

Research on Talent Training Model of New Applied Undergraduate Colleges

Liu Jing'ai and Liu Weiqing

Abstract—At present, since research universities are more respected in society, some new undergraduate colleges and universities also advocate the way of running research universities, and concentrate on training research-oriented talents, regardless of their strength and social needs. There are many problems in talent training programs, such as extremely high professional training objectives, impractical curriculum, weak practical teaching system, and so on. This paper adopts the talent training program of engineering cost specialty in our university as an example, takes into account the investigation and research of the talent training program of three new applied undergraduate colleges in Shandong province, and explores the problems existing in the talent training objectives, curriculum setting, education and teaching, practical teaching and teachers' strength of the newly-built application-oriented undergraduate colleges. This paper clarifies the respective connotations of talent cultivation in research-oriented universities and application-oriented universities, explains their characteristics, and finally puts forward the path of establishing talent cultivation mode in newly-built application-oriented undergraduate universities. The newly-built undergraduate colleges choose the right direction of running a school, establish a differentiated system of running education, and then bring the education to a characteristic and high level. This is the realistic need to promote the classified and stratified development of colleges and universities, and an important means to alleviate the contradiction between economic restructuring and talent supply, which is also a strategic choice for newly-built local undergraduate colleges and universities to enhance endogenous power and core competitiveness.

Index Terms—New applied undergraduate universities, talent training program, talent training model.

I. INTRODUCTION

As the Chinese economic development has entered high-quality stage, there is an urgent demand for all kinds of high-quality applied talents is urgent. The present scale of higher education in our country has become the first in the world, but there is obvious structural contradiction of talent training, serious homogeneity tendency and blind pursuit of research-oriented education. All these make the graduates employment situation worse. The number of college graduates in 2018 is 8.2 million, more than 7.95 million of the previous year. If we add the number of the vocational school graduates and the not-yet-employed 2017 graduates, according to statistics from the Ministry of Social Affairs, there are more than 15 million graduates waiting for

employment in 2018. It is the most difficult job season in history. At the same time, there is an extreme shortage of applied talents in social production and service enterprises, which is due to the fact that the talent training mechanism of new applied undergraduate colleges has not been fully established, and the talent training model is not suitable for the readjustment of economic structure and the upgrading of industry. How to actively promote the transformation and development of newly built applied undergraduate colleges and universities? According to The Guidance Of The Ministry Of Finance, The State Development And Reform Commission And The Ministry Of Education On Leading Some Local Colleges And Universities To Change To The Application Type (Education Development (2015) No. 7), we should focus on the national strategies of innovation-driven development, mass entrepreneurship and universal innovations, and "The Belt and Road", try to find the key points and breakthrough for transformation and development, truly enhance the ability of newly-built local colleges and universities to serve the local regional economic and social development and to serve the technological progress of related industries, and adapt to and even lead the new economic development trend. It is crucial to establish high quality talent training model.

II. CONNOTATION OF NEW APPLIED UNDERGRADUATE COLLEGES

A. New Local Colleges and Universities

The newly-built undergraduate colleges and universities refer to the local colleges and universities which have been upgraded to universities from junior colleges since 1999, the number of which is more than 600 up to now. According to administrative subordination, they are classified into two groups: one, colleges and universities affiliated to the Ministry of Education, with some Project 985 universities, Project 211 characteristic universities as representatives; two, all kinds of ordinary institutions of higher learning in the charge of the provincial-level (autonomous region, municipality directly under the Central Government) people's government, collectively known as local colleges and universities. Newly-built local colleges and universities generally have common weak points like a short history, a small scale and insufficient practical training facilities. Compared with research universities who have a long history, a large scale and obvious advantages of disciplines, there is a large gap between the two in the basis of doing education and the funds support.

B. Connotation of Applied Undergraduate Colleges

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The authors are with Shandong Agriculture and Engineering University, Shandong, China (e-mail: 13605315003@163.com, 417314785@qq.com).

The applied undergraduate colleges and universities should recognize the history and present situation, fully understand the local attributes, combine the local characteristics, transform the characteristics brought by local industrial advantages into their own characteristics, and seek a breakthrough to serve the development of the local economy and industry, with training technical, skilled personnel as a duty mission. The university should formulate specialty curriculum which has obvious practicability to the local industrial economy, decide the role of the university according to the social and economic development condition, the industrial structure, the talent demand situation, and promote the local economic development. Research-oriented universities are committed to the training of high-level talents and scientific and technological research and development. They are the highest level talent training and cutting-edge scientific and technological research and development centers in China. Based on education and scientific and technological research and development, they have a high quality of talent training and academic output, whose service spreads all over the world.

C. The Applied Talent Training Model

The applied talents, under the scientific principle discovered by the academic type person, engage in the concrete social production work, to serve the social practice activity and create the direct economic benefit and the material wealth for the society. According to the training objectives and specifications, the mode of talent training carries out the process of talent education with relatively stable teaching content, curriculum system, management system and evaluation method. The training mode of applied talents should have the following three characteristics. First, it pays attention to the combination of theory and practice. Emphasis should be placed on the construction of students' practical ability and on the transformation of theoretical knowledge into practical application. Second, it centers on market demand. Professional setup, curriculum system and teaching content greatly meet the needs of the society and related industries. Third, it pays attention to knowledge and skills. Not only does it attaches importance to students' basic knowledge and professional knowledge, but also pays more attention to students' professional skills. In terms of the talents training objectives, research-oriented universities have the dual task of producing the high-quality outstanding specialized technical personnel in urgent need by the national economic and social development and the high level outstanding talents to promote the social and economic development.

III. ANALYSIS ON THE CULTIVATION MODE OF ENGINEERING COST SPECIALTY IN OUR UNIVERSITY

A. Our University Profile

Shandong Agricultural and Engineering University has Jinan and Jibei two campuses, covering an area of 2671 mu (about 178 hectares). Established in June 1971, it has developed from Shandong Agricultural and Forestry Cadre College and then Shandong Agricultural Management Cadre

College to today's Shandong Agricultural and Engineering University, which was approved by the Ministry of Education in April 2013. As a typical new applied undergraduate college with a weak foundation for running a school, it is of practical significance to analyze its talent training scheme. The university has 579 full-time teachers and 12000 full-time students, the specialty covering 6 disciplines including industry, agriculture, classics, management, literature and arts, under which are 20 junior college specialties and 24 undergraduate specialties.

B. Introduction to Engineering Cost Specialty

In September 2015, the engineering cost undergraduate major began to recruit students, mainly including the ordinary high school students through the college entrance examination and junior college graduates through social top-up entrance examination. With the length of schooling four years, students who meet the requirements of graduation can obtain a bachelor's degree and diploma. Basic information of engineering cost specialty is shown in Table I.

TABLE I: BASIC SITUATION OF ENGINEERING COST SPECIALTY

Train Objective	The students are cultivated to be high-quality applied talents who meet the needs of socialist modernization, develop in an all-round way including the moral, intellectual, physical and aesthetic fields, master basic theoretical knowledge in the field of construction engineering, relevant management of project cost management, economy and law, and be able to engage in engineering measurement and valuation, cost control, construction cost management and consultation in the whole process, contract management, engineering audit and other aspects of technical and management work in enterprises and institutions of construction engineering, cost consulting, auditing, bidding agency, supervision and other in the construction engineering field.
Main Courses	Management principles, Civil Engineering drawing, CAD, Civil Engineering Materials, Building Architecture, Building Mechanics, Architectural structure, concrete plane drawing, Engineering Economics, Civil Engineering Construction Technology, Engineering cost Management, Construction Organization, Construction and decoration engineering measurement and valuation, bidding and contract management, construction regulations, project management, engineering cost case analysis.
Characteristic Curriculum	The specialty has two orientations. One is agricultural architecture orientation whose subjects include agricultural water conservancy engineering, intelligent agricultural technology and its application, land regulation engineering measurement and valuation, landscape engineering measurement and valuation. The other is installation engineering orientation whose subjects include construction equipment and intelligence, installation engineering drawing, installation engineering measurement and valuation, MEP mechanical and electrical BIM deepening application (first BIM, REVIT civil engineering and BIM application).
Employment Direction	In enterprises and institutions such as construction, real estate development, engineering cost consultation, engineering management, engineering supervision, capital construction departments of construction units and government construction

	management departments, talents are engaged project investment and financing, project cost control, engineering pre-calculation and cost analysis in project constructions, or pursue further postgraduate study in such majors as engineering cost, engineering management, project management, real estate management, civil engineering, technology and economy and management, industrial economics.
Post Development	The first batch of students have not graduated and employed

C. Analysis on the Training Mode of Engineering Cost Specialty

1) Courses offered

The main subjects of engineering cost major in Shandong Agricultural and Engineering University are management science and engineering and civil engineering. Around these two main subjects we arrange general education (including compulsory courses, elective courses at different levels and elective courses, a total of 12 courses), basic courses (including compulsory courses and elective courses, a total of 19 courses), and professional courses (including professional compulsory courses, agricultural engineering and installation engineering two professional direction compulsory courses, professional expansion courses, a total of 35 courses), a total of 66 theoretical courses. Among them, the general education courses are mainly public culture courses, which are the basic quality courses that all the college students need to master. The basic courses are those related to the specialty of engineering cost, which plays an important role in the subject system. In order to highlight the characteristics of engineering cost of Shandong Agricultural and Engineering University, the specialty courses are divided into two directions: agricultural engineering and installation engineering. The curriculum arrangement is reasonable to some extent. For example, in order to highlight the characteristics of running a school, two professional directions are offered. However, there are many problems in the offering of basic courses and specialized courses, for example, some courses content has overlapped and the courses are not connected enough and some lack the combination of local characteristics and so on [1].

2) Credit allocation and teaching management in school hours

Engineering cost major has a four-year system and an eight-term teaching plan. The whole curriculum system includes five parts: general education curriculum, subject basic education curriculum, professional education curriculum, innovative entrepreneurship training and quality development and intensive practical teaching. About the course system class hours and credit allocation and teaching arrangement, details are shown in Table II and Table III.

In Table II, some proper nouns are going to be replaced by some acronyms, such as: Required class hours(R.c.h), Required credit(R.c), Credit(C), Total class hours (T.c.h), Total credit(T.c), Proportion(P), weeks(W).

In Table III, some proper nouns are going to be replaced by some acronyms, such as: School year(S.y),Class teaching

(C.t), Course paratice (C.p), Entrance education(E.e), Public welfare labor (P.w.l), Professional practice (P.p),Graduation project (G.p).

TABLE II: ALLOCATION OF CREDITS IN THE COURSE SYSTEM

Course type	Compulsory courses		Elective course		T.c.h	T.c	P (%)
	C. h	C	R. c.h	R.c			
General education curriculum	616	33	128	8	744	41	25
subject basic education curriculum	488	30	132	8	620	38	23
professional education curriculum	528	32	302	18	830	50	30
innovative entrepreneurs hip training and quality development	24	1.5	24	1.5+4*	48	7	4
intensive practical teaching	35w(744c.h)	31	—	—	744	31	18
The total c.h/c	2400 c.h	128	586 c.h	40	2986	167	100

Note: The credits for "innovation and entrepreneurship practice" and "second classroom activities and social practice" are awarded.

TABLE III: WEEKS OF TEACHING ACTIVITIES FOR EACH ACADEMIC YEAR

S.y	Term	C.t C.p	E.e	P.w.l	P.p	G.p	Exam	Total
1	1	15	2		1		2	20
	2	16		1	1		2	20
2	3	16			2		2	20
	4	16			2		2	20
3	5	16			2		2	20
	6	16			2		2	20
4	7	13			5		2	20
	8	-	1		1	16		18
Total		108	3	1	16	16	14	158

3) Practical teaching

Practical teaching is divided into innovative entrepreneurship training and quality development (including compulsory courses, elective courses, innovative entrepreneurial practice, the second classroom activities and social practice) and intensive practical teaching (including basic practice, professional practice and graduation practice). The former has 7 credits which should be tested by

examination, and the latter takes up 31 credits. From the point of view of credit distribution, the form of concentrated practice is taken as the main body. The practical activities basically rely on the team cooperation to complete a final achievement, with the teachers working as a guiding role. Most of graduation practice is done by the students themselves to contact the practice units and provide the practice certificate to the university. It is difficult to truly guarantee the practical effect of students. Detailed practical teaching is shown in Table IV.

In Table IV, some proper nouns are going to be replaced by some acronyms, such as: In-class practical teaching (I.c.p.t), Offering practical courses independently (O.p.c.i), Innovation entrepreneurship and Quality development practice (I.e and Q.d.p), Intensive practical teaching (I. p.t), Percentage of total credits(P.o.t.c).

TABLE IV: WEEKS OF TEACHING ACTIVITIES FOR EACH ACADEMIC YEAR

Category	I.c.p.t	O.p. c.i	I.e and Q. d.p	I. p.t	Total
Agricultural engineering direction					
C	12.5	6.2	4.0	31.0	53.7
P.o.t.c	7.5	3.7	2.4	18.6	32.2
Installation engineering direction					
C	13.5	6.2	4.0	31.0	54.7
P.o.t.c	8.1	3.7	2.4	18.6	32.8

4) Teachers' situation

Shandong Agricultural and Engineering University is a public school, with a total of 19 teachers, among which 17 full-time teachers, 2 part-time teachers, 3 associate professors and above, and 14 with master's degrees or above. The proportion of "double-typed"(teacher as well as engineer) teachers is 48. From the point of view of students' evaluation of teachers' teaching situation, part-time teachers who have been working in enterprises for many years have rich cases and practical experiences, which can attract students' interest in attending classes more than young teachers who jump out of university to teach in a school. Although the school is strengthening the training of professional teachers by organizing them to go to enterprises for internships, teachers always go on intermittently and for a short period of time. Without a complete understanding of the whole project, teachers take a risk of teaching some kind of semi-finished product in the classroom. Of course, it is not as good as the old experts who have worked for many years. The construction of teachers is the foundation of engineering colleges who are designed to train applied talents. As the saying goes, "Master leads in the door, practice in the individual". If the master is semi-understanding, the results can be imagined.

IV. PROBLEMS IN THE TRAINING MODE OF ENGINEERING MANAGEMENT MAJOR IN APPLIED UNDERGRADUATE UNIVERSITIES

We research on the training scheme of engineering cost major in Shandong Agricultural and Engineering University as an example, combining with the investigation of the other three applied undergraduate talents training schemes in Shandong province, and find some problems such as the training goal abstract and unrealistic, the curriculum repeated, the teaching method single and teacher team construction weak. In summary, they are classified in the following categories.

A. The Goal of Talent Training is Abstract, Lacking Uniqueness and Maneuverability

In terms of engineering cost major, there are 13 undergraduate colleges with this major in Shandong province and 30 in total with private colleges added up. For different levels and types of schools, in the face of student differences, there should be differences in the major in different institutes. This is not the case, however. Many schools have almost exactly the same goals. The training objectives of our university's engineering cost specialty are as follows. The students are cultivated to be high-quality applied talents who meet the needs of socialist modernization, develop in an all-round way including the moral, intellectual, physical and aesthetic fields, master basic theoretical knowledge in the field of construction engineering, relevant management of project cost management, economy and law, and be able to engage in engineering measurement and valuation, cost control, construction cost management and consultation in the whole process, contract management, engineering audit and other aspects of technical and management work in enterprises and institutions of construction engineering, cost consulting, auditing, bidding agency, supervision and other in the construction engineering field. This project is similar to the goal of engineering cost training in Shandong Architecture University which is the highland for the cultivation of architectural talents in Shandong Province. Our university Shandong Agricultural and Engineering University should stick to our own characteristics, cultivate personnel with basic engineering cost literacy, and explore our own uniqueness and feasibility, combining the cost of rural revitalization and the construction of irrigation and water conservancy facilities.

B. The Curriculum Has Overlapped Content, Lacking in Application and Logic

This paper investigates the talent training schemes of four applied undergraduate colleges in Shandong province. The curriculum setup is basically based on the modularization of general courses, major basic courses and professional courses, which is reasonable to break the traditional scattered curriculum. But there are still some problems after a careful analysis. First, the courses offered by different modules or in the same module have overlapping content, for example, in two compulsory courses of our university engineering cost major, namely Construction Organization and Engineering Project Management, the core of the former, which is the drawing of network drawing in progress control has overlapped with the content of the latter's the progress control chapter. Besides, the content of the course Bidding and Contract Management will repeat the knowledge of bidding in

Construction Law. Second, the order of courses opening is unreasonable. For example, Green Building and Construction Technology is arranged in the second term, which in fact, is higher and harder than the ordinary reinforced concrete construction courses. With no specialized course as the basis, it is impossible for students to learn well Green Building and Construction Technology. Third, the professional core curriculum is not prominent and application is not strong. Although the curriculum also combines with the characteristics of the college, it sets up two directions, namely installation engineering and agricultural engineering, the core curriculum of the major is not outstanding and the application is not strong. For example, for the agricultural engineering direction, we offer three courses Intelligent Agricultural Technology and its Application, Land Renovation Engineering Measurement and Valuation, Landscape Engineering Measurement and Valuation. After a careful analysis, we find the three courses are scattered and have little in common, like a bit of patchwork. At the same time, some courses have little application.

C. The Teaching Method Is Single, and the Practice Exists in Name Only

The teaching of the four colleges and universities mainly adopts the traditional classroom teaching method, which is high efficient and easy to carry out, but is terrible to cultivate the students' innovation and exploration consciousness. As a new applied undergraduate college, the cultivation of talents should pay more attention to the practicality and application, rather than the exploration of theoretical knowledge as the research universities do, and should focus on the flexible application of professional knowledge and professional skills. Emphasis should be placed on improving the students' ability to solve practical problems with the theoretical knowledge they have learned. Applied universities should increase the proportion of field teaching and case teaching and carry out flexible and varied ways of knowledge teaching. In addition, practical teaching should be the most important part of the whole teaching, which reflects the advantages and highlights of the major. Many schools have practical teaching modules. However, they lack standardized practice teaching system and effective management. As for the engineering cost specialty of Shandong Agricultural and Engineering University, most of the practical teaching modules need to be completed in the form of team cooperation under the guidance of teachers. As a result, the students' individual input time and energy is not enough and the experience is insufficient. In addition, many practical courses in lack of the guidance of "double typed" teachers, it is insufficient to integrate the knowledge with the practice and the understanding is not deep. The examination of the practice process is not strict, which turns the professional practice to a mere formality. As a result of the management laxness and the students' slackness, the homework is a thousand pieces of the same tune, the scores of which are only made due to the impression of the teachers. It is difficult to give full play to the value of practical education.

D. Professional Teaching Team Lack Practical Experience

Engineering cost specialty is an interdisciplinary subject,

which requires professionals to understand engineering technology as well as to have certain economic and management capacity. In fact, the applied subjects in newly established applied undergraduate colleges have to be closely connected with the practice, so there is a high requirement for the professional teacher team. Such universities hope more of front-line teachers are related enterprises experts or technical backbone professionals with engineering practice experience, but the actual situation is not optimistic, with few external teachers employed. This unreasonable teacher structure is one of the main reasons that restrict the development of professional teaching team. For example, our university has 19 teachers majoring in engineering cost, among which less than a half are double-typed teachers, no one with the social part-time work and only two employed as the external teachers. What is more, the age structure is unreasonable, with the post-80s teachers accounting for 85%, in shortage of experience and practical experience. In the other three colleges and universities, the rate of "double-typed teachers" can be improved by means of external services and posts, but the teaching workforce is highly mobile and unstable. Most of them are retired engineers of enterprises, whose old-dated knowledge prove difficult to arouse interests of students. Therefore, as applied undergraduate college teachers hardly meet the requirements, it is only theory that is imparted from the teachers to the students instead of practical experience. The new applied universities should actively connect with related enterprises, devote part time and even a period of full time to learn from the enterprises. Only those with no less than two years' practical experience are allowed to teach students.

V. OPTIMIZATION OF PROFESSIONAL TALENTS TRAINING MODEL IN APPLIED UNDERGRADUATE COLLEGES AND UNIVERSITIES

Taking the training scheme of engineering cost major in Shandong Agricultural and Engineering University as an example, this paper analyzes the similar problems existing in three other applied undergraduate colleges in Shandong province, and finds that the cultivation mode of new applied undergraduate colleges needs to be optimized constantly. Based on the analysis and comparison of the training models of applied technical talents in Germany [2], Britain and the United States [3], we find that their aim is to serve the local economic and social development. The curriculum set highlights flexibility and practicability. The key majors combine with the local pillar industry and students have general knowledge and professional knowledge, free to group up courses, when teachers pay attention to practical parts. Whether in Germany or in the United States or in the United Kingdom, the teaching hours and credits in the practical aspects of professional teaching account for a large proportion of the academic hours and credits. In addition, the hired professors have rich working experience and can combine theory with practice through engineering cases, so that the teaching level can be maintained at a higher level. How to optimize the mode of cultivating professional talents in applied undergraduate colleges and universities needs a systematic and comprehensive consideration of the following

aspects [4].

A. Changing the Educational Idea and Defining the Target of Cultivating Applied Talents in Newly-Built Colleges and Universities

The applied undergraduate colleges are the bridge between higher vocational education and professional postgraduate education, the important carrier of solving the employment and pioneering activities in the new era, and the effective engine of the mass development of higher education. Therefore, the educational concept should be changed. We should not blindly pursue the construction of research-oriented universities. Society should also break the traditional view of education, who thinks highly of a research university. In accordance with the General Standards for the Education and Training of Excellent Engineers, universities should formulate the training standards of talents according to their own characteristics. The goal of cultivating new undergraduate colleges and universities should be to train applied, compound and innovative talents, with comprehensive professional quality and strong practical operation ability, who can use the professional knowledge in the specialized field and integrate professional knowledge and professional ability into professional comprehensive ability. Different from specialized talents, they are equipped with various knowledge and abilities, integrate relevant knowledge in the era with social characteristics of interdisciplinary, knowledge fusion and technology integration, and apply theory to practice better. Innovative talents can make use of tough innovation will and rich innovative knowledge to create new work results in traditional and emerging fields. Therefore, with newly-established undergraduate colleges and universities highlighting the training of advanced applied talents in the front line of production practice in the service industry, the talents to be cultivated should be able to use knowledge and skills in interdisciplinary fields to solve practical problems in work and can improve work efficiency and work quality in innovative way. This is to promote the employment-oriented undergraduate talent training model, which means that the goal is to improve the employment rate and the quality of employment of graduates and cultivate talents with the market needs as the starting point and destination [5].

B. Establishment of Operation Guarantee System with Talent Training Program As the Core

Establishing the operation guarantee system with the talent training plan as the core mainly includes the four aspects. Curriculum set should try to realize the docking together of the subject chain and the industry chain as much as possible. The construction of the “double-typed” teachers should be strengthened. The assessment way should be more flexible and diverse. Inside and outside school practice base construction and supervision examine methods should be improved. We can see it from Fig. 1.

1) The curriculum should be set reasonably to make sure the subject chain and industry chain be connected actively

We should pay attention to the docking of professional disciplines with local industries, and the docking of discipline chains with industrial chains, which is a symbiotic and

common prosperity. The development of disciplines leads to the development of industries, and the development of industries promotes the progress of disciplines. Subject chain and industry chain linking can also promote the employment of students. Students can use what they have learned after four years of professional study and smoothly adapt to the industry work with their quick application of what they have learned [6].



Fig. 1. Operational guarantee system with talent training program as the core.

2) To strengthen the construction of “double typed” teachers

At present, there is a shortage of “double-typed” teachers in new applied undergraduate colleges and universities, so we should set up our own “double-typed” teaching team. The first is to train the young teachers into “double typed” teachers, which can encourage teachers to visit enterprises, participate in enterprise research and development, obtain certificates of professional skills, and even practice in enterprises for more than 2 years. Second, we should pay attention to the introduction of practical experience and theoretical knowledge of the excellent “double-typed” teachers and attract talent with a more generous pay. The third is to invite the talents with rich working experience to the school to work part-time or full-time, plus the training of the university, so that they become qualified “double-typed” teachers [7].

3) To improve the construction of practical training facilities

In order to cultivate practical talents, we should pay attention to students’ experimental practice. First, we should improve equipment infrastructure, provide enough practice equipment with a high quality. The second is to pay attention to the scientific management like facilities maintenance, repair, and use registration and so on. Third, we should expand the training base and practice site, school-enterprise cooperation and the use of social resources. Finally, it is necessary to ensure that the practical training system is reasonably-designed and time-sufficient and that the supervision and evaluation of the training be carried out truly rather than just on paper.

4) To explore flexible teaching examination form

The teaching should not be limited to modularized teaching form, but be flexible and diverse. Such approaches as “Flipping classroom”, “cooperative learning” and “micro-classroom” emphasize “student-oriented” and stimulate students’ interest and enthusiasm in learning. The professional teaching in developed countries is not performed around the curriculum, but around the project. Teachers not

only impart knowledge, but also guide students to explore, participate in students' discussion, discover problems and solve problems together with students. The performance of the students in the process of completion is more important in the assessment. Whether in the choice of teaching form or examination mode, only by improving the students' practical application ability, can the quality of students' cultivation in applied undergraduate colleges be improved effectively.

C. Construction of "Four Subjects and Four Driving Forces" Applied Talent training Mechanism

According to The Guidance Opinion Of the Ministry Of Finance, the State Development and Reform Commission and the Ministry Of Education on Guiding Some Local Colleges and Universities to turn into an Application-Oriented One (the State Development and Reform Commission and the Ministry Of Education (2015) No. 7), "Opinions of the General Office of the State Council on Deepening the Reform of Innovation and Entrepreneurship Education in Colleges and Universities" (issued by the State Office (2015) 36) and The Circular of the Department of Higher Education of The Ministry Of Education on the Development of Research and Practice in new Engineering Subjects (Department of Higher Education of The Ministry Of Education (2017) 6), in light of the law of the development of higher education, and the applicability between the new local applied colleges and local economic development, we should establish an applied talent training mechanism, with the government, universities, enterprises and students as the subjects, with laws and regulations, social evaluation, professional standards and corporate training as the driving force, that is, "four subjects and four driving forces" [8], which is shown in Fig. 2.

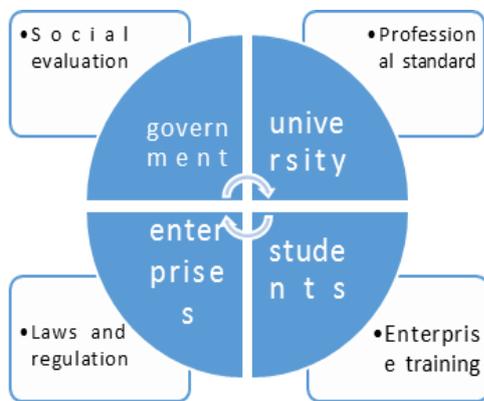


Fig. 2. Training mechanism of applied talents with four subjects and four driving forces.

1) To clearly target at "government, universities, enterprises and students" as the subjects

The government, school, enterprise and students are the core and key of the talent training model, which play the main role and play an important role in the talent training model.

The government mainly means that the competent education departments at all levels. As leaders in the transformation and development of universities, it should grasp the top-level design, guide the scientific and correct transformation of universities and establish pilot universities and regions for transformation and development. It actively creates a good atmosphere for the transformation and development of local undergraduate colleges and universities.

Universities refer to the new applied undergraduate colleges. As the main subjects of talent training, they must change their ideas, make a breakthrough in the cultivation of applied talents, and do a good job in organization, system, resources and other aspects of security work.

The enterprises are the places where the student products work, who have the biggest say in whether the products are qualified or not. It is in the enterprises that we can see whether the students can really play a role in work, use the theoretical knowledge to guide production, solve the difficult problems, and improve the efficiency of enterprises.

Students are the main subject of products. All talent training programs, curriculum, teaching arrangements and examination work must be in accordance with the characteristics of students' ability and knowledge structure and our teaching must be carried out according to their aptitude.

2) Construction of "laws and regulations, social evaluation, professional standards and enterprise training" as the driving force

Since 1996, we have put forward the idea of promoting the cooperation between schools and enterprises to educate people. But the progress is slow because the enterprises and universities have different thoughts and the perspectives are different. We should set up the organization system of the universities and enterprise, establish the mechanism of supervision and evaluation, formulate the laws and regulations of the reward policy, further promote the integration of the universities and the enterprises and lay the foundation for the cultivation of applied talents.

We should improve the social evaluation mechanism of talent training. Social evaluation refers to the independent evaluation on educational activities by social organizations with certain authority that are not entrusted by any educational department. It is also an evaluation of the degree to which schools train students to meet the needs of society. At present, the report on the employment quality of students in colleges and universities is basically made up by themselves, with a bright and beautiful surface, but in fact, it has little truth. We should learn from the practice of American education evaluation in which professional certification is used to show whether educational institutions have met certain school standards. Among them, the American Engineering and Technology Accreditation Commission (ABET in short), a socialized professional service organization, mainly engage in independent third-party engineering education certification and engineer registration to improve the quality of professional education.

The professional standard is the benchmark for the construction of talent training model. Applied talents are oriented to various industries, and we should establish the standards of training applied talents with professional standards driven by professional standards. The professional standard refers to the normative requirement of the ability level of the employees according to the professional content on the basis of the occupational classification.

We should increase the strength of enterprise training driving force. The purpose of cultivating applied talents is to train talents who can apply knowledge to practice and

combine theory with practice. Colleges and universities mainly teach students theoretical knowledge, laying a good theoretical foundation. Due to the reasons in the fields of funds, venues, equipment, the practical venues provided by colleges and universities are few and the simulation environment is different from the enterprise work environment. The enterprise training driving force can use the specialized, professional practice training to train the applied talented personnel.

We adopt the case teaching method, in the teaching of bidding and contract management, make full use of the cases of bidding project that teachers have participated in, and research on the lively and fascinating materials of the characteristics of bidding projects, project demonstration, prequalification, inviting bid, bid opening, bid evaluation, bid deciding, and psychological feelings of both bidding parties, so that students can analyze them. We also let students collect cases themselves in advance, and prepare to do a presentation in the class. One representative elected by each group reports in front of the class, and then the class ask questions then and there for the group students to answer, at last the teacher summarizes the experience and the lesson in the case. In order to arouse the students' enthusiasm of learning and the initiative of acquiring knowledge, we adopt the method of teaching and learning exchange according to the characteristics of the course, which means students go to the podium to teach some easy-to-understand chapters in the classroom. About the open teaching method, teachers can make full use of contacts to deepen students' understanding and mastery of the curriculum, such as organizing students to visit the construction project trading center and observe the actual scene of the bidding meeting. Students will be more impressed when we invite business experts and engineers in related fields to give lectures and to share their theoretical knowledge with their own experience. The flexible teaching method greatly enhances the students' cohesion and team consciousness, and develops the students' ability of thinking and analyzing problems [9].

The practice module examination in the course may combine the teaching outline request. The normal time appraisal accounts for 30 percent of the total score, which is the practice assessment result, while the final examination 70 percent. Practice assessment is made from attendance, classroom performance and practice results three aspects. The test results of the practice module are mainly evaluated from four aspects: attendance, practice performance, practice achievement and practice defense.

VI. CONCLUSION

According In the light of the fact that many new applied universities follow the unrealistic approach of building a new research university, regardless of their own school histories and the actual present situation, the paper explores the project cost training plan of Shandong Agricultural and Engineering University as a study case, combining with the investigation of the talent training plan of three other newly established applied undergraduate colleges in Shandong Province, and puts forward its solution. The new applied universities should

change the educational concept, further scientifically orientate the training target of talents, and focus on the construction of the applied talents training mechanism with four subjects and four driving forces and the social participation as a whole, which is supported by the operation guarantee system talent training model with the talent training scheme as the core. This will certainly provide certain help for the new applied undergraduate colleges to strengthen the endogenous motive force, the core competitive power and the higher quality development.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Liu Jingai conducted the research; Liu Weiqing collected the data; all authors had approved the final version.

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Liu Jingai was born in March 1979 in Jining, Shandong province. He is an associate professor. He received a bachelor's degree from Shandong University of Architecture and Engineering in July 2001. He received a master's degree in engineering project management, a master's degree in engineering project management, a national registered cost engineer, a supervisor and a consulting engineer (investment) from the School of Management, Shandong University in December 2010.

Mainly engaged in construction project management, engineering bidding and engineering quality control and other aspects of teaching, the main course is "Project Management", "Bidding and Contract Management", "Management" and "Construction Project Quality Control". In the field of engineering quality control and management, green building and green construction technology has been studied; in recent years, in the field of engineering project management and teaching. In terms of scientific research, 2 papers from SCI, 3 papers from EI and 5 papers on Chinese core teaching and research were published; 4 textbooks such as Construction Engineering

Economy and Enterprise Management were compiled; 10 national and provincial topics were presided over or participated in.

The main members of the teaching team of engineering project management specialty have successively won the honorary titles of advanced individual teachers and excellent teachers, and many times won the "Excellent Instructor" of the National University Guanglian Da Software Computing Competition.



Liu Weiqing was born in Shandong province, China in October, 1986. She got her master's degree on English translation from Tianjin Foreign Studies University in Tianjin in 2014. Her major field of study is English literature translation. She works as a lecturer in Shandong Agriculture and Engineering University in Jinan.