

Research and Practice in Cultivating Integrated Talent Mode Led by Practical Teaching¹

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Abstract: Newly-founded institutions have their own features in types, specifications, and modes of talent training, majors, courses etc. Traditional modes of talent cultivating focuses on theoretical teaching, neglects the significance of practical teaching and leads to dislocations in time, space, importance between theoretical teaching and practical teaching. The following aspects should be realized through the cultivation of applied talents. They are integration of theoretical teaching and practical teaching, of teaching and scientific research, of professional teaching and ideological and political education, of theoretical teaching and training of engineering practice ability, harmonious interaction between teaching and learning and close combination of professional education and curriculum education. Thus, cultivating integrated talent mode can be formed.

As to the mode of cultivating talents, the newly-founded institutions with a rather long period of exploring and practicing do not cast off the yoke of academic undergraduate. They designed teaching mainly based on theoretical teaching, which had a less relationship with the position of cultivating talent types; as a result, their own features haven't formed. Through long period of research and practice, so, in our view, cultivating integrated talent mode led by practical teaching is just a correct choice for the newly-founded institutions to make in the course of teaching reform.

I Institution-running Orientation and Its Basic Features of Newly-founded Institutions

1. Institution-running Orientation

As the rapid development of economic globalization, industrial modernization, internationalization of education and mass higher education, the structure of higher education has been transformed in a large scale in China in order to satisfy the needs for diversified talents in our society and the needs for giving people greater access to higher education.

Since 1999, there have been no more than 300 newly-founded institutions in China^①, which is over one third in undergraduate colleges and universities.

The newly-founded institutions have a good foundation of running technique education because they originally come from one vocational college or more than two colleges.

After becoming undergraduate institutions, most newly-founded institutions exploit their strong points and avoid exposing their weaknesses, position to run applied education and cultivate applied talents.

Only a few newly-founded institutions with good disciplinary base, great scientific achievements and powerful teachers run their teaching according to the mode of cultivating academic talents.

2. Basic Features

Although newly-founded institutions have some shortcomings, such as short history, located in prefecture cities, weak

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discipline awareness, poor disciplinary base, lack of excellent teachers, bad operating conditions, and so on, they still have the following basic features, in contrast to traditional undergraduate colleges and universities which aim to cultivate academic talents.

As to talent types, newly-founded institutions mainly run applied education and cultivate all kinds of talents who major in engineering strategy, plan, design, drawing production and construction. The exact jobs are field engineer, production technique engineer, supervisory technique engineer, and other staff who can guide related technique in the production spot such as technology, equipment maintenance, monitoring, marketing and after-sales service, etc. and offer management service. Research universities mainly cultivate research-typed talent; traditional undergraduate universities mainly cultivate engineering talent; vocational colleges mainly cultivate skilled talent; which all have different orientation in contrast to newly-found institutions.

As to talent specifications, cultivating applied talents should emphasize the features such as the abilities of design, construction and management. Then, engineering majors should be based on science and actual project, and keep technology at the core. And those institutions cultivate technical talents who can convert science theory into engineering production, that is, technology applied talents. They should also have noble character, relevant knowledge, great competence and high quality.

As to professional setting, newly-founded institutions mainly face profession, profession groups or technical field, and set up professions according to market demand, development tendency, technical requirements, post-setting and demand for talents, which show clear professional orientation.

As to curriculum setting, newly-founded institutions put emphasis on the improvement of professional skills, business techniques, management techniques, and intelligent control techniques. The institutions require the talents to have broader theory base than skilled talents, and to have more competence to apply techniques and to solve actual problems than academic talents. About the construction of the curriculum system, enough technical courses are set according to the profession graduates are engaged in. At the same time, practice courses are strengthened, and the depth and width of theories are limited within proper scope. Thus, enough and solid theories and strong practice skills can be combined perfectly with each other.

As to the mode of cultivating talents, newly-founded institutions follow cultivating application ability of engineering technology, and the mode is led by practical teaching. The students can develop their technical ability, practical working ability, hands-on skills, finding-out-problem ability and solving-problem ability.

II Serious Opposition between Traditional Mode of Cultivating Talents and Rules of Training Applied Talents

Academic talents' cultivation gives priority to theoretical teaching, and gives a subordinate position to practical teaching. The essential attribute of applied is practical, the cultivation of applied talents should follow a universal rule including practice, acquaint; practice again, and reacquaint. The traditional talents' training modes and the applied talents' training rules oppose seriously.

1. Dislocation in Time between Theoretical Teaching and Practical Teaching

The traditional talents' training mode and the teaching process are theory first, and then practice; students immediately have their theoretical teaching after the admissions. The students will have their practical teaching when the theoretical teaching progress comes to a certain extent. In addition, the design and the arrangement of practical teaching are based on the need for the theoretical teaching. Practical teaching has no independent status; it is not systematic, it just serves as a supplement of the theoretical teaching. It has no objection for an old undergraduate university to cultivate academic talents mainly, but it is not appropriate for the newly built undergraduate colleges to cultivate applied talents mainly.

2. Dislocation in Space between Theoretical Teaching and Practical Teaching

In the process of teaching, theoretical teaching and practical teaching are quite distinct, not combining closely enough. Talents' cultivation has specific goals and specifications, theoretical teaching and practical teaching are two important aspects of achieving training targets, there is no

primary or secondary problem between them, both should be closely integrated, and serve as the supplements of talents' cultivation, but in reality, theoretical teaching and practical teaching usually separate from each other, either considering the practical teaching as an auxiliary method of theoretical teaching, or considering the two independent in separate settings, systematic respectively, never considering blending each other.

3. Dislocation in Important Extent between Theoretical Teaching and Practical Teaching

In the teaching and management, the practical teaching is in a subordinate position; colleges generally give priority to the theoretical teaching. Practical teaching is designed according to the operating conditions, referring a serious shortage of investment, less management than the theoretical teaching which is more formal and not scientific assessment, ignoring the talents' cultivating objectives, violating the cognitive rules. Practice teaching faculty is also not valued, some colleges employ theoretical class teachers as professional teachers, and position practical teaching members as teaching aid personnel, setting up accordingly wage, and the importance of practical teaching has not been really established.

4. Dislocation between Course Education and Professional Education

Some colleges ignore the majoring education and offer simple entrance education at the beginning of school. Students even don't know the basic situations of what they will learn about their majors, don't know what a dominant role their majors will play in the national economy and social development, don't understand the accordingly talents' working nature of their majors, and don't understand the curriculum, teaching outline and basic teaching requirements, which make it difficult to learn an organic link between personal learning and career development, thus the students learn passively, following the rhythm of the teachers, on step by another, learning setting courses one by one. That is highly inconsistent to "students' principal learning status".

III Particularly Important Role of Practical Teaching in Application-oriented Education

1. Practical Teaching Is Very Important in Cultivating Undergraduate Talents

Recent years, Ministry of Education has issued a number of documents in succession to enforce undergraduate teaching, requiring more practical teaching. *Several Opinions on Strengthening Higher School Undergraduate Teaching and Improving the Quality of Teaching* (Department of Higher Education [2001]4), *Several Opinions on Further Strengthening Higher School Undergraduate Teaching* (Department of Higher Education[2005]1), *Several Opinions on Deepening Undergraduate Teaching Reform and Improving the Quality of Teaching in an All-round Way* (Department of Higher Education [2007]2) , *Several Opinions on Improving the Quality of Higher Education in an All-round Way* (Department of Higher Education[2012]4) and several other documents all pay much more attention to practical teaching.

From "value" to "enhance", to "highly value" and even to "new teaching funds used for practical teaching should become a priority", we can see key emphasis in work has changed and what is the key to improving quality of teaching since mass higher education came upon the stage, which shows that Ministry of Education highly values cultivating applied talents and the students' practical ability. Meanwhile, the four documents make more concrete demands on practical teaching in higher institutions. At the beginning, Ministry of Education only claims "pay attention to practical teaching", then gradually, some clear requirements, specific contents and operational measures have been set. Such as, time and effect of practical teaching must be ensured; the standard of practical teaching must be lowered; exact credits and credit hours of practical teaching must be guaranteed; new teaching funds used for practical teaching should become a priority and so on. All those are gradually put forward by Ministry of Education.

Practical teaching and theoretical teaching, which are like two wings of a bird, can not be divided, and they both are necessary parts of undergraduate teaching and play an important part in cultivating high-quality talents. Practical teaching is an important part in undergraduate teaching and quality education. It is a key link of integrating theory with practice and training students' practical ability, creative ability and overall quality. So practical teaching is far more important to applied-type institutions which put emphasis on cultivating applied talents with creative spirits and practical ability.

2. Practical Teaching Is an Important Component in Applied Talent System

A relatively complete system should be constructed when the institutions cultivate applied talents. Different institutions have different statements, “based on knowledge, emphasizing on competence, aiming for service, the mode of cultivating applied talents insists that knowledge and competence should be harmoniously developed, and learning, practice and professional skills should be combined perfectly.”^② “Directed by ‘enough’ and ‘practical’, theoretical teaching system is constructed; based on competence, courses are chosen and course system is set; aiming for the overall development of students, quality education system is built.”^③ “The mode of cultivating applied talents is theoretical teaching system based on applied knowledge; practical teaching system followed by competence and quality education system possessing humanistic quality and professional ethics.”^④ In conclusion, there are three parts in cultivating applied talents, theoretical teaching system, practical teaching system and quality education system.

At the Second National Conference of Undergraduate Teaching in General Institutes of Higher Education, the former Education Secretary, Zhou Ji once pointed out, “Knowledge comes from practice, competence comes from practice, and even quality is formed in practice; all kinds of practical teaching are quite important to cultivate students’ practical ability and creative ability; practice plays an important role in the growth of undergraduates.” This is a high-level overview of the importance of practical teaching in cultivating applied talents.

Cultivating high-quality applied talents is the target of applied institutions. Important as theoretical teaching is, practical teaching is no less important. They are equally significant. Only through systemic practical teaching can students’ practical ability, hands-on skills and creative ability be cultivated. And students can better apply what they have learnt to practice. With stronger ability to apply knowledge, higher overall quality, better engineering innovative awareness, applied talents can fit in with the needs of the society and be welcome in talent market.

3. Practical Teaching Is a Booster for Scientific Research in Newly-founded Applied Institutions

One main task of applied institutions is cultivating high-quality applied talents, but it also has the function of scientific research. Theoretical research in newly-built applied institutions is in weak position, and these institutions are often local ones, so their scientific research should mainly deal with techniques and its application and innovation. The scientific research should have close connection with local economy and social development. While practical teaching is just the booster for the newly-built applied institutions to carry out scientific research.

Teachers and students carry out practical teaching in the production sport, and students practice in the off-campus practice bases after certain professional skills training. In this way teachers and students provide technology services and serve for the society progress and economic development of local area.

On the basis of production condition in off-campus practice bases, teachers can declare subject and carry out the research with companies and also drive technology innovations and reform for the companies. This kind of research is more targeted and of practical significance. The scientific achievements can be commercialized and applied easily. So, practical teaching can boost scientific research and increase the influence and radiation of the institutions.

4. Practical Teaching Is an Important Pathway for Newly-founded Applied Institutions Serving Society

The orientation of cultivating talents in local newly-founded Applied Institutions must be combined with local economy and social development. Aiming at the development of local economy, industrial structure improvement and upgrade, development of hi-tech industries and urbanization, integrated use of natural resources and sustainable economic and social development and so on, newly-founded Applied Institutions can carry out applied-type scientific research. Availing advantages in talent and educational resources, the institutions can develop talent exchange and training with local governments and companies, encouraging teachers to bring their specialty into full play, Actively participate in the local economic construction and serve local economic development, political development, cultural development, social development and ecological

civilization construction. Of course, the institutions develop quickly through serving the local economic and social development. So the institutions need to know the need of local economy and study the trends of local economic development. Practical teaching is just the most important and convenient pathway.

IV Cultivating Integrated Talent Mode Led by Practical Teaching Being the Correct Choice for Application-oriented education

The Cultivation Mode of Integrated Talent refers to the talent cultivation method, which is closely integrated by the construction of theoretical teaching, applied teaching and the like, and led by practical teaching, in accordance with the requirements in the recognition rules. To be specific, it includes the following contents:

1.The Integration of Theoretical Teaching and Practical Teaching

There is no strict division between theoretical teaching and practical teaching in the designation of the teaching system. However, the cultivation mode is reorganized based on the orientation of the training target, and requirements of knowledge, ability, quality structure and the job. Theoretical teaching and practical teaching is completely integrated and intertwined, with no particular order and with equally importance, serving for the realization of the orientation of the training target together. The dislocation in time and space due to the man-made division in the traditionally theory courses and practical courses should be broken, for the realization of the organic combination of the two. Meanwhile, teachers will not be divided into teachers for theory courses and teachers for practical course. Teachers should reach a high level in theory; they should have project awareness, practical experience in project and certain ability of conducting practical scientific research. Management major in Liao Ning Institute of Science and Technology (LIST) fully realizes the organic combination of theoretical teaching and practical teaching, in accordance with the modes of “multi-levels in vertical and multi-modules in horizontal teachings, with the combination of in class and outside class, required courses and optional courses”. The comprehensive applied ability for students in Management majors has been improved, and distinctively formed the practical feature.

2.The Integration of Teaching and Researching

A newly established undergraduate college should also possess four functions as the undergraduate university. The main orientation in scientific research for a newly established undergraduate college is to conduct practically scientific research, and it is also the historic advantage. Teaching without research will lead teaching lose its base, while pure research pure will lead school far from the principle of talent cultivation. The separation of both will hardly realize the functions of serving society and inheriting culture. The cultivation of practical talents, and the integration of teaching and research, are decided by the practical nature of practical talents. Teachers' process in the practical teaching is also the process of carrying practical scientific research. On the contrary, teachers' new fruits from practical scientific research into the practical teaching process will inspire students' thoughts intensely, which is beneficial for the cultivations of the practical manipulative ability and project creating mind. Major of surveying and mapping at LIST integrates teaching and research. Students participate in teachers' research project, to exploit the subject's advantages to the full, they utilize school's modern surveying and mapping instruments and equipments, to carry on the research and teaching work on the surveying and mapping project together. Students not only have a good command of the organization and management of surveying and mapping constructions, but also a systematic command of the advanced knowledge of the subject and the development of the surveying and mapping instruments. They have also mastered the modern surveying and mapping technology, which they can immediately apply to the practice of surveying and mapping after graduation, and they are warmly welcomed by the employees.

3. The Integration of Academic Teaching and Ideological and Political Education

The cultivation of practical talents should include not only the scientific and normative academic teaching, but also enough ideological and political education to improve the comprehensive quality of the college students. Traditional teaching often separates the academic teaching from ideological and political education. Although ideological and political education is independent, its result is not satisfactory for its purity. The result is self-evident when academic education effectively combines

with ideological and political education, as an integration, ideological and political education is carried on with the combination of academic training, and it is carried in accordance with the requirements job demands, career specialties, work types. Accounting major at LIST closely combines with the strong political and secret characters of the accounting personnel, combines the principles of the experiences and lessons from both the positive and negative aspects in real life, gives academic teaching and carries the ideological and political education which conform to the major's character. By demanding "Observing the Laws and Regulations, Never Making False Accounts", it enriches the connotation of ideological and political education and improves students' comprehensive quality.

4.The Integration of Theoretical Teaching, Project Practicing Ability and Development of Professional Quality

Modern enterprises attach great importance on the project practicing ability and professional quality of the graduates, which requires the newly established college to enhance the teaching of project practicing ability and the development of professional quality. Teaching system is optimized along the principal line of project practicing ability. The element of profession is injected into talents cultivation. Students acknowledge the professional quality at school early, and they conscientiously raise self-cultivations. Metallurgy major at LIST encourages teachers to cooperate with enterprises; together they develop the Analog Simulation System of Steel Making, Analog Simulation System of Converter Steelmaking, and the production of qualified billet steel. Theoretical teaching is combined with practical teaching, which enable students to master systemically, and completely theories and practices in steel making, and the whole process of steel making and practices. Students can work once they graduate as they have mastered the production and operation skills.

5.Harmonious Interaction between Teaching and Learning

The traditional teaching method stress too much on the effects of "teaching", while ignores the dynamite role of "learning". Teaching is composed process of "teaching" and "learning", without "interaction", the teaching effects can hardly be guaranteed. The integrated teaching mode requires careful consideration and scientific design on the two aspects of teacher and student, and teaching process. It exerts teacher's dominant effect and students' subjective role, highly unifies the teacher's teaching objective and students' learning objective, combines the teacher's teaching approach and students' learning method, integrates the teacher's practical objective and students' practical objective, changes students from passive learn to active learn, transforms students from "high scores and low abilities" to "high scores and high abilities", and finally reaches the same goal of the teacher and students' practice result and objective.

6.Close Integration of Academic Education and Subject Education

Academic education in this paper specifically refers to education to the basic condition of student's major, possible future career, influences in the national economic system and so on. Simple as it seems, this question is often ignored by most colleges and universities. The direct consequence from it is that students are not familiar with their majors and hence lose the objective. It is also true for each subject in the learn, if they are not familiar with the status and influence in the professional training, they are learning passively. Therefore, before the learn of each subject, we should attach great importance on the academic education, in order to enable students to get familiar with and know the basic conditions of the learned major, get familiar with the general survey of the development, history, present situation and future of the major, they should know the possible work they will undertake in future, possible field they are working, get familiar with the leading edge of the major, leaders, curriculum settings, teaching syllabus, reference books, related papers, designs, cases, they should also know the teaching modes and teaching methods of their major. In this way, students learning passion will be motivated, their interest will be aroused, learning objective and pertinence will be enhanced so as to obtain a better learning effects.

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