each master worker.

During the process of Dinggangshixi, students are mentored by master workers according to the requirement of the work. The number that each master worker mentors normally is important because normally students believe that if a master

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worker mentors too many students, there is no chance to communicate with their master workers. Figure 18 shows that among 286 students, there are 118 students every 5-10 share one mentor, which accounts for 41.3%; 124 students, accounting for 43.4% of all, every 11-20 students share one mentor; and the rest 44 students, 34 of them every 21-30 share one mentor and 10 of them every 31-40 share one mentor respectively. All in all, 84.7% students are in the group of 5-10 and the group of 11-20. The number indicates that most students are mentored in small groups during the process of Dinggangshixi, which might be convenient for their communication with the mentors.

The fact is that the communication between students and their mentors did go well. The frequency of communication between the students and their mentors are shown in Figure 19. 51 students often discussed with their mentors, 166 students were sometimes involved in the student-mentor discussion, and 59 students participated in the discussion occasionally. These students, altogether 276, accounting for 96.5% of all, admitted that they had discussion with their mentors during Dinggangshixi. Compared with the percentage of 60.7% in previous case, students in this case are more active in communicating with their mentors.



**Figure 19.** Frequency of discussion between students and master workers.

In the following interviews, the interviewees were asked to talk about the discussions between the mentors and them.

***Excerpt 11 (Interview)***

*Student: Honestly I love to discuss with my mentor about the work, because I am really interested in the work and I hope that I can continue to do this work after graduation...so I need to know more about the work...my mentor is nice and willing to tell me more...we become good friends now...*

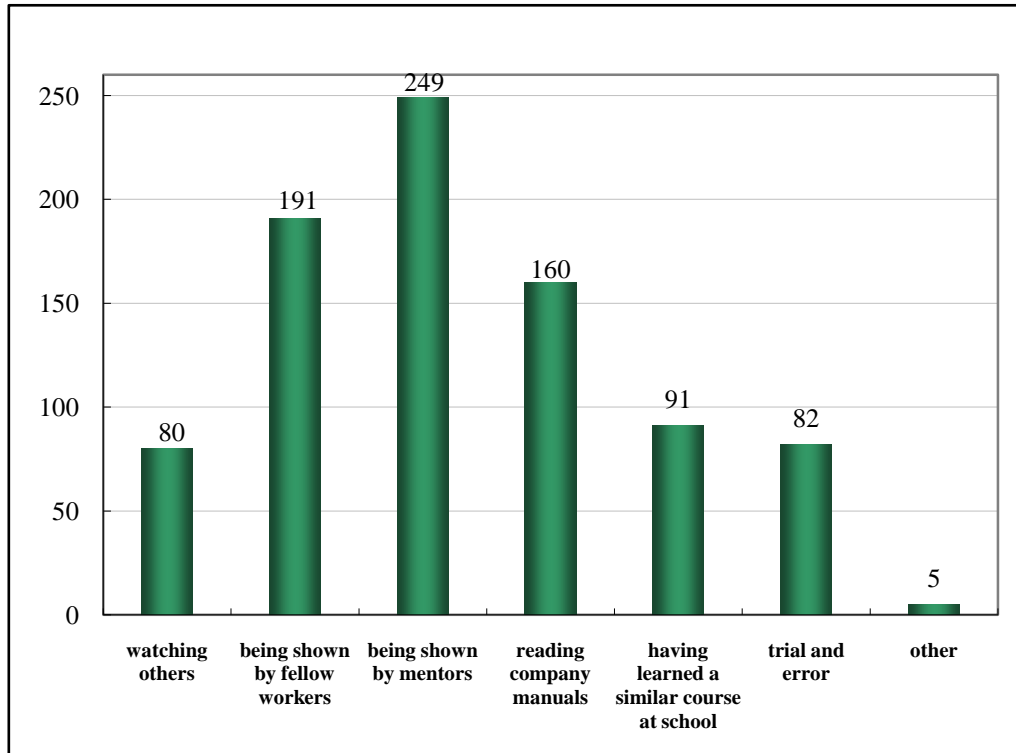
***Excerpt 12 (Interview)***

*Student: ...at the beginning I found it hard to communicate with my mentor because I am not good at it...my mentor noticed this and told me that it was not a shame to ask if I met some problems...she encouraged me to ask and even offered me a chance to do a short presentation before official staff during the morning meeting on Wednesday...you know that was my first presentation, I haven't done that even in the college...*

The results of Figure 19 as well as the interviews are quite different from

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previous case. In previous case, 60.7% students discussed with their mentors about the work, among which 26.2% students chose the word “occasionally” to describe the frequency of discussion. During the interviews, students complained that it seemed the mentors were not interested in discussing with students due to the assumption of the new-comers’ threatening. In this case, things are quite different. The difference lies in the fact that firstly, most of the students in this case took more positive attitudes during Dinggangshixi. They cherished their chances whenever they got suitable positions. Secondly, it is not exaggerating to say that the students in this college are more sociable though some of them mentioned that they are not good at socializing. Actually “interpersonal relationship” has been taken as a necessary subject in some departments and students are required to enroll the course named “interpersonal relationship in workplace”. This could be further proved by reading their final reports of Dinggangshixi, which are full of elaborations on how to improve interpersonal relationship during work. Thirdly, objectively speaking, the positions of Dinggangshixi for these students are more flexible, so the official staff felt less threatened by the potential employees. For example, cashiers in the mall might change their workplaces more frequent than workers or technicians on the production lines in factories, especially when the factories that they work for are good ones.



**Figure 20.** Distribution of learning ways in Dinggangshixi.

During the process of Dinggangshixi, students developed their ways of learning to accumulate work experience. In the questionnaire, students were asked to choose three most important ways of learning in their work. Figure 20 below shows that “being shown by mentors”, “being shown by fellow workers”, and “reading company manuals” are three most important ways of learning.

Figure 20 actually re-confirms the relationship between students and their co-workers in Dinggangshixi as the first two most important ways of learning are “being shown by the mentors” and “being shown by fellow workers” respectively. It is obvious that the mentors as well as se co-workers played important roles in students’ Dinggangshixi. Students learn in their work through communicating with mentors and fellow workers instead of “watching others” and “trial and error”, which are two of the three most important ways of learning in the previous case. It is noticeable that

“watching others” and “trial and error” are less important ways of learning in this case.

It is important to know whether students are clear about the tasks that they are assigned to during Dinggangshixi. Table 9 shows that among 286 students, 18.2% students are always clear about how to carry out their tasks in work, while 14.7% students claim that they are usually unclear about how to carry out their tasks. The rest 67.1% students chose “sometimes I am not clear about how to carry out tasks”. This seems to be contradicted with the foregoing results of “frequent discussion with mentors” and the comparatively active ways of learning.

<b>Type of comment</b>	<b>No.</b>	<b>%</b>
I am always clear about how to carry out tasks	52	18.2
Sometimes I am not clear about how to carry out tasks	192	67.1
I am usually unclear about how to carry out tasks	42	14.7
<b>Total</b>	<b>286</b>	<b>100</b>

**Table 9.** Students’ clarity about the tasks in Dinggangshixi.

In the interview, students were asked whether there is any obstacle for them to understand the tasks in their work.

**Expert 13 (Interview)**

*Student: I was a designer of the website during my Dinggangshixi...and I was entitled to be creative in my work...but, for me, it is hard to know...to what extent? Sometimes*

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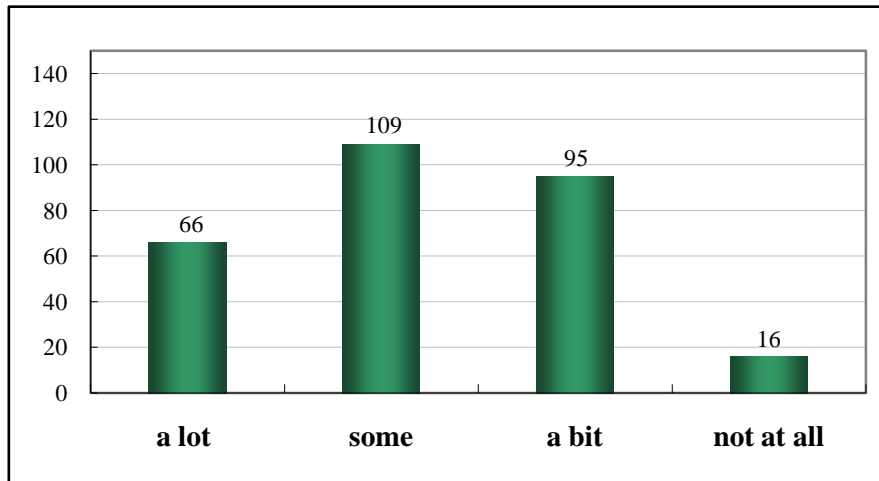
*my boss said my piece was too flashy, and sometimes too simple...it is really difficult for me to know where the point of balance is...*

***Excerpt 14 (Interview)***

*Student: ...it is difficult for me to understand my tasks in my work (assistant of marketing manager). Sometimes I had to think over my assignment and asked my boss whether I got it wrong. Though I know it is not smart to ask, but it is better than make mistakes since most of my works are really flexible...*

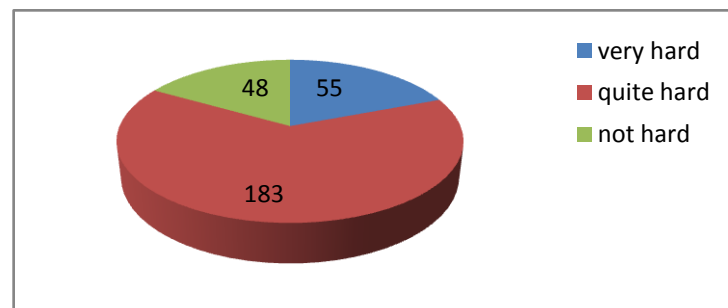
Excerpt 13 and excerpt 14 explain the contradictions. The complexity of the tasks, students' lack of work experience, and even the natural abilities of students should be taken into consideration when we talk about whether they are clear about their tasks in the work.

For most students, Dinggangshixi is their first work experience and they really care about the importance of their work. Students were asked to evaluate the importance of the work they undertook during Dinggangshixi. Figure 21 shows that 16 students, accounting for 5.6% of all, deny there is any importance in their work, and the rest 270 students claim that their work is important, though to various degree. In the interview, students mentioned that they define the importance by the complexity of work. If their work is purely mechanical repetition, they regard it as no importance at all. If they can take initiative during work, then they regard it as highly important.



**Figure 21.** Importance of the task.

As Guile and Griffiths argue, the prime purpose of work experience would be to help students adjust themselves more successfully to the changing content of work through the opportunity to participate in different communities of practice (Guile & Griffiths, 2001). In the questionnaire, students were asked whether it was hard for them to adapt to the working environment. Figure 22 shows that 55 students chose “very hard” to describe their adaption to their working environment, 183 students chose “quite hard”. These 238 students account for 83.2% of all students. The rest 48 students chose “not hard”.



**Figure 22.** Difficulty of adapting to working environment.

During the interviews, students were asked to elaborate on the most difficult things that they met during Dinggangshixi. The following excerpts are from the interviewees.



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***Excerpt 15 (Interview)***

*Student: ... I major in computer and my work during Dinggangshixi is to design website as requested by customers... I know lots of my classmates expect to take initiative during their work, but sometimes it is not that easy...my boss trusted me and always gave me chances to do things by myself. Honestly most of time I did not know what he wanted, since he always described his demands vaguely...that made me nervous as I did not know the starting point of my work...*

***Excerpt 16(Interview)***

*Student: I worked as a secretary in a company. My mentor, who is the secretary of the manager, was planning to change her job. Every day she complained about the job and the boss, and this really affected my mood. So during my Dinggangshixi, I had to double my mind to listen to her complaint and to finish my work...*

The above excerpts from students' interview are about the work contents and the interpersonal relationship. It is clear that students do wish their initiatives be valued, but when they were authorized to take initiatives, they felt confused and didn't know to what degree this initiative went. As for the second excerpt, we have to admit that during Dinggangshixi, mentors can influence students in both ways, positive and negative. It is hard to say which way is better. The important thing is that students realized the work environment might be more complicated than they thought, and this helps them well prepare when they change into other workplaces. This is what Guile and Griffiths said "the development of any individual is affected by the task or activities which he or she is asked to undertake in a specific context" (Guile &

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Griffiths, 2001).

Needless to say that Dinggangshixi helps students develop their generic skills in various ways to various degrees. In the questionnaire students were asked to choose freely among the mentioned generic skills. Table 10 shows that the items were chosen 386 times altogether, which indicates that an average of less two items was chosen by each student. It is noticeable that “oral communicating” ranks the first in table 9 and it is followed up by “planning and organizing”. “Using initiative” comes next, which is the last but one in previous case. “Communicating in writing” and “how to behave at work” rank the last two in this case.

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<b>Type of comment</b>	<b>No.</b>	<b>%</b>
communicating in writing	29	7.5
oral communicating	121	31.3
planning and organizing	87	22.5
using initiative	66	17.1
solving problems	57	14.8
how to behave at work	26	6.8
<b>Total</b>	<b>386</b>	<b>100</b>

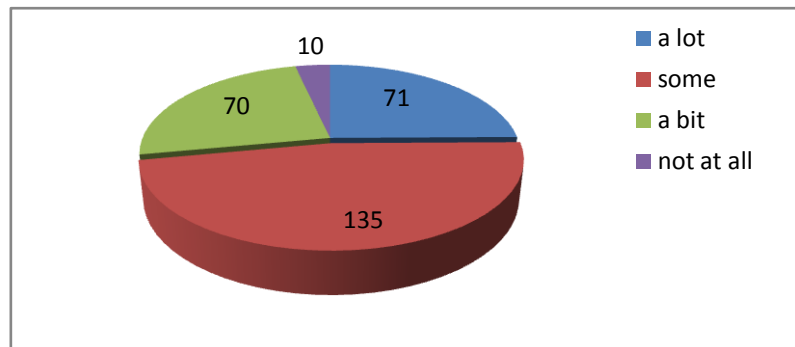
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**Table 10.** Distribution of ability promotion in Dinggangshixi.

Concerning students’ satisfaction with their Dinggangshixi, Figure 23 reveals that 10 students chose “not at all” which means they are not satisfied with their Dinggangshixi at all. The rest 276 students are satisfied with Dinggangshixi, though

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to various degrees. 71 students, accounting for 24.9% of all, chose “a lot” to describe the degree of their satisfaction. 135 students, accounting for 47.2% of all, chose “some”. In this case, the satisfaction degree is about 96.5%, which is higher than the percentage of 87.4% in the previous case.



**Figure 23.** Distribution of students’ satisfaction with Dinggangshixi.

The above figures, tables, and excerpts from interviews depict pictures of the general situation of Dinggangshixi conducted by the students. According to the above data, the 286 respondents, among whom 168 are male students and 118 are female students, mostly conducted their Dinggangshixi in their third academic year, and at least 75.6% of them participated in Dinggangshixi less than six months. The information delivery before Dinggangshixi, according to the data, was not appropriately conducted. Students prefer brief and practical information delivery instead of large scale and irrelevant one. When Dinggangshixi began, students shared mentors and most of them were divided into the group consisting of 5-10 and 11-20 members. Students admitted that mentors played important roles in their work. Mentors were willing to discuss with the students and encourage them to perform themselves. With the help of the mentors, the students developed their learning during the work mainly through three ways, “being shown by the mentors”, “being shown by

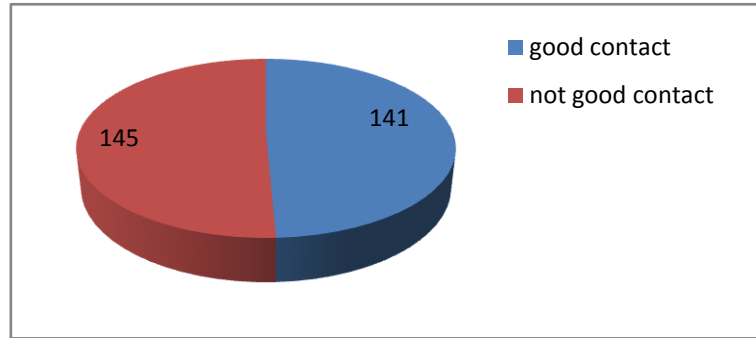
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the fellow workers”, and “reading company manuals”. Though well-mentored, most of the students still felt unclear about the tasks in their work. This reminds us that we have to take students’ natural abilities and the complexity of the tasks into consideration. Students were assigned important tasks during their work, but they felt hard to adapt to the working environment because the environment is way too complicated than they thought. Their abilities got promoted during Dinggangshixi, especially the generic skills such as “oral communicating”, “planning and organizing”, and “using initiative”.

To sum up, students are satisfied with their Dinggangshixi, and half of them decide to continue their work after graduation.

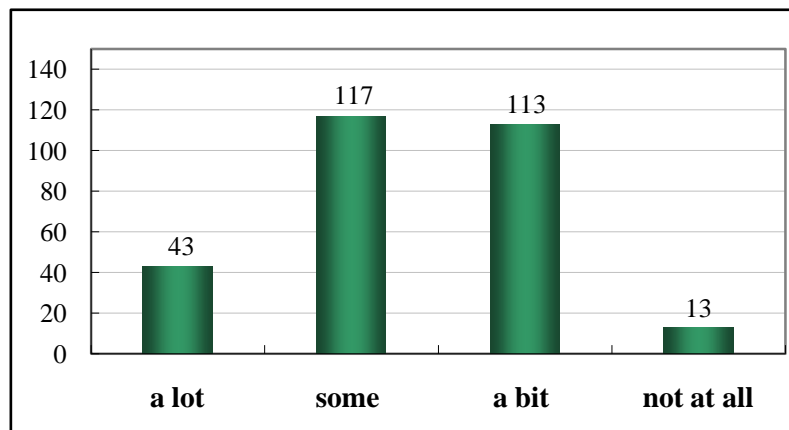
#### **4.2.2.3 Links between Dinggangshixi and school learning**

Dinggangshixi is meant to be a chance for students to practice out the study at school in the workplaces. It is based on the assumption that the study at school is relevant to the work during Dinggangshixi. Meanwhile, the college is supposed to keep in touch with the student participants in Dinggangshixi in case they need any help or advice from the college. Since most students found their positions by themselves in different workplaces, it is impossible for the college to send teachers or supervisors to all workplaces. So students are required to keep contact with their teachers through telephone and email.



**Figure 24.** Students' contact with school teachers during Dinggangshixi.

In the questionnaire, students were asked whether they kept good contact with their teachers during Dinggangshixi. Figure 24 shows that 141 students kept good contact. On the contrary, 145 students did not keep good contact with their teachers during Dinggangshixi.



**Figure 25.** Connection between school courses and work in workplace.

Students were asked whether there is any connection between the school course and the work in workplace. Figure 25 shows that 13 students chose “there is no connection at all between school courses and work in workplace”, accounting for 5% of all. The rest 273 students, accounting for 95%, admitted there are connections, though to various degrees. The percentage is comparatively high as we mentioned previously that in this case most of students took the relevance between the positions

and their specialties into consideration when they chose their Dinggangshixi positions. In the interview, students mentioned that sometimes after work, they took their textbooks out to find out certain knowledge which was quite useful in their work, especially some computer. Some admitted that they felt really regretful that they did not study well in the school classes, and the work compelled them to review their knowledge and apply the knowledge into practice.

Likewise, students were asked whether they've learned something useful in Dinggangshixi to their school study. Table 11 shows that 11 students have known what they learned in Dinggangshixi already through school study. 4 students said that they learned nothing from Dinggangshixi at all. The rest 271 students, accounting for 94.8% of all, declared that they learned something useful to their school study.

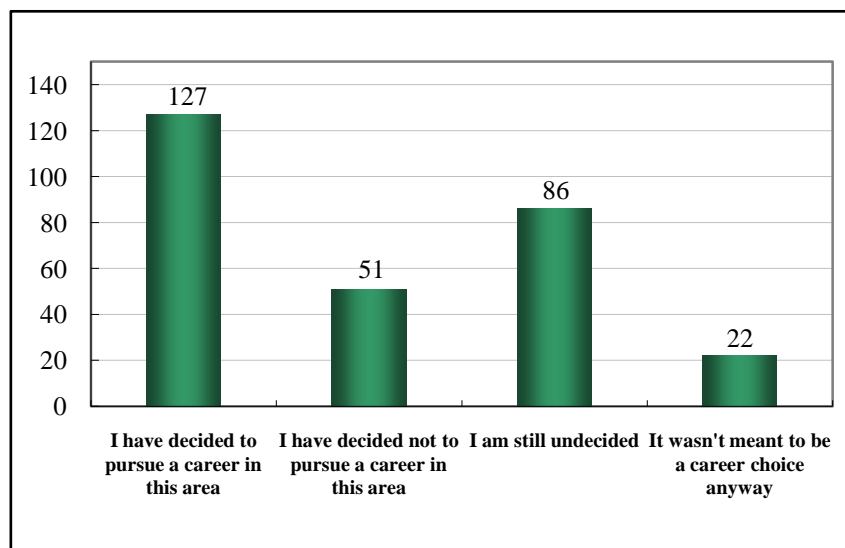
Type of comment	No.	%
a lot	71	24.8
some	127	44.4
a bit	73	25.5
knew it already from school	11	3.9
not at all	4	1.4
<b>Total</b>	<b>286</b>	<b>100</b>

**Table 11.** Did you learn anything useful in Dinggangshixi to your school study?

Since students chose their Dinggangshixi positions relevant to their specialties, it is a good chance for them to consider whether they will continue to work in the fields after graduation. In the questionnaire, the question of “the impact of Dinggangshixi on

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students' career choice" was asked. Actually this question has been mentioned in the previous "planned post-school destination", and 129 students admitted that they will continue their current work after graduation. Figure 26 shows that concerning the impact of Dinggangshixi on career choice, 22 students chose "it wasn't meant to be a career choice anyway", which is a denial of the impact. 86 students chose "I am still undecided", which is an unconfirmed answer to their final decision as well as the impact of Dinggangshixi on their career choice. The rest 178 students, accounting for 62.2%, made clear decisions after Dinggangshixi. 127 students have decided to pursue a career in this area, by which we may presume that Dinggangshixi gives positive impact on students' career choices. 51 students chose not to pursue a career in this area, which shows that Dinggangshixi may give negative influence on their career choice. On either way, it is great for students to make decisions through Dinggangshixi. During the interviews, students explained their choices.



**Figure 26.** Impact of Dinggangshixi on career choice.

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**Excerpt 17 (Interview)**

*Student: Before Dinggangshixi, I have no idea about my work in the future. Actually I always asked myself whether there are chances to change my specialty. Then I started Dinggangshixi and I began to like what I did in my work...though my boss was not quite satisfied with my performance, I will work harder in the future...*

**Excerpt 18 (Interview)**

*Student: I used to study really hard in school...wish I could have a good job after graduation...but after Dinggangshixi, I realized the work is not suitable for me. Though it is a little bit late for me to know, still I have chance to find a job in other fields before graduation...*

**4.2.2.4 Reliability statistics of the respondents**

The details of Cronbach Alpha are shown as Tabel 12.

No.	Description	No. of items	Cronbach Alpha
1	Performance in Dinggangshixi	9	0.853
2	Links between school learning and work	4	0.861

**Table 12.** Reliability statistics.

The computed Cronbach Alpha result indicated that each item in the questionnaire has quite high reliability.

**4.2.2.5 Summary**

The overall impression gained from the analysis of the 286 questionnaires and some interviews is that undertaking Dinggangshixi seems to be positive work experience for the majority of those involved. It does need to be acknowledged that



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those returning the questionnaires might not be entirely typical of the full population of Dinggangshixi, but it is reasonable to assume that the responses may be indicative of Dinggangshixi as a whole.

#### **4.2.2.5.1 What kind of work contexts did the workplaces offer during Dinggangshixi?**

The overall impression gained from this case is quite different from the previous one. In this case, to highlight the relevance between the positions and the specialties, students were encouraged to look for Dinggangshixi positions by themselves. As a result, students scattered in different workplaces that don't have any cooperation with the college at all, which makes it inconvenient for the college to send teachers to oversee students' performance in Dinggangshixi. Hence, there is "minimal amount of cooperation between vocational institutions and the workplace" as suggested in the "traditional model of work experience". When Dinggangshixi got started, students were poorly informed concerning the work by the staff from the workplaces as the "traditional model of work experience" suggested that they are "launched" into the workplaces where they have to adjust to the requirements of the job, and no special guidance or facilitation is conducted. During Dinggangshixi, most students were divided into groups with reasonable members sharing the same mentors, who actually did help a lot to students' work. Students properly handled their interpersonal relationship with their mentors, and because of the harmonious relationship the discussion between students and their mentors went well. The tasks assigned to students were regarded as important and required initiatives. Students found it hard to

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adapt to the working environment because of this initiative-demanding, as they were not aware the extent this initiative went.

#### **4.2.2.5.2 What type of work experience did students obtain in Dinggangshixi?**

In this case, the college evaluates students' performance based on their final Dinggangshixi reports recorded their daily work life. This is a token of "generic model of work experience" which emphasizes the learning outcome. As we mentioned in this section, there is a course in the college called "interpersonal relationship in workplace" required all students' attendance and previously we concluded that students in this case are more likely to deal with the interpersonal relationship in their Dinggangshixi. It is reasonable to assume that the course did help students in certain degree with their interpersonal relationship. This is a characteristic of the work process model through which students have a panoramic understanding of the interpersonal relationship during their work. Students claimed that their generic skills, especially their "oral communicating", "planning and organizing", and "using initiatives" got promoted during the process of Dinggangshixi.

#### **4.2.2.5.3 Can work experience help students figure out their future career choice?**

There are 286 respondents in this case, among whom 168 are male students and 118 are female students and their specialties include natural science as well as social science. Most of these students conducted their Dinggnagshixi in their third academic year. More than 62.2 % students confirmed their career choice after participating in Dinggangshixi. It is reasonable to say that Dinggangshixi is a good chance for students to figure out whether they will choose to work in the area that they major in.

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#### **4.2.2.5.4 What problems remain?**

Though students claimed that they preferred practical and casual training before their work got started, it turned out that their understanding of the work tasks were not good especially the degree to which their initiatives went. Though students are reminded to keep contact with their teachers at school through emails and phone calls if they need advice or suggestions, it turned out that more than half of students claimed that their contact with school teachers during Dinggangshixi didn't go well. Meanwhile, the college evaluates students' performance only based on their final Dinggangshixi reports recorded their daily work life. As students know that nobody will go and check about their performance in Dinggangshixi (this never happened before), the contents of Dinggangshixi reports are not reliable.

### **4.3 Dingdanpeiyang and Dinggangshixi in College C (Harbin)**

#### **4.3.1 Dingdanpeiyang (订单培养)**

The students' employability after graduation nowadays is the most important measure for assessing vocational colleges. Job-orientedness is a key word and cannot be emphasized enough in the higher vocational education. Lots of documents have been issued to compel vocational schools to take the employability into consideration during the process of training and learning. Dingdanpeiyang, a special way of training, is advocated in documents. In 2002, *the State Council's Decisions on Furthering the Reformation and Development of Vocational Education* suggested, "... companies should cooperate with vocational schools, and Dingdaipeiyang might be an effective way..." In 2004, *Suggestions on Job-oriented Reformation on Vocational*

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*Education* put forward that Dingdanpeiyang should be regarded as one of the most important training pattern in vocational education. In 2005, in *Decisions on Developing Vocational Education*, the State Council repeated the importance of Dingdanpeiyang in vocational education and encouraged vocational schools to bring this training form into effect.

Dingdanpeiyang (订单培养) consists of four Chinese characters. The first two characters “Dingdan” (订单) is a term originally used in business. Literally it refers to the order for goods or the paper to show the order of goods. The second two characters “peiyang”(培养) means learning and training. So far, scholars have come to an agreement concerning the definition of Dingdanpeiyang. It refers to vocational schools and enterprises sign agreement on students’ training according to the recruitment plans of the enterprises. The general process of Dingdanpeiyang goes as the followings:

- The college looks for cooperative partner enterprises
- The college and its partners sign the agreement, including the final goal of the training, number of students, ways of training, duties and responsibilities of the college and enterprises (Huang, 1998)
- The Dingdan Classes are organized
- Students in Dingdan Classes are trained according to the requirement of the partner enterprises
- Evaluation of the students’ learning and training by the college and the enterprises

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➤ Recruiting the qualified students by the enterprises

On the whole, “Dingdanpeiyang” is a way of training, in which the core is the training agreement signed between enterprises, who are the buyers in the agreement, and the vocational schools, who are the sellers with their products-students. The agreement means to guarantee the students get jobs in the enterprises if they are trained according to the enterprises’ demands and the training goals are obtained. It is important to point out that normally the agreement is signed before the training of the students gets started, because both the schools and the enterprises are expected to involve in the training process.

This section attempts to give an overview on Dingdanpeiyang, a training pattern between the vocational College C and its partner enterprises. This case study started with careful reading of the documents issued by the central and local governments, through which data concerning the general contexts was obtained. Later on 15 semi-structured interviews were conducted among the faculties in the college and the working staff in its partners. All these interviews were audio recorded with the permission of the interviewees. The transcripts were interpreted, analyzed, and finally conclusions were made.

As Engeström suggested, any activity of learning must answer at least four central questions (Engeström, 2001):

- Who are the subjects of learning?
- Why do they learn, what makes them make the effort?
- What do they learn?

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- How do they learn, what are the key actions or processes of learning?

In the following parts, these four questions will be combined into three questions, i.e. the subjects of learning, the contents of learning, which is also the reason of learning, and the ways of learning.

#### **4.3.1.1 Subjects of learning - College C and its partners (Company H included)**

College C is located in the capital of Heilongjiang province, Harbin. Founded as a national training base of agricultural engineering in 1949 and promoted to a vocational college for higher vocational education in 2001, now the total area of the college is about 2.04 million square meters, and the building area is about 240 000 square meters. The college has 101 modern training workshops on campus, including integrated test lines (Level A) of automobiles, MPS modularized production system, training platform of internet technology, etc. In addition, the college owns 18 training bases of agricultural engineering repairs and 296 training workplaces outside the campus. There are 58 multimedia classrooms, and 444 900 books in the college library. The college is entitled as the national training bases of “numerical control technology”, “automobile test and repair”, and “electrical automation”.

There are 7206 students and 553 faculties, among whom 371 are full-time teachers and 282 dual-qualified teachers. It has 8 departments, such as the department of electrical automation, the department of mechanical engineering, and the department of humanities, etc. So far the college has cooperated with 8 colleges overseas. For example, the Royal Agricultural College in UK, Daegu University in South Korea, TU Dresden in Germany, and so on.

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Heilongjiang Province now is an important base of energy, raw materials, commodity grains and heavy industry. Over recent years, Heilongjiang Province has developed industrial clusters in medical, equipment manufacturing, agricultural, high-tech, petrochemical and food. The diversified industrial clusters offer more opportunities for the college to choose its cooperative partners to improve students' practical skills. So far the college has established Dingdanpeiyang with more than 100 enterprises, which are parts of the industrial clusters in Heilongjiang Province, including CNH (Harbin), SANY (Shanghai), and the so-called "the three powers" in Harbin. For example, Company H is designer as well as manufacturer of fossil steam turbine, nuclear steam turbine, combined cycle steam turbine, gas turbine and marine steam turbine in Harbin. It has 5500 staff, including more than 1,200 engineers and technicians and about 400 senior technicians. Possessing the capacity of manufacturing 300MW, 600MW unit as well as 1000MW class ultra-super critical unit, above 1000MW nuclear unit and heavy gas turbine, the company has annual production capacity of 12000MW, accounting for over 1/3 of the total output of steam turbine for power generation in China. In recent years, Company H has grasped the opportunity of "revitalizing the traditional northeastern industrial base" and cooperated with famous foreign company and introduced 1000MW ultra-super critical steam turbine, 600MW ultra-super critical steam turbine, 600MW supercritical steam turbine and steam turbine for 9F combined cycle. It has vigorously developed new products, continuously increases the core competition of enterprise, and developed 3-casing and 4-casing 600MW subcritical air-cooled/wet-cooled steam turbine;

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300MW subcritical air-cooled/wet-cooled steam turbine; and 668mm, 1000mm, 1200mm L-0/L-1 blade so as to maintain its dominance in turbine manufacturing trade.

#### **4.3.1.2 Contents of learning**

For College C, the learning content is to get its students employed after the training required by the agreement signed between the college and its partners. For the cooperative partners, the learning content is to recruit qualified employees as they expected from the agreement.

#### **4.3.1.3 Ways of learning-aspects of cooperation**

The Dingdanpeiyang is conducted through several ways. First of all, the execution must follow the basic rules and principles listed in the agreement signed between the college and its partners. The whole process of the training must be supervised by the administration office including members from the college as well as its cooperative partners. During the process of training, the partners of the college send mentors to direct students' learning and training in the college, specialty steering committee makes sure that the specialties in the college keeping up with the position requirement of the partners, and Dingdan classes are the final form of training which brings the items in the agreement into practice.

##### **4.3.1.3.1 The agreement**

It is important to point out that in “Dingdanpeiyang”, the agreement between companies and vocational schools is signed before the students' training gets started. As most vocational colleges require three academic years, most training begins from



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the enrollment of the freshmen. The training is carried out according to the items in the agreement, through which the duration of the training (mostly lasts for three years), ways of cooperation, rights and responsibilities of the stakeholders are clarified. The agreement of “Dingdanpeiyang”, which is the key part, was outlined by this office and furthermore, it is the office’s obligations to facilitate the whole process of this project. In the cooperation between College C and Company H, the following items are involved. For example, there were 80 students participated in Dingdanpeiyang in the agreement of 2006 signed by Company H and the department of mechanical engineering in College C. At the beginning of the agreement it is stated that these 80 students are expected to become official employees in Company H in October 2009 if they can finish the training accordingly. The training is carried out by the college and the company cooperatively (as in the cooperative training in the following sections), and it is pointed out that if any of these 80 students fails, the college and the company can fill the vacancy with new student candidates, who must pass the interviews co-conducted by the company and the college. The responsibilities of the stakeholders are also drafted out in the agreement. Basically Company H is the one who decides what to be trained and College C is the one who decides how to be trained with the involvement of the company. Meanwhile, it is emphasized that the practical skill training includes two parts, i.e. the on-campus training which imitates the real working positions in the training center of the college and the out-campus training which is the real working positions, mostly is Dinggangshixi in Company H. During the on-campus training, Company H offers the skills and techniques to help the

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college figure out ways of imitating the real working position, or, Company H sends technicians and engineers who can teach the students directly. In the agreement it is pointed out that in this “Dingdanpeiyang”, not all students can be recruited as official employees in Company H. The rate is around 90%, and the rest 10% will find jobs by themselves.

#### **4.3.1.3.2 Administration office of cooperation**

The administration office of cooperation was co-founded by the college and its cooperative partners, including Company H. All cooperation between the college and companies must go through this administration office. For the convenient communication between the stakeholders, all company partners are required to send at least one spokesman in this office during their cooperation. Now it has 11 members, among whom 3 are from the college and the rest 8 are from its cooperative partners. The office has lots of responsibilities, such as the reception of the potential cooperative partners, the negotiation and confirmation of the cooperation, the supervision of the process of the cooperation, and the evaluation of the cooperation. Besides, it is the administration office in charge of Dingdanpeiyang, Dinggangshixi, which are the most important ways of cooperation. There are two representatives from Company H in this office. Now these two persons and the other three members from the college are in charge of “Dingdanpeiyang”.

#### **4.3.1.3.3 Mentorship**

The students who enroll in Dingdanpeiyang are divided into several classes, and there are 40 students in each class. Company H sent several mentors to the classes,

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and each class has one mentor, who co works with the mentor assigned by the college. These mentors are not supposed to be in the college every day, but they are expected to be there whenever they are needed by the students and they are required to keep in touch with students through cell phone. The mentors are responsible for organizing the academic activities of the students, instructing students harmonizing their relationship with Company H, helping students solve problems in their studies, especially during their out-of-campus training in Company H. The mentors from the college are mainly responsible for students' study at school. They are supposed to co-work with the mentors from Company H, and keep the on-campus and outside-campus training go smoothly.

#### **4.3.1.3.4 Specialty steering committee**

To reinforce the communication and cooperation and make sure the learning and training at school can keep up with the demands of employers, the college established a specialty steering committee. The committee is subordinate to the department of public education, consisting of leaders from the college, teachers with more than 6 years of working experiences in teaching and training, and experts from companies. Now there are 15 members in the committee, among whom 6 are from the college and the rest 9 are from companies. These 15 members include one chairman, one vice chairman, one secretary, and the rest are just committee members.

The major jobs of the committee can be described as the followings:

- Give guiding suggestions concerning specialty training objectives, teaching plans, syllabus of specialized courses and skill trainings, and ways of assessing

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specialized knowledge and skills.

- Supervise the construction of the training bases on campus as well as the construction of training and researching bases outside campus.
- Give advice and suggestions on the development of the specialties.
- Analyze the issues in specialty development and argue the reasonable approaches to get the issues solved.
- Participate in the specialty investigation and discussion as well as academic communications.
- Propose key topics and projects in specialties to improve the academic abilities in the college.
- Give advice on bridging students training and their final workplaces and offer hands on students' career guidance.
- Keep informing the college of the demanding qualities for graduates from the workplaces and offer suggestions to train students at school accordingly.

The committee holds official meetings once a month to summarize, reconsider and discuss the work together. The meetings are hosted by the chairman and all members are required to participate and give oral presentations. It is important to point out that the faculties in the college have the right to be auditors in the official meetings. The members' duration of the appointment is three years, and the college offers financial support for the committee. Meanwhile, the committee is allowed to receive financial help from other departments.

#### **4. 3.1.3.5 Dingdan Classes**

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Dingdan class is the general training form of Dingdanpeiyang in the college. Normally the candidates of Dingdanpeiyang are organized and divided into Dingdan classes according to their works in workplaces. The students in each class are expected to be trained according to the requirements of the workplaces, i.e. the final enterprises that hire them. To materialize this object, the college made certain adjustments concerning the teaching contents, teaching methods, and teaching facilities. These adjustments strengthen students' practical abilities as well as improve the teachings in the college.

**a) Specialized courses**

The specialized courses are reformed and developed based on the college's on-the-spot investigations in its partners' factories as well as the suggestions from Dingdanpeiyang graduates. The reformation of specialized courses tends to enhance students' core skills in their work. Meanwhile, the specialties in the college are re-adjusted in order to meet the needs of the industry development in Heilongjiang province. Not only the popular specialties, but also the specialties in demand are taken into consideration during the process of specialty adjustment. For example, Heilongjiang province now undergoes restructuring in the industrial areas such as equipment, petroleum and chemical industry, energy resources, and food, and some specialties such as resources engineering, mining engineering are in demand. Generally speaking, it is easier for the college to make Dingdanpeiyang with its partners in these specialties in demand, and this is why the college has already established academic departments for these specialties to explore more possibilities of

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cooperation.

### **b) Teaching facilities**

The college has its own training center on campus, which is used for students' training in classes. The training bases outside the campus, including the equipments supplied by the college's partners, offer opportunities for students to be trained in real workshop. The exploitation of the equipment in training center and training places is important for Dingdanpeiyang since it may help students reduce the gap between school learning and the work.

### **c) Teaching method**

In order to teach effectively and let students get more hands-on-experience, the teaching methods were improved in two ways:

- The roles of teachers are changed. Instead of teaching as they used to do, the teachers supervise now and students are encouraged to take their initiative in their study. Table 13 shows the role changes of the teachers and students:

Teachers: actors	→	Director
Teacher: performer	→	Student: performer
Teacher: prepare for the lecturing	→	Design the lecturing
Teacher: leading role	→	Student: leading role
Teacher-teaching + student-listening	→	Acting

**Table 13.** Role changes of teachers and students.

- The teaching methods are arranged according to the concrete courses. For example, when students learn computer skills, the teaching methods of project

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teaching and task-based learning are put into practice in order to get students motivated during their learning. Besides, teachers try to combine the teaching contents with the teaching methods. For example, the project teaching and the inversion method are combined into “the inverse ways of the project teaching”, which changes the traditional teaching process, from general and abstract theory to concrete and individual practice, into the inverse teaching method, from concrete, individual and diverse practice to the abstract, general and systematic theory. This may help students have better understandings of the knowledge during the process of learning by decreasing the difficulty when the beginners approach new subjects.

#### **d) Teaching staff**

The teaching group has been enriched by recruiting more part-time teachers from the college’s cooperative partners. Meanwhile, the full-time teachers in the college are encouraged to take part in professional training in order to improve their teaching abilities. The full-time teachers are also required to practice in the cooperative enterprises no less than two months every year.

#### **4.3.1.4 Different types of Dingdanpeiyang**

Though Dingdanpeiyang enhances the employability, it brings lots of troubles due to the long cycle of training and recruiting. Some students don’t study hard any more since they know their work is just to finish what is required in Dingdan; Some students get better chances when they graduate, but they have to go to the companies that they have signed Dingdan with. They must work till the contracts are over; In

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Dingdanpeiyang, some training programs are characterized by the skills and techniques that are required only in the factories that support these programs. These skills or techniques might be useless or out of date in other factories or companies. In this sense, students' learning is confined to their workplaces. There is the possibility that the companies or factories cannot recruit any students when students graduate. The reasons might be the companies go to bankruptcy and bad economic situation due to which lots of employees get laid off and it is impossible to recruit new ones. To solve these problems, new models of Dingdanpeiyang are designed and brought into effect.

#### **4.3.1.4.1 Postpositional “Dingdanpeiyang”**

As mentioned previously, the Dingdan is signed before the students' training get started, which means the whole training process needs 3 years, that is, from the students' enrollment to their graduation. To solve this problem, the college created a new way of Dingdanpeiyang, the so-called postpositional Dingdanpeiyang.

Here, “postpositional” refers to the time of signing “Dingdan”, which makes this kind of Dingdanpeiyang different from the previous ones. The previous Dingdanpeiyang's agreements are signed before the students' training get started, while the “postpositional Dingdanpeiyang” suggests that the agreement will not be signed until students finish some basic courses and trainings at school. For example, in the department of mechanical engineering, the academic schedules (altogether 6 semesters) are arranged as the followings: the first four semesters focus on the ability-oriented training and professional skills training in order to get the students



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familiar with their professional skills. The agreement will be signed during the summer vocation after the 4<sup>th</sup> semester, and from the 5<sup>th</sup> semester on the training will be arranged as Company H requires. The last semester will be the Dingganshixi time or the final preparation for their graduation. In the 5<sup>th</sup> and 6<sup>th</sup> semesters students are co-trained by the department and Company H.

The concrete arrangement of the teaching and training from the 1<sup>st</sup> semester to the 4<sup>th</sup> semester in this department is changed due to the change of the agreement signing. Usually the courses in this department are divided into basic courses, basic specialized courses, specialized courses and practical trainings. The basic courses refer to Chinese, mathematics, and foreign language; basic specialized courses refer to some theoretical knowledge concerning the specialty; and specialized courses consist of concrete and practical skills and these skills will be put into practical trainings. The faculties in the department argued that these four parts weaken the basic knowledge and the specialized courses are overlapped and some of them are empty, which is obviously a waste of time. To overcome this problem the courses are re-arranged as basic courses plus project trainings. The basic courses aim to offer basic professional qualities and skills, while the project trainings aim to train students' practical skills on in working positions. The basic courses are conducted through lectures and experiments in the college. In the department of engineering, they include basic cultural courses, mechanical designing, mechanical manufacturing, mechanical and electrical technology, and numerical control technology. The program trainings are based on the working positions and focus on the training of the skills on working

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positions. One project covers the basic skills and techniques used in one working position. For example, the numerical control technicians are expected to get familiar with the structure and repair of lathes, turning tools and techniques, jigs, measuring tools, numerical control program and operation. The program trainings are conducted in the worksite and co-mentored by technicians, engineers, and teachers.

The above-mentioned basic courses and project trainings are supposed to be finished within four semesters. In the summer vocation after the 4<sup>th</sup> semester, Dingdan is supposed to be signed between College C and Company H, through which the further trainings are negotiated and arranged by stakeholders. Normally in the 5<sup>th</sup> semester students will be practicing practical skills on the so-called task-based working positions in the training center on campus. These task-based working positions are co-created by teachers, technicians, and engineers to simulate the actual working positions. These hand-on experiences lay foundations for students' Dinggangshixi in Company H in the 6<sup>th</sup> semester. Dinggangshixi in Company H will be co-assessed by the mentors both from the college and from Company H. If students pass this assessment, they will sign contracts with Company H and upon their graduation they will become employees in Company H officially.

#### **4.3.1.4.2 “Virtual Dingdan Classes”**

The idea resource of “virtual Dingdan Class” is *agile manufacturing*, a term introduced with the publication of the American report entitled *21st Century Manufacturing Enterprise Strategy*. Later the term of *virtual corporation*, a key concept in *agile manufacturing*, is conceptualized by Kidd as the synthesis of a

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number of enterprises that each has core skills or competencies which are brought to a joint venturing operation, a temporary alliance of enterprises based on using each partner's facilities and resources (Kidd, 1994). The joint venture enterprises are called virtual corporation, because it does not own significant capital resources of its own. The competitive advantages of the virtual corporation are the agilities, such as low risks, fast new product development, low product costs, short time-to-market, and highly flexible and responsive process to the changes in the market.

The “virtual Dingdan class” is a conceptual application of agile manufacturing in the training of higher vocational education. The “virtual Dingdan class”, based on the reorganization of the current resources in vocational colleges, is a transformation of virtual corporation. According to the recruit plans of Human resources in enterprises, the college temporarily re-organizes the students into “virtual Dingdan classes” regardless of their specialties and grades to meet the requirement of the enterprises. “The virtual classes” are comparatively flexible since the students do not need to come into the virtual class every day. They stay in their original classes during school time, but they are required to come to the virtual class to participate in the extra-training conducted by the enterprises in their spare time, weekends, summer holidays, and winter holidays. The characteristics of the “virtual Dingdan class” can be summarized as the followings:

- **Virtuality.** As mentioned above, the “virtual Dingdan class” does not exist as real class. Students remain in their original classes and follow their academic schedule as they always do. When the partner enterprises start training, students in “virtual

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classes” will be gathered together by the dean of the “virtual classes”. Afterwards, these students will be arranged in training bases equipped with certain facilities.

There are no time and schedule conflicts between students’ training of the “virtual Dingdan class” and their normal courses.

- Integration. The “virtual Dingdan class” is a highly integrative organization. The communicative mechanism between the college and its partner enterprises is set up in order to share the detailed information such as theoretical training, practical training, Dinggangshixi and final employment. Normally, the college is responsible for the theoretical and technical training and the practical training and Dinggangshixi will be conducted in partner enterprises.
- Flexibility. The “virtual Dingdan class” is highly flexible. As mentioned previously, students are organized into “virtual Dingdan class” regardless of their specialties and grades.

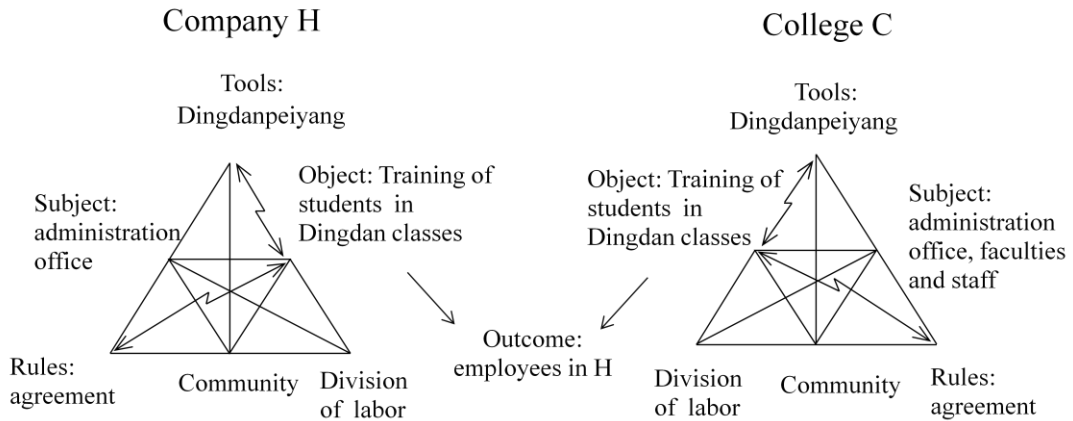
To be a member of “virtual Dingdan class” needs to go a process of being selected. As mentioned above, though the specialties and grades are not supposed to be taken into consideration during the organization of “virtual Dingdan class”, grade is actually regarded as an important factor. Normally the students in one “virtual Dingdan class” are from the same grade, though different specialties. For example, all students in the two “virtual Dingdan classes” of Company H are from the second grade. Students are divided into different groups according to the requirement of working positions. After this, all students have to go through the so-called self-exposure to show that they possess the qualities that are required by the working

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position. The self-exposure is something rather personal. Instead of showing professional knowledge, students are expected to show they are team players, they are patient enough to finish some small yet significant details, and everyone is capable of organizing team members into a union. In this way, the self-exposure is actually personality test. The students who pass the personality test will be further divided into classes which are defined by their working positions. The two “virtual Dingdan classes” are trained for technicians and directors of workshop. After the confirmation of the student members, the training will begin. The training plan is designed by Company H, carried out by the cooperation between the college and Company H.

#### **4.3.1.5 Summary**

In Dingdanpeiyang, the basic idea is to guarantee the employability of the students after their graduation by the agreement signed between the college and its partners. The agreement is the key concept, in which the detailed items of the cooperation are listed in it. For example, the number of the required employees, the expected qualities of the potential employees, the responsibilities and duties of the cooperative partners, ways of training, etc. It is these detailed rules and principles in the agreement of Dingdanpeiyang that bridge the cooperation up. The final outcome, qualified employees in the cooperative partners, Company H in this case, is the goal of the cooperation. The cooperative activity consists of two activity systems, as Engeström put forward in his third generation of activity theory. The relationship of the cooperation between the college and Company H can be exemplified by Figure 27.



**Figure 27.** Relationship between Company H and college C.

Figure 27 shows the interaction between Company H and College C. The rules that these two activity systems must obey are the rules and principles in the agreement that they sign before or after the conduct of Dingdanpeiyang. The community in each system is the administration office in charge of the execution of Dingdanpeiyang as well as some other practical training inside or outside the college. The division of labor depends on the arrangement of the training in each activity system.

In the horizontal interaction between Company H and College C, two representatives from the company act as subject in the administration office. These two persons co-work with the other three persons from the college, who are also the members of the administration office, to carry the training out. The mediating artifacts conducted by Company H can be elaborated as the persons from the administration office, the mentors sent for the co-supervising of the Dingdan class students, and the members sitting in the specialty steering committee. Besides the above-mentioned tools utilized by Company H, the college made further adjustment in the aspects such as the reformation in specialized courses, teaching facilities, teaching method, and

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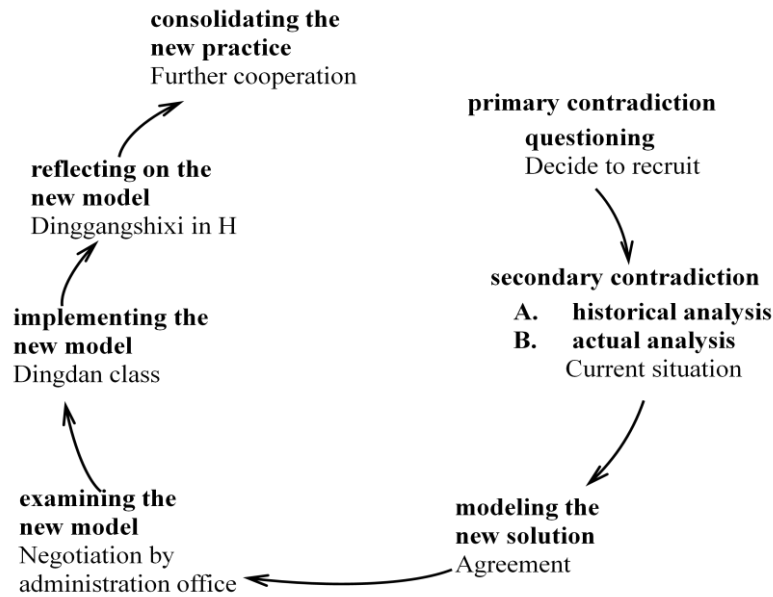
teaching staff. Meanwhile, the types of Dingdanpeiyang are further developed concerning the time of signing agreement (postpositional Dingdanpeiyang) and the ways of the organization of the class (virtual Dingdan class). Obviously these two things could not be accomplished without the assistance of Company H as the changes of time and the organization of virtual Dingdan classes are participated by Company H, though not to significant degree. As teaching staff from the college commented, in Dingdanpeiyang, most of the work is done by the college due to the fact that the college is eager to get its students employed. This actually explains the current situation of all the cooperation between the vocational schools and enterprises.

As Engeström put forwards in the principles of activity theory, the internal contradictions within each activity system are the driving forces of change and development in activity systems (Engeström, 2001). In the college, the issue is how to get the graduates hired as the employability is a very important index for the assessment of all vocational schools in China. This is the starting point of the cooperation for the college and the college even makes some concession during the cooperation, as some teaching staff during the interview said. In Company H, the recruiting plan is the starting point of the cooperative training. Normally the agreement of Dingdanpeiyang is based on the recruiting plan of Company H. Compared with the employee supplier (the college), nowadays the favor is taken on the side of the employee demander (Company H). As the teaching staff from the college said during the interview, the college made lots of concession in the cooperation in order to carry the program out.

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As shown in Figure 28, Dingdanpeiyang gets started when Company H finds it necessary to recruit new employees. This corresponds to Engeström's "questioning the existing practices" (Tuomi-Groehn & Engeström, 2003). Obviously this plan is based on the analysis of the current situation of the employees. The recruiting plan is clearly demonstrated in the agreement signed between the college and the company, which contains the required number, the qualities of the potential employees from the cooperative partners, and the ways of training. After the signing of the agreement, the cooperation is set up and this is the step of the "modeling the new solution". Based on this step, the new model of training will be negotiated by the administration office to see if the model is practical and this step is "examining the new model". When these students are organized into Dingdan classes, the training is implemented in real sense. When the students in Dingdan class start their Dinggangshixi or training in the company, the training model is reflected and new practice will be consolidated in further cooperation between the college and the company. In the postpositional "Dingdanpeiyang", though the duration of the company's involvement is shortened due to the postpositional signing of the agreement, the steps of the circulation are the same. This corresponds to what Engeström put forward, that is, expansive learning.





**Figure 28.** Strategic learning and actions and corresponding contradictions in the cycle of expansive learning.

As in the case of Shenyang, the enterprise in this case seems less active than the college, though the involvement of Company H is an indispensable part of the cooperation. It is important to point out that the final outcome of the cooperation is for Company H, and the expansive learning occurs between the two activity systems, that is, the college and the company.

### 4.3.2 Dinggangshixi in Harbin

This section attempts to give an overview on the general situation of students' Dinggangshixi outside College C. There are 8 academic departments in the college, i.e. the mechanical and electrical department, the automation department, information department, automotive engineering department, agricultural machinery department, economics and management department, department of humanities, and department of animal science and technology. Dinggangshixi in the college is managed on the scale of academic departments. In each department office, there is one staff designated to be

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in charge of Dinggangshixi in the department. The staff is responsible for keeping contact with partner enterprises to adjust the supply and demand of students' positions in Dinggangshixi between the department and enterprises. At the end of each semester, it is his/her obligation to write an executive report on Dinggangshixi and hand it over to the cooperative office in the college.

So far, the college has more than 100 partner enterprises that offer Dinggangshixi positions for students. All academic departments, except department of economics and management and department of humanities, have more than one cooperative partner offering enough positions for students' Dinggangshixi. In addition, some partner enterprises, for example, the Huishan Group, the Fushi Group, and the Xinzhongxu Group offer scholarship for students to support their study in the college. Students who take the scholarship and take part in Dinggangshixi in these enterprises have the priority of being employed after their graduation.

The questionnaire was designed to collect the data from the students who participated in Dinggangshixi outside the college. Altogether 200 questionnaires were handed out to students and got 168 responses and the responding rate is around 84 %. The high response rate is attributable to the fact that the questionnaires were distributed and collected by hands. Meanwhile, 20 student interviewees participated in the following interviews. These 20 interviewees were divided into two groups. The interviews were conducted after the analysis of the questionnaires' results. The interview was audio-recorded with the permission of the interviewees, and the transcripts were made and analyzed.

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#### 4.3.2.1 Students' performance in Dinggangshixi

Through the questionnaire, students' basic personal information was collected and Table 14 is the profile of the 168 respondents who participated in Dinggangshixi outside the college. Students' personal information is obtained through Table 14. It could be summarized as the followings:

- Most students are at their twenties, which indicate that these students participated in Dinggangshixi at their last academic year, i.e. the third academic year.
- Female students are more than male students. This is quite different from the previous two cases, in which male students are definitely more than female students.
- The specialties are diversified. 19 students major in animal husbandry and veterinary medicine, and 54 students major in food processing technology, which are two popular specialties in this college.
- 7.1% students took part in Dinggangshixi no less than 6 months, as required by the Ministry of Education.
- In terms of the planned post-school destination, 36.3% students are not sure; 5.4% students decided to further their study; 25.0% students will continue the current work; 33.3% students will find another work after their graduation.

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#### Profile of the 168 respondents to the questionnaire

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<b>Age</b>	18 years old-0.6% (1 student); 19 years old-0% (0 student); 20 years old-6.0% (10 students); 21 years old-31.5% (53 students); 22 years old-37.5% (63 students); 23 years old-20.2% (34 students);
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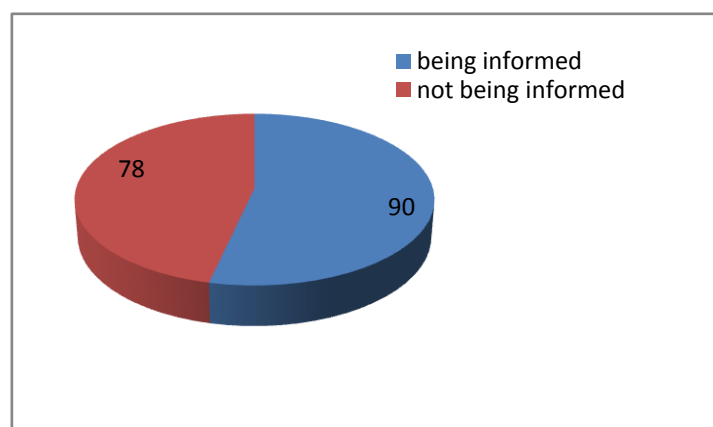
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	24 years old-4.2% (7 students)
<b>Gender</b>	Male-48.8% (82 students); Female-51.2% (86 students)
<b>Major</b>	Auto service and marketing-37.5% (63 students); Logistics -14.9% (25 students); Animal husbandry and veterinary medicine -11.3% (19 students); Computer -1.2% (2 students); Food processing technology -32.1% (54 students); Applied English -3.0% (5 students)
<b>Duration of Dinggangshixi</b>	1-2 months - 33.3% (56 students); 2-4 months - 48.8% (82 students); 4-6 months – 10.8% (18 students); No less than 6 months – 7.1% (12 students)
<b>Planned Post-school Destination</b>	University-5.4% (9 students); Continue the current work-25.0% (42 students); Find another work-33.3% (56 students); Not sure-36.3% (61 students)

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**Table 14.** The profile of the 168 respondents to the questionnaires.

After students stepped into the workplaces of Dinggangshixi, information such as work description, security knowledge, and required skills in work are expected to be delivered by the official staff in the workplaces in order to help students get familiar with the working environment. Figure 29 shows that 90 students, accounting for 53.6% of all, were informed by the staff concerning the basic information in the workplaces. The rest 78 students, on the contrary, were not informed.



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**Figure 29.** Information delivery to students by staff from workplace.

During the follow-up interview, students were asked to elaborate on the information delivery before Dinggangshixi gets started. The following paragraphs are the excerpts in students' interview:

***Excerpts 19 (Interview)***

*Student: ...I major in animal husbandry and veterinary medicine and I took part in Dinggangshixi in ... company with other 34 classmates. The information delivery is conducted by a graduate from our college and he works in the company now. He was quite patient and gave detailed introduction of those labs equipped with advanced machines...later on he became the supervisor of our group and helped us a lot...*

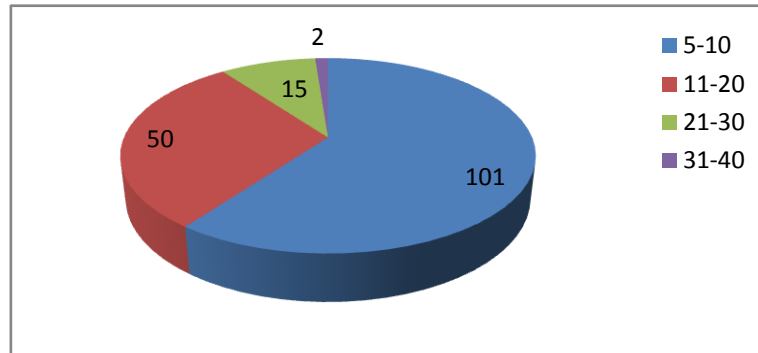
***Excerpt 20 (Interview)***

*Student: I major in auto service and marketing and I practiced my Dinggangshixi in a 4S car shop. My job is to stand in front of a new brand car and introduce it to the customers who are interested in it... In my first day of Dinggangshixi I was given a uniform and a pamphlet about the car. All the staff in this shop is required to wear uniforms and on the pamphlet all the information about the car is clearly depicted. Then I was shown to the cubicle and I sat there the whole morning to memorize all information about the car...Next day, I started my work there and gradually I found myself used to it...*

Figure 29 and the above two excerpts show that most students were informed of the basic knowledge in the workplaces before Dinggangshixi got started. Some were

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not well-informed, but they figured ways out to solve the problems by themselves as time passed by.



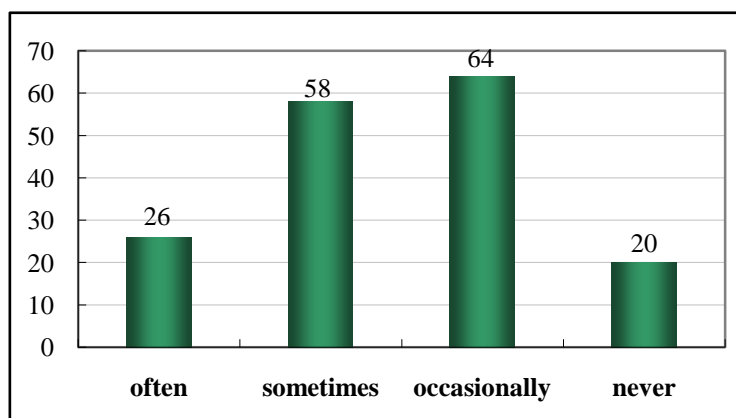
**Figure 30.** Distribution of student number mentored by each master worker.

When Dinggangshixi begins some official staff is assigned by the workplace to act as students' supervisors. It is quite normal for students to share supervisor with their peers. In the questionnaire, students were asked how many students shared one supervisor. Figure 30 shows that among 168 students, there are 101 students every 5-10 students share one supervisor, which accounts for 60.1%; 50 students, accounting for 29.8% of all, every 11-20 students share one supervisor; and the rest 17 students, 15 of them every 21-30 share one supervisor and 2 of them every 31-40 share one supervisor respectively. All in all, 89.9% students are in the group of 5-10 and the group of 11-20. The percentage indicates that most students are supervised in small groups during the process of Dinggangshixi, which might be convenient for them to communicate with their supervisors.

The fact is that the communication and discussion between students and supervisors did not go quite well. Figure 31 shows the frequency of discussion between students and their supervisors. Among 168 students, 26 students often discussed with their supervisors and 58 students sometimes discussed with their

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supervisors. The rest 84 students, among whom 64 students occasionally discussed with their supervisors and the rest 20 students never discussed with their supervisors.



**Figure 31.** Frequency of discussion between students and master workers.

In the interview, students were asked to talk about the discussion between their supervisors and them. It seems that students did not respond to this question quite actively as the interviewer noticed that they always looked at each other frequently to see if they've got anything to say.

***Excerpt 21 (Interview)***

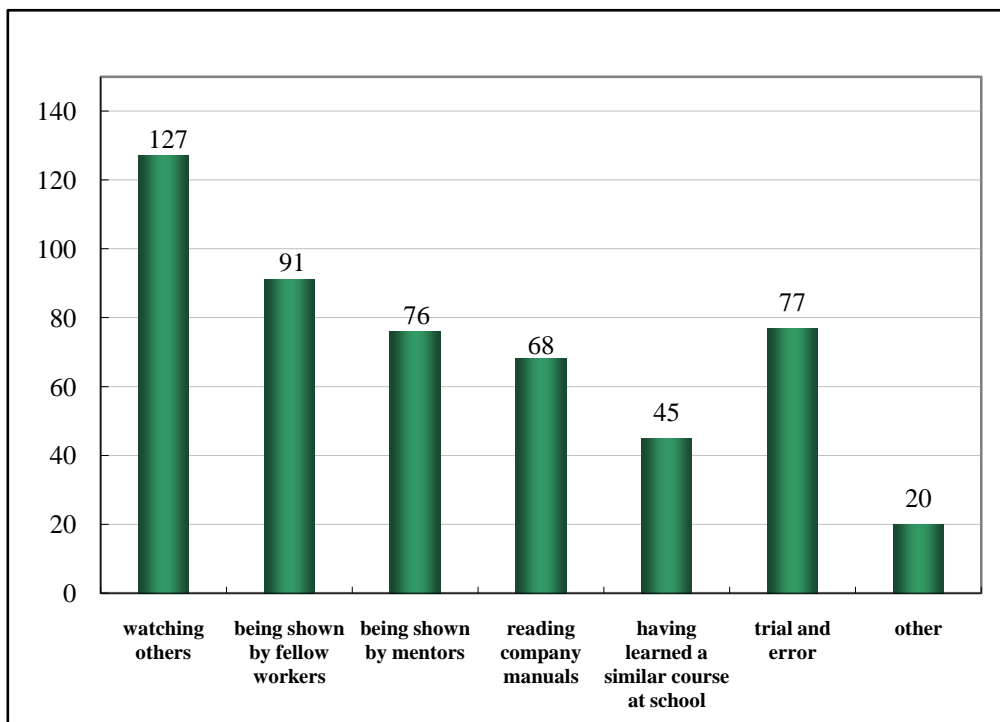
*Student: ...I did not communicate with my supervisor very much because he gave me the impression that there is no time for him to do so...we were supposed to have a brief meeting every Wednesday, but he rarely showed up...many students felt upset about it and the only thing we can do is to give him a bad comment when Dinggangshixi ended...*

***Excerpt 22 (Interview)***

*Student: ...My supervisor is an engineer... I was told to ask whenever I got questions, but gradually I found the perfect time to discuss with my supervisor, that is, over*

*lunch...we ate in the company's canteen at noon and the lunch always started with his question, "is everything ok?"...normally he answered my questions by giving oral examples, once he drew me a sketch...and another time when I did not get his meaning, we went to the workplace after lunch directly and he showed me the operation of the multicut lathe in person...*

The relationship between students and their supervisors is depicted by Figure 31 and the two excerpts. From excerpt 21 we may see that the supervisor did not take full responsibilities during students' Dinggangshixi. Meanwhile, students did not take active attitudes towards their Dinggangshixi because they stayed there and waited instead of asking questions. This is the typical situation as students revealed in the interviews. Excerpt 22 is the opposite situation because the supervisor was quite responsible and the student was also very active to communicate with his supervisor.



**Figure 32.** Distribution of learning ways in Dinggangshixi.



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It is important to know students' ways of learning during their Dinggangshixi. In the questionnaire, students were asked to tick three most important ways of learning during Dinggangshixi among the choices of "watching others", "being shown by fellow workers", "being shown by mentors", "reading company manuals", "having learned a similar course at school", "trial and error", and "other". Figure 32 unfolds that the most important three ways of learning are "watching others", "being shown by fellow workers", and "trial and error". "Watching others" ranks the first and reaffirms students' passive positions during Dinggangshixi as excerpt 21 shows. "Being shown by fellow workers" was chosen by more than half students, and it reveals students' relationship with fellow workers. "Trial and error" is a normal learning way for students who practiced their Dinggangshixi in factories, through which students learned the operation of some machines. "Being shown by mentors" was mentioned in excerpt 22, and through students' narration during their interview, this is the way that they expect the most during Dinggangshixi. It is noticeable that "having learned a similar course at school" ranks last but one, which indicates that students' learning at school and the work in Dinggangshixi are less connected than expected.

Despite the natural ability students possess and the relative complexity of tasks, students were asked whether they were fully aware of the tasks assigned in Dinggangshixi. Table 15 shows students' clarity about the tasks in Dinggangshixi. 33 students claimed that they were always clear about how to carry out tasks, 123 students said that sometimes they were unclear about how to carry out tasks, and the

rest 12 students said that they usually unclear about how to carry out tasks.

Type of comment	No.	%
I am always clear about how to carry out tasks	33	19.6
Sometimes I am not clear about how to carry out tasks	123	73.2
I am usually unclear about how to carry out tasks	12	7.2
<b>Total</b>	<b>168</b>	<b>100</b>

**Table 15.** Students' clarity about the tasks in Dinggangshixi.

In the interview, student interviewees were asked whether there was any obstacle for them to understand their tasks in Dinggangshixi.

***Excerpt 23 (Interview)***

*Student: ...for me, the biggest obstacle is to understand the job description from my supervisor. Whenever I tried to ask for further information, she would leave me short sentences, like, "use your head...", "think about it"...these are really rude, but I could do nothing about it...*

***Excerpt 24 (Interview)***

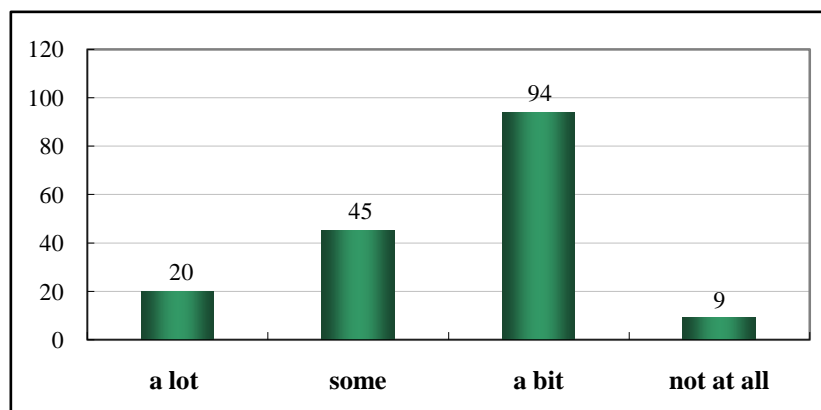
*Student: ...the biggest obstacle for me in Dinggangshixi is to deal with the interpersonal relationship...there were too many staff in my workplace and I had to figure out how to communicate with them in order to get familiar with the work environment quickly...it did not go well at the beginning and I was quite frustrated because it seemed that they were quite indifferent to the things that were irrelevant to them...then I found a great way to communicate with them, that is, playing basketball*

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*after work in the playground within the company...this helped me to make some friends and I started to get more help from them...*

The above two excerpts mentioned about the interpersonal relationship during during students' Dinggangshixi. It is quite difficult for students to deal with, especially for those who work in the factories.

The students were asked to evaluate the importance of the tasks during their Dinggangshixi. Figure 33 shows that 20 students claimed there were *a lot* importance in their tasks, 45 students said there were *some* importance in their tasks, 94 students, accounting for 56.0% of all, said that there were a bit importance in their tasks. The rest 9 students claimed that in their tasks there was no importance at all. All in all, according to students' own evaluation, their tasks possess certain importance, though the degree varies.



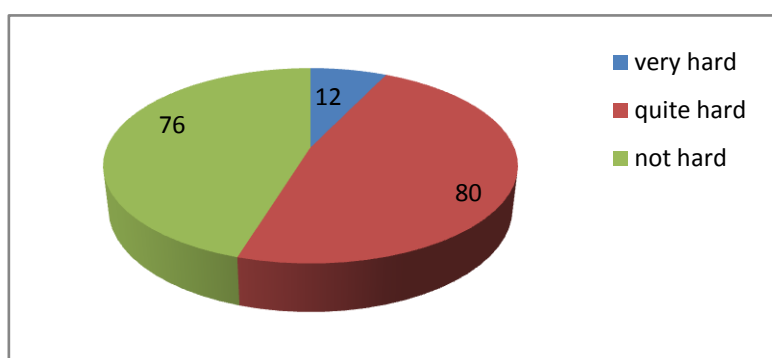
**Figure 33.** Importance of the task.

In the questionnaire, students were asked whether it was difficult for them to adapt to the working environment. Figure 34 shows that 12 students chose “very hard” to describe their difficulty to adapt to their working environment, and 80 students, accounting for 47.6% of all, claimed that it was “quite hard” for them to adapt to the

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working environment. 76 students, accounting for 45.2% of all, said that it was “not hard” for them to adapt to the working environment.

In the interview, students explained why it was hard/not hard for them to fit into their working environment. Excerpt 25 and excerpt 26 are students’ explanations to this question.



**Figure 34.** Difficulty of adapt to working environment.

***Excerpt 25 (Interview)***

*Student: ...I major in applied English and I performed my Dinggangshixi in a primary school...I established great relationship with my students and my supervisor...during my Dinggangshixi, students were preparing for their mid-term test and they had so many questions to ask and I had never answered that many questions...but I have never been so happy and I decide to be a teacher after my graduation...*

***Excerpt 26 (Interview)***

*Student: ...I found it difficult adapt to the working environment because this environment is quite different from school...at school whenever I am assigned to do something, the assignment is usually depicted quite clearly. Besides, when I am not clear about the assignment, I know how to get it done...but in the workplace it is different...sometimes the description of the job is ended before I figured out what it is*

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*and when I tried to ask my supervisor or the workmates, they would say the same words, “you will get it when you start your work” ...in fact, I did not...*

The above two excerpts from students’ interview are about their adaption to the working environment. From the above excerpts we may see that it is difficult for students to adapt to the working environment mainly because of the interpersonal relationship, which is also an issue in the previous two cases.

Needless to say that Dinggangshixi helps students develop their generic skills in various ways to various degrees. In the questionnaire students were asked to choose freely among the mentioned generic skills, including communicating in writing, oral communicating, planning and organizing, using initiative, solving problems, and how to behave at work. Table 16 shows that these generic skills were chosen 364 times, which indicates that an average of more than two items was chosen by each student. Table 14 shows that oral communicating was chosen 112 times and ranks the first and accounts for 30.8%; 93 students chose solving problems, accounting for 25.5%; planning and organizing was chosen by 53 students, accounting for 14.6%. Using initiative and how to behave at work were less developed, and communicating in writing is least developed during students’ Dinggangshixi as 28 students, accounting for 7.7% chose it as an item of the ability promotion.

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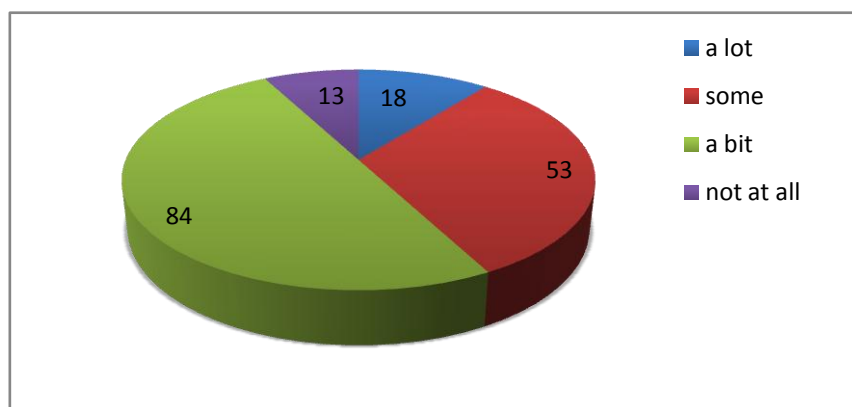
<b>Type of comment</b>	<b>No.</b>	<b>%</b>
communicating in writing	28	7.7
oral communicating	112	30.8
planning and	53	14.6

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organizing		
using initiative	44	12.1
solving problems	93	25.5
how to behave at work	34	9.3
<b>Total</b>	<b>364</b>	<b>100</b>

**Table 16.** Distribution of ability promotion in Dinggangshixi.

In Dinggangshixi, students developed their ways of learning through which their generic skills got promoted. Figure 35 reveals students' degree of satisfaction with Dinggangshixi. Clearly 13 students are not satisfied with their Dinggangshixi, the rest 155 students are satisfied with their Dinggangshixi to various degrees. 18 students describe their satisfaction degree as "a lot"; 53 students claimed that their satisfaction degree is "some"; 84 students, accounting for 50.0% of all, are a bit satisfied with their Dinggangshixi. On the whole, students are satisfied with their Dinggangshixi.



**Figure 35.** Distribution of students' satisfaction with Dinggangshixi.

The above data unfold the general situation of Dinggangshixi conducted by the students. According to the analysis, the 168 respondents, among whom 82 are male students and 86 are female students, mostly conducted their Dinggangshixi in their

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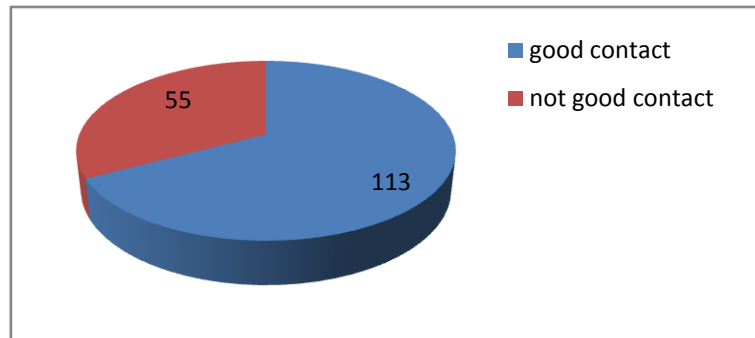
third academic year, and 92.9% participated in Dinggangshixi less than six months. The information delivery before Dinggangshixi, according to most students, was appropriately executed. Some were not well-informed, but they figured ways out to solve the problems by themselves as time passed by. When Dinggangshixi began, students shared supervisors with their peers. In this case, 89.9% students are in the group of 5-10 and the group of 11-20. With the help of the supervisors, students developed their learning during the work mainly through three ways, “watching others”, “being shown by fellow workers”, and “trial and error”. Though mentored by supervisors, some students felt unclear about the tasks in their work. This reminds us that we have to take students’ natural abilities and the complexity of the tasks into consideration. Students were assigned important tasks during their work and most of them felt it hard to adapt to the working environment because they were not good at dealing with interpersonal relationship. Their abilities got promoted during Dinggangshixi, especially the generic skills such as “oral communicating”, “solving problems”, and “planning and organizing”. To sum up, most students are satisfied with their Dinggangshixi.

#### **4.3.2.2 Links between Dinggangshixi and school learning**

As mentioned previously, students who participate in Dinggangshixi have double identities, that is, students (still not graduated yet) and temporary staff in workplaces. They are required to keep contact with teachers from school and make sure their teachers can keep track on the whole process of Dinggangshixi through phone calls and emails. Figure 36 shows that 113 students, accounting for 67.3%, claimed that

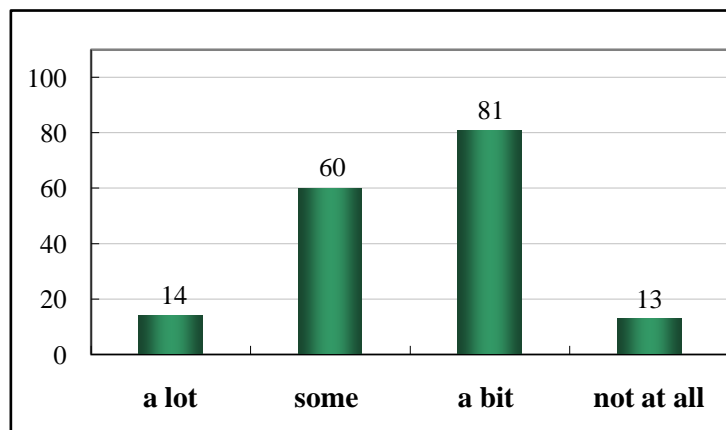
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they kept good contact with the teachers at school when they conducted their Dinggangshixi. The rest 55 students, accounting for 32.7%, said that their contact with school teachers were not good.



**Figure 36.** Students' contact with school teachers during Dinggangshixi.

Students were asked whether there is connection between school courses and work in work places. Figure 37 shows that 13 students chose there was no connection at all between what they learned at school and what they did during Dinggangshixi in workplaces. The rest 155 students asserted that there were certain connections between school courses and work in workplaces, though to various degrees.



**Figure 37.** Connection between school courses and work in workplace.



Type of comment	No.	%
a lot	18	10.7
some	80	47.6
a bit	62	36.9
knew it already from school	0	0
not at all	8	4.8
<b>Total</b>	<b>168</b>	<b>100</b>

**Table 17.** Did you learn anything useful in Dinggangshixi to your school study?

Likewise, students were asked whether they've learned something useful in Dinggangshixi to their school study. Table 17 shows that 18 students asserted that they learned *a lot* in Dinggangshixi to their school study; 80 students, accounting for 47.6% of all, claimed that they learned *some* in Dinggangshixi to their school study; 62 students, accounting for 36.9% of all, said they learned *a bit* in their work which is useful to the school study. It is noticeable that none said that they had known what they learned during Dinggangshixi from school. 8 students did not learn anything useful in Dinggangshixi to their school study.

Dinggangshixi intends to offer students' chances to get to know the real working environment as well as help them get their skills practiced. Normally it is also a good chance for students to decide whether they will take jobs in the area that they have practiced for a while. Figure 38 shows that 103 students made clear decisions about their career choice after Dinggangshixi. 63 students claimed that they would like to choose work in the area that they have conducted Dinggangshixi in; on the contrary, 40 students asserted that they have decided not to pursue a career in the area. These

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103 students account for 61.3% of all. Among the rest 65 students, 55 of them were still undecided about their future work, and 10 students claimed that Dinggangshixi wasn't meant to be a career choice anyway.

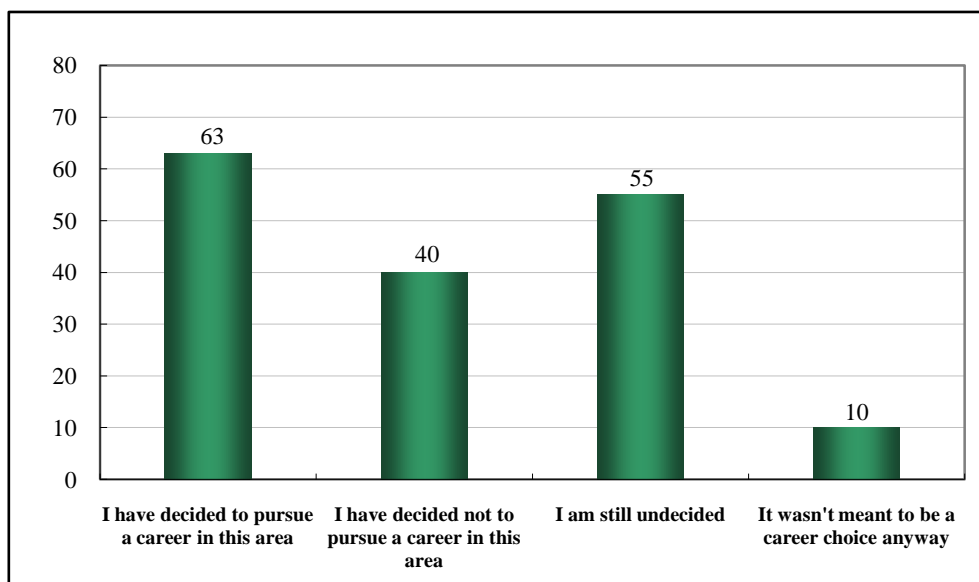


Figure 38. Impact of Dinggangshixi on career choice.

In the interview, students explained the influence of Dinggangshixi on their career choice.

**Excerpt 27 (Interview)**

*Student: ...I have decided to pursue a career in this area...I have got familiar with the work in my Dinggangshixi, and I am really interested in it...as you know that the competition nowadays is quite severe, it is not easy to find an appropriate job...and I believe that if I work hard in this area, it might be possible for me to get my ability promoted and my professional skills developed...*

**Excerpt 28 (Interview)**

*Student: ...I am still undecided about my future job...I am not really interested in the work during my Dinggangshixi, because I think what I did in my Dinggangshixi is*

*mechanical and there is nothing creative in it...but for my major (logistics), to be honest, there aren't many choices...Plus, I am not quite ambitious, it might be my destination to choose a common life? Dinggangshixi put me into dilemma...*

#### **4.3.2.3 Reliability statistics of the respondents**

The details of Cronbach Alpha are shown as Tabel 18.

No.	Description	No. of items	Cronbach Alpha
1	Performance in Dinggangshixi	9	0.831
2	Links between school learning and work	4	0.872

**Table 18.** Reliability statistics.

The computed Cronbach Alpha result indicated that each item in the questionnaire has quite high reliability.

#### **4.3.2.4 Summary**

The overall impression obtained from the analysis of the 168 questionnaires and some interviews is quite different from previous two cases. In this case, students participated in Dinggangshixi in the partner enterprises of the academic departments. Though the cooperation between the departments and their partner enterprises is minimal as in the “traditional model of work experience”, most students who undertook Dinggangshixi enjoyed their work experience. As mentioned in previous cases, it does need to be acknowledged that those returning the questionnaires might not be entirely typical of the full population of Dinggangshixi, but it is reasonable to assume that the responses may be indicative of Dinggangshixi as a whole.

##### **4.3.2.4.1 What kind of work contexts did the workplaces offer?**

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From the data above, we may see that when students stepped into workplaces, the workplace information was comparatively properly delivered, and even if not, students found ways to figure out by themselves. During Dinggangshixi, students were divided into groups with reasonable members sharing the same mentors, who actually helped students' work to certain degrees. We may see there was no good discussion concerning work between students and their mentors, which really disappointed students as they were assigned important tasks and they needed help from their supervisors. All in all, students found it hard to adapt to the working environment mainly because of the interpersonal relationship.

#### **4.3.2.4.2 What type of work experience did students obtain?**

Guile and Griffiths put forward that more than one model of work experience might exist in one program, that no specific work experience program fits neatly into any of the five models of work experience. As in the previous two cases, Dinggangshixi in this case also belongs to the generic model that values the outcomes as the outcome of Dinggangshixi in each department will be put into reports to the cooperative office in the college, which will be the major data to assess the conduct of Dinggangshixi. The cooperation between the college and its partner enterprises is minimal throughout the whole process as we may see that the college took no concrete assisting steps to help students make their work easier in their workplaces except the requirement of keeping contact with the school teachers by phone calls and emails. The minimal cooperation is a mark of the traditional model of work experience. Though students found it hard to adapt to the working environment, their

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generic skills, such as “oral communicating”, “solving problems”, and “planning and organizing” are developed. It is in experiential model of work experience the generic skills gets promoted.

#### **4.3.2.4.3 Can the work experience help students figure out their future career choice?**

The students undertaking Dinggangshixi were found to be more females than males, with diversified specialties, in their third academic year. The participants in Dinggangshixi in a large proportion of cases confirmed their career choice for them, although in some cases it gave them the chance to try out, and reject, the industry area. All in all, Dinggangshixi is a chance for students to figure out whether they will choose their career in the area.

#### **4.3.2.4.4 What problems remain?**

In Dinggangshixi, the cooperation between the college and its partner enterprises is minimal. The summery report written by the staff in charge of Dinggangshixi in each academic department is based on students’ own narration of their performance in Dinggangshixi. In this sense, the evaluation of students’ Dinggangshixi is conducted by themselves. There is no involvement of the college and its partner enterprises, which made Dinggangshixi perfunctory.

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## Chapter 5

### Summary and perspectives

Drawing on documentary analysis, semi-structured interview, questionnaire and observation, this thesis has studied the ways of cooperation between three higher vocational schools and their enterprise partners in northeastern China. The attempt is made to consider all the points concerned so far and the final interpretations are to be coupled with the implications to advance the cooperative activity. The thesis has argued that in the two categories of cooperation, especially in Dinggangshixi, there remain further space in improving the work context as well as the connection between school and enterprise.

#### 5.1 Summary

The cooperation between higher vocational schools and enterprises can be categorized into two types, the optional ways of cooperation designed by the cooperators based on their own situations and the compulsory way of cooperation required by the Ministry of Education. According to the vocational education, the aim of the cooperation is to enhance students' employability after their graduation by exposing them to the work-related knowledge and skills. In the former type of cooperation, the gap between the qualifications students possessed and the qualifications required by the final employers, i.e. enterprises, is the basic reason led to the cooperative activity. As subjects of the cooperative activity systems, higher vocational schools cooperate with their enterprise partners to work for the object of students' training, primarily by updating their learning contents and refreshing their

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ways of learning. The mediating artifacts employed or constructed include organizing special program (TQP in the first case and Dingdanpeiyang in the third case), in which student participants took advantages of training designed by vocational institutions and enterprise partners; teaching staff cooperation, through which the teaching teams consequently the students can access to the practical knowledge as well as skills required by enterprises. Boundary crossing is executed and expansive learning is achieved.

The case analysis shows that in the cooperative activity, most of the work has been done by the vocational schools. High vocational schools played passive roles during the process of cooperation. The vocational schools initiated the cooperative programs, outlined the items in the cooperation, developed new teaching materials with the assistance of the enterprise partners, and sent their students to participate in Dinggangshixi which might contradict with the syllabus at schools. The enterprises did play auxiliary roles, but according to the teaching staff in the vocational schools, enterprises work less and profit more in the cooperation. The vocational schools complained that they were cornered into the cooperation due to the consideration of students' employability. This is the basic reason that makes the cooperation possible. To cooperate with enterprise means to get more chances for the students to be hired after graduation. The high employability is very important for vocational institutions because it brings both reputation and high enrollment for vocational institutions. This makes vocational schools willing to take more responsibilities and duties during the cooperation. For the enterprise, there are more options when they need to recruit

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employees, such as from the human resource pools or from universities directly. They choose to cooperate with vocational schools because they can get the specific professionals without investing too much, especially through Dinggangshixi.

In the latter type of cooperation Dinggangshixi, students were either sent to the enterprise partners (in the first case) by their school, or found workplaces relevant to their specialties by themselves (in the second and third cases), to work in the positions of official staff, and they were expected to act as official ones too. Ostensibly Dinggangshixi offers great chance for students to enter into real workplaces through which their work experience can be enriched, but the research in this thesis has revealed that compared with the former type of cooperation, Dinggangshixi in these three cases has much space to be improved. Firstly, the work contexts offered by Dinggangshixi are not good enough for students' learning. For example, there was no proper information delivery when students entered into the workplaces; the mentors in workplace did little help for students' learning. The tasks assigned to students are either mechanical or too intensive for them. Students found it hard to adapt to the work environment mainly because of the interpersonal relationship. Secondly, the persons who were supposed to supervise students in workplaces as well as in schools did not discharge the full responsibilities, and there were no connections between these two groups of people either. This made students feel they were less cared, ignored and isolated. Thirdly, the evaluation of Dinggangshixi needs to be further considered. If Dinggangshixi is only evaluated by the reports written by students themselves, vocational schools can not be fully aware of students' performance in



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Dinggangshixi. Fourthly, in terms of the work experience students obtained in Dinggangshixi, the shared model of work experience in these three cases is the generic model that emphasizes the evaluation of outcomes. The outcomes of Dinggangshixi are important for vocational schools not only because Dinggangshixi is compulsory, but also because in most cases Dinggangshixi overlapped with self-designed (optional) ways of cooperation and its outcomes may influence the development of the optional ways of cooperation.

## **5.2 Perspectives**

Given the current situation, certain aspects in the cooperation, especially in Dinggangshixi, need to be further considered.

Firstly, the cooperation on supervising Dinggangshixi participants should be strengthened. Students participate in Dinggangshixi during their academic semester, and they have double identities simultaneously, students and staff. It is necessary to assign supervisors in both workplaces and schools to instruct students during Dinggangshixi, and the supervisors from workplaces and schools should keep contact with each other in order to exchange ideas concerning students' performance in Dinggangshixi. Responsibilities should be reasonably divided between these two groups of supervisors. For example, the supervisors from workplaces may deliver information concerning the work contexts and work contents, help students immerse themselves into the workplace culture, harmonize the relationship between students and official staff, inform the supervisors from schools when students have problems during their work, etc. The supervisors from schools may pay on-site visits to students,

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discuss the problems in their work and help them negotiate with their workplaces to get the problems solved. Meanwhile, these supervisors as well as the supervisors from workplaces should play roles in evaluating Dinggangshixi. So far, the most important evaluation is Dinggangshixi report written by students themselves. The involvement of the supervisors certainly will make the evaluation more thorough.

Secondly, Dinggangshixi should be re-conceptualized in vocational schools. Since Dinggangshixi is compulsory, for vocational schools, the fact that Dinggangshixi has been executed is more important than the process of the execution. This is the basic reason why the process of Dinggangshixi is less cared by vocational schools. It is important to point out that though Dinggangshixi is conducted in workplaces, it is still part of students' learning and counts scores in students' files. Dinggangshixi means to compensate what vocational schools could not offer. Vocational schools should do more than just let students scatter in different companies, bring back that piece of Dinggangshixi report, and put it into files. Its aim is not Dinggangshixi for Dinggangshixi's sake; its aim is for learning's sake. To realize the starting point of Dinggangshixi may help students, vocational schools as well as enterprises get more involved into Dinggangshixi.

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## References

- Ary, D., Jacobs, L.C., & Razaveih, A. (1990). *Introduction to Research in Education*. Fourth edition. Forth Worth: Holt, Rinehart and Winston, Inc.
- Baker, C. (2002). Ethnomethodological analyses of interviews. In Gubrium, J., & Holstein, J. (Ed.), *Handbook of Interview Research*. Thousand Oaks, CA: Sage.
- Bateson, G. (1972). *Steps to an ecology of mind*. New York, NY: Ballantine Books.
- Benbasat, I., Goldstein, D. K., & Mead, M. (1987, September). The case research strategy in studies of information systems, *MIS Quarterly*, 11(3), 369-386.
- Bonoma, T.V. (1985, May). Case Research in Marketing: Opportunities, Problems, and a Process. *Journal of Marketing Research*, 22(2), 199-208.
- Brand Competition in the After-sales auto services. *China Industry Report Research*, 2009, July.
- CASESA SHAPIRO GROUP, (2008, November). The franchised automobile dealers: The automakers' lifeline. Progress Report of CASESA SHAPIRO GROUP.
- Chaiklin, S., Hedegaard, M. and Jensen, U. J. (Eds.) (1999). *Activity theory and social practice: Cultural-historical approaches*. Aarhus, Denmark: Aarhus University Press.
- Cohen, L., Manion, L., & Morrison, K. (2003). *Research methods in education* (5<sup>th</sup> ed.). London: Routledge Falmer.
- Cook, T.D., & Campbell, D.T. (1979). *Quasi-experimentation: Design and analysis issues for field settings*, Boston, MA: Houghton Mifflin.
- Deng, Y.H., & Zhou, J.M. (2004 December). Chance analysis on the development

- 
- vocational education in Northeastern area in the process of China's social transition. *Hebei Normal University of Science & Technology (social science)*. 3 (4), 52-54.
- Engelsted, N., Hedegaard, M., Karpatschhof, B. and Mortensen, A. (Eds.) (1993). *The societal subject*. Aarhus, Denmark: Aarhus University Press.
- Engeström, Y. (1987). *Learning by expanding: An activity-theoretical approach to the developmental research*. Helsinki: Orienta-Konsultit.
- Engeström, Y. (1993). Developmental studies of work as a testbench of activity theory: the case of primary care medical practice. In S. Chaiklin & J. Lave (Eds.), *Understanding practice: Perspectives on activity and context* (pp. 64-103). Cambridge: Cambridge University Press.
- Engeström, Y. (1995). Objects, contradictions and collaboration in medical cognition: An activity-theoretical perspective, *Artificial Intelligence in Medicine*, 7(5), 395-412.
- Engeström, Y., Engeström, R., & Kärkkäinen, M. (1995). Polycontextuality and boundary-crossing in expert cognition: Learning and problem solving in complex work activities, *Learning and Instruction*, 5, 319-336.
- Engeström, Y. (1996). Developmental work research as educational research. *Nordisk Pedagogik: Journal of Nordic Educational Research*, 16, 131-143.
- Engeström, Y. (1999b). Activity theory and individual and social transformation. In Engeström, Y., Miettinen, R., & Punamäke, R. (Ed.), *Perspectives on Activity Theory* (pp. 19-38). Cambridge: Cambridge University Press.

- 
- Engeström, Y. (1999c). Innovative learning in work teams: Analyzing cycles of knowledge creation in practice. In Engeström, Y., Miettinen, R., & Punamäke, R. (Ed.), *Perspectives on Activity Theory*. Cambridge: Cambridge University Press.
- Engeström, Y. (2001). Expansive learning at work: Toward an activity theoretical reconceptualization. *Journal of Education and Work*, 14 (1), 133-156.
- Engeström, Y. (2002a). The horizontal dimension of expansive learning: Weaving a texture of cognitive trails in the terrain of health care in Helsinki. International symposium-New challenges to research on learning, Helsinki.
- Gheredi, S., Nicolini, D., & Odella, F. (1998). Towards a social understanding of how people learn in organisations: the notion of a situated curriculum. *Management Learning*, 20 (2).
- Gong, H. J. (2007). The significance of T-TEP to the cooperation between vocational schools and enterprises. *Education and Vocation*, 21 (5).
- Griffin, P., & Cole, M. (1984). Current activity for the future: the zo-ped. In B. Rogoff & J. V. Wertsch (Ed.), *Children's learning in the zone of proximal development*. San Francisco: Jossey-Bass.
- Griffiths, T., & Guile, D. (2004). *Learning through work experience for the knowledge economy- issues for educational research and policy*. Luxembourg: Cedefop, 48.
- Gudmundsdottir, S. (1996). The teller, the tale, and the one being told: The narrative nature of the research interview. *Curriculum Inquiry*, 26 (3), Fall.
- Guile, D., & Fonda, N. (1999). *Managing Learning for Added Value*. London:

- 
- Institute of Personnel and Development.
- Guile, D., & Griffiths, T. (2001). Learning through work experience. *Journal of Education and Work*. Routledge, 14 (1), 113-131.
- Guile, D., & Griffiths, T. (2001). Learning through work experience. *Journal of education and work*, 14 (1), 113-131. Routledge.
- Guo, S. (2006). On the development of the vocational education in China. *Journal of Chongqing Vocational and Technical Institute*. 15(1), 44.
- Han, P. (2006). Analysis on the pattern of running higher vocational colleges of cooperation between universities and enterprises: integrating six aspects into one. *Education and Career*, 27.
- He, X.Y., & Guo, W. (2004). The importance of the cooperation between vocational schools and enterprises in the development of the higher vocational education. *Vocational and Technical Education Forum*, 24.
- Hu, Y. H. (2004). Virtual operation and elastic expansion in the cooperation between polytechnic and enterprise, *Tsinghua Journal of Education*, 25 (5).
- Huang, B. (2006). The interpretations of “dual qualified teachers” in higher vocational schools. *Education and Career*. 11 (4).
- Huang, R. (2004). The involvement of the enterprises into the vocational schools in China. *Vocational Education Research*. 7, 6-7.
- Huang, W. (1998). *An Introduction on the Supervision of Modern Education*. Guangzhou: Guangdong Higher Education Press.
- Il'enkov, E.V. (1977). *Dialectical Logic: Essays in its History and Theory*, Moscow:

- 
- Progress.
- Il'enkov, E.V. (1982). *The Dialectics of the Abstract and the Concrete in Marx's "Capital"*, Moscow: Progress.
- Janis, I. L. (1982). *Groupthink: Psychological studies of policy decisions and fiascoes* (2nd Ed.). Dallas, TX: Houghton Mifflin.
- Kidd, P.T. (1994). *Agile Manufacturing: Forging New Frontiers*. Addison-Wesley.
- Kindermann, T., & Skinner, E.A. (1992). Modeling environmental development: individual and contextual trajectories. In Asendorpf, J.B. & Valsiner, J. (Ed.), *Stability and change in development*. London: Sage.
- Kvale, S. (1996). *An introduction to qualitative research interviewing*. Thousand Oaks, California: Sage Publications.
- Langemeyer, I. (2006). Contradictions in expansive learning – towards a critical analysis of self-dependent forms of learning in relation to contemporary socio-technological change. *Forum: Qualitative Social Research*, Vol. 7(1).
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. New York, NY: Cambridge University Press.
- Leon'ev, A.N. (1981). *Problems of the Development of the Mind*. Moscow: Progress.
- Liu, X.M., & Yin, R.S. (2003). The current situation, issues, and patterns of cooperation between higher vocational schools and companies, *Forum of vocational education*, 14, 9-10.
- Luo, X. (2009). The development of the model higher vocational schools. *China Comment*, 02.

- 
- Luria, A.R. (1976). *Cognitive Development: its Cultural and Social Foundations*, Cambridge, MA: Harvard University Press.
- Miller, J., & Glassner, B. (2004). The “inside” and the “outside”: finding realities in interviews. In Silverman, D. (Ed.), *Qualitative research – theory, method and practice*, (2nd Ed.). London: Sage Publications.
- Prior, L. (2003). *Using Documents in Social Research*. London: Sage.
- Qian, M.H. (1999). *Research on the vocational education and the development of the society*. Harbin: Heilongjiang Education Press.
- Qin, J. H., & Cao, Y. P. (2007). Research into the trinity cooperative model between colleges and enterprises in higher vocational education. *Journal of Jiangsu Polytechnic University (Social Science Edition)*, 8 (4).
- Robson, C. (1993). *Real world research-A resource for social scientists and practitioner researchers*. Oxford & Cambridge: Blackwell Publishing.
- Shao, B. (2006). Revitalizing the old industrial bases and developing the vocational education in the northeastern China, *Education Exploration*. 181(7), 37-38.
- Shen, J. (2009). New challenges and chances in the auto market in the coming ten years. Conference paper presented in the marketing prize for China Autos hosted by Phoenix TV.
- Silverman, D. (2000). Analyzing Talk and Text. In Denzin N., & Lincoln Y. (Ed.), *Handbook of Qualitative Research*. Thousand Oaks, CA: Sage.
- Silverman, D. (2001). *Interpreting qualitative data: Methods for analyzing talk, text and interaction*, (2nd Ed.). London: Sage.



- 
- Smith, E. (2000). *Young people's learning in their first year of full-time work*, PhD thesis, University of Technology Sydney.
- Stake, R. (1995). *The art of case study research*. Thousand Oaks, London, New Delhi: Sage Publications.
- Star, S.L. (1989). The structure of ill-structured solutions: boundary objects and heterogeneous distributed problem solving. *Distributed Artificial Intelligence*, 2, 37-54.
- Star, S.L. (1989). The Structure of ill-structured Solutions: Boundary objects and heterogeneous distributed problem solving, *Distributed Artificial Intelligence*, 46.
- Star, S.L., & Griesemer, J.R. (1989). Institutional ecology, translations and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science*, 19, 387-420.
- Stern, D., & Wagner, D.A. (1999b). School-to-work policies in industrialized countries as responses to push and pull. In Stern, D. & Wagner, D.A. *International perspectives o school-to-work transition*. Cresskill, N.J. :Hampton Press.
- Strauss, A., &Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications.
- Suchman, L. (1994). Working relations of technology production and use. *Computer Supported Cooperation Work*, Dordrecht, Boston, London: Kluwer Academic Publishers, 2, 21-39.
- Trend, M, G. (1979). On the reconciliation of qualitative and quantitative analyses: A

- 
- case study. In Gook, T.D., & Reichardt, G.S. (Ed.), *Qualitative and Quantitative Methods in Evaluation Research*, Beverly Hills, GA: Sage Publications, 68-86.
- Tuomi-Gröhn, T., & Engeström, Y. (2003). *Between School and Work: new perspectives on transfer and boundary-crossing*, (Ed.). Amsterdam: Pergamon.
- Tuomi-Gröhn, T., & Engeström, Y. (Ed.) (2003). *New perspectives on transfer and boundary crossing*. Amsterdam: Elsevier.
- Tuomi-Gröhn, T. (2005). Studying learning, transfer and context: A comparison of current approaches to learning. In Engeström Y., Lompscher J. & Rückriem G. (Ed.), *Putting activity theory to work*. Berlin: Lehmann Media.
- Vickers, M. (1995). Employer participation in school-to-work programs: The changing situation in Europe. In Bailey, T. (Ed.). *Learning to work: Employer participation in school-to-work programs*. Washington, DC: Brookings Institute.
- Walker, R. (1986). The conduct of educational case studies: Ethics, theory and procedures. *Controversies in Classroom Research*. Buckingham, UK & Bristol, USA: Open University Press.
- Wang, X.C., Zhang, B.Y. (2010). Study on the current situations of teaching staff in vocational schools, *Vocational Education Research*. (5).
- Wang, Y. C. (2009, June). Speech in the forum of cooperation between a hundred vocational institutes and a hundred companies. *Vocational Education and Training* (internal material), 52 (1), 8-10.
- Wang, Z. Q. (2008). Research on the game theory in the cooperation between vocational education and enterprises. *China Higher Education Research*, 09.

- 
- Wenger, E. (1998). *Communities of practice. Learning, meaning and identity*.  
Cambridge: Cambridge University Press.
- Wu, S., & Xia, J. (2006). New public management campaign and the innovation of  
the vocational education in China. *Journal of Huaibei Professional and Technical  
College*.3, 19-20.
- Yu, Q. (2006). Creating new patterns of cooperation between vocational schools and  
enterprises based on the current resources. *Vocational and Technical Education*,  
27 (13).
- Zhou, Q., & Luo, S., (2007). Zero distance : The requirement of the enterprises and  
the teaching and training of the vocational schools. *Modern Enterprise Education*.  
5, 44-45.
- Zhu, X. (2006). On difficulties and regulations of the enterprises' participation in  
vocational education. *Exploring Education Development*. 11A, 15-18.
- Zou, W. (2008). The analysis on the cooperation between vocational schools and  
enterprises from the aspects of institutional economics. *China Academic Journal*,  
124-126.