

1.5 媒体宣传报道和国际会议交流（论文 9 篇）

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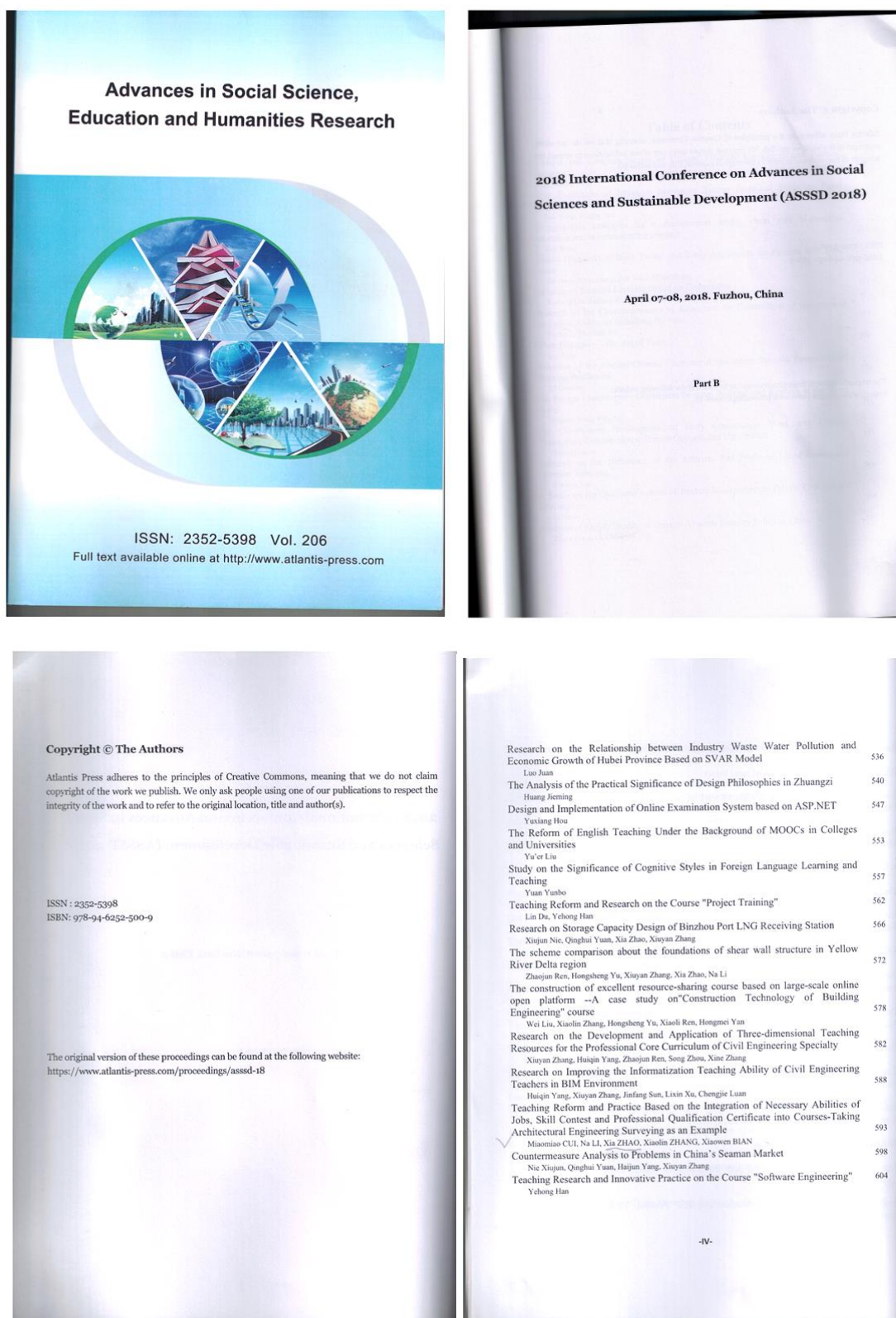
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图 1-25 滨州日报对成果进行宣传 and 报道



Teaching Reform and Practice Based on the Integration of Necessary Abilities of Jobs, Skill Contest and Professional Qualification Certificate into Courses—Taking Architectural Engineering Surveying as an Example

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Keywords: Integration of Necessary Abilities of Jobs, Skill Contest and Professional Qualification Certificate into Courses; Teaching Reform; Architectural Engineering Surveying; Project Orientation

Abstract: The integration of necessary abilities of jobs, skill contest and professional qualification certificate into courses is an advanced teaching mode to meet the development of higher vocational education and to train highly skilled and application-oriented professionals. Taking the course design and teaching of architectural engineering surveying as an example, job competencies, skill contest abilities and professional qualification requirements are integrated into classroom teaching, which refers to enterprise, industry standards and focuses on the training of students' professional skills and development abilities. Work situations were created based on the curriculum teaching platform. Digital teaching resources were developed and the teaching method of project orientation, task driven and process assessment was used. The good effect of teaching reform has been shown with fully improving the quality of personnel training.

Introduction

The integration of necessary abilities of jobs, skill contest and professional qualification certificate into courses is a new trend of course construction and education reform. In the developing tendency of higher vocational education and an advanced teaching mode for cultivating high skill and high quality talents, Urban-construction joint council, construction guidance committee for construction engineering technique major and construction implementation group all professional curriculum system built by the school and enterprises together are set up to cooperate further with industry, enterprise and professional skill identification organization. The knowledge, skills and professional accomplishment required by the students for jobs are included in the training programme and integrated into the teaching of related professional courses on the basis of formulating curriculum standards. Teachers and students are encouraged to participate in various professional skills contests to promote teaching and learning and to realize the integration of courses and contests. Because of the integration the new curriculum system and teaching content fully agree with the necessary abilities of jobs[1][2][3].

Course Design of Architectural Engineering Surveying Based on the Integration

Architectural engineering surveying which plays a major supporting role in the training of vocational skills and qualities of students is a core-competence course of architectural engineering technology. And it also lays a good foundation for the students to obtain the professional qualification certificate of the second construction engineer and to engage in the secondary employment position, which plays an important role in the curriculum system of the major. The professional ability requirements of construction crew, quality worker and surveyor are determined through the professional research of School-enterprise joint council in construction enterprise and surveying and mapping companies. By instructing students to participate in skill contests and

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Table 2 the course design based on the integration of necessary abilities of jobs, skill contest and professional qualification certificate

Construction Process	Teaching Project	Work Task	Learning Target	
			Knowledge Target	Capability Target
survey and design phase	1.basic knowledge	1.basic knowledge of surveying	1.tasks, functions, datum, basic work, procedures and principles of surveying; 2.measuring coordinate system and elevation system; 3.determination methods of ground points	master the datum, basic work, basic procedure and principle of surveying; master the methods of determining the position of ground points
		2. overview of architectural engineering surveying		
	2. surveying instrument	3.development of surveying instruments		1.use the level quickly and accurately; 2.carry out closed and coincidental leveling line survey; 3. set up theodolite quickly and accurately; 4.proficient in horizontal angle measurement of the observation method in two directions; 5. set up total station and measure angle, distance and coordinate correctly and quickly; 6. use GPS for RTK measurements
		4. level and its application	1. the structure and operational steps of the level; the measuring steps of the leveling and the calculation method of internal work; 2. the structure and principle of theodolite; the theoretical knowledge of angle measurement; 3.operation methods of total station and GPS	
		5. theodolite and its application		
		6. measuring-distance instrument and its application		
		7.total station instrument and its application		
		8.GPS		

Based on the learning targets of the curriculum design, the professional teaching standard of higher vocational college, the engineering survey specification, the outline of construction examination and the professional skill appraisal requirement of surveying and mapping geographic information industry are incorporated in the teaching of architectural engineering surveying. Teaching, we actively develop digital teaching resources and adopt informational teaching means. And the whole process reflects the mutual integration of necessary abilities of jobs, skill contest and professional qualification certificate into courses.

Teaching Practice of Architectural Engineering Surveying Based on the Integration

The subtask "Horizontal Angle Measurement of Two Directions" of the typical work task "Theodolite and its application" is given as an example to introduce the actual teaching process of the course. "Horizontal Angle Measurement of Two Directions" is the work task that is defined according to the requirements of the job ability of the construction crew, the quality worker and the

levels, the teachers deeply analyze the national vocational skill standards, technical specifications and the enterprise post abilities required of students. Furthermore, on the basis of the analysis of the requirements of professional qualification for the job and the extraction of the relevant professional knowledge in combination with the examination outline, the specific requirements of "job, contest, certificate" are translated into the knowledge and skill targets of course learning. The paper summarizes the corresponding relation of job, skill contest, vocational qualification certificate and teaching targets of architectural engineering surveying as shown in Table 1 [3] [4].

Table 1 the corresponding relation of job, contest, certificate and course target

Job	Skill Contest	Professional Qualification Certificate	Course Target
construction crew ; quality worker ; engineering surveyor	1."Unicom Wopai Cup" Shandong university students' science-technology culture and art festival(surveying skill contest); 2. "ZhengYuan Geomatics Cup" Shandong vocational college students' surveying skill contest; 3. Shandong vocational college skill contest(surveying and mapping); 4. National Vocational College Skill Contest (surveying and mapping); 5. Binzhou vocational college skill contest(engineering surveying)	construction crew, quality worker, engineering surveyor	1.skilled in the operation of measuring instruments and equipments; 2. carry on the basic work of measurement; 3.set out known elevation, angle and distance; 4. building positioning and laying out; 5. make the corresponding construction survey plan and organize the construction; 6. carry on survey inspection of engineering constructions according to measurement norms; 7. make topographic map and carry on building deformation observation.

Therefore, according to the professional abilities of job, the standard and norm of skill contest, and the requirement of vocational qualification examination, 6 teaching projects and 25 tasks relying on the course teaching platform have been set up for architectural engineering surveying in the light of the actual work flow (survey and design phase-construction phase-operation and management stage). The knowledge and skills which should be mastered by students through the course learning are given on the basis of these typical work tasks' analysis. For example, the content design of the first and second teaching items is shown in Table 2.

surveyor, which is one of the competition events of surveying skill contest at all levels and the necessary examination content of construction crew and three-level engineering surveyor. Therefore, the job ability analysis, examination requirements and technical requirements (shown in Table 3) for the horizontal angle measurement of three-level traverse surveying in the engineering surveying norm are integrated in the teaching.

Table 3 basic technical requirements for traverse surveying (2 "stage angle measuring instrument")

Level	Position Number	Difference of Two Half Observation Sets (")	Difference of Three Readings for Distance Measurement (mm)	Error of Closure in Azimuth (")	Relative Closure of Traverse Surveying
three	1	24	5	24√n	≤1 / 5000

Note: n is the number of stations in Table 3.

Based on the integration, knowledge, ability and quality target of "Horizontal Angle Measurement of Two Directions" are given as shown in Fig. 1. Teaching priorities include the operation of angle measuring instrument (total station) and the measuring step of horizontal angle. The difficulties are the method of filling out the record form and the evaluation of measurement's accuracy. The core is to measure the horizontal angle safely and normatively.

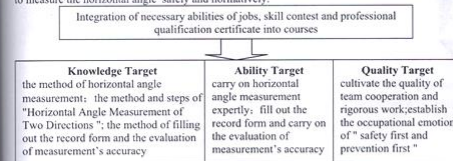


Fig.1 teaching targets of "Horizontal Angle Measurement of Two Directions"

The teaching process is as follows:

1. Creating the work situation in combination with the curriculum teaching platform
The axes of the building has been set out at the construction site of no.2 teaching building. Axes' location needs to be checked, which includes two checking tasks: angle check and distance check. When checking the angle, we need to check the horizontal angle between the two adjacent axes.
2. Issuing the work task
According to technical requirements for the horizontal angle measurement of three-level traverse surveying, the horizontal angle between the two adjacent axes of the building is measured and checked with 2" total station.
For example, take O as the occupied station and A, B as the target points, measure the horizontal angle β ($\angle AOB$) between the building axis OA and OB by the "Horizontal Angle Measurement of Two Directions", fill out the record form earnestly and give the check result on the precision standard.
3. Task-driven, explaining priorities and difficulties, training exercises, examination and evaluation.

The course examination and evaluation is transformed from the final skill examination mode to the mode that includes class process test, final skill examination, skill competition evaluation and professional qualification certificate score. Students are encouraged to actively participate in the skill contests, strive to obtain relevant professional qualification certificates and make the professional knowledge standardized, practical.

Effectiveness of the Course Teaching Reform and Its Prospects

The integration of necessary abilities of jobs, skill contest and professional qualification certificate into courses has greatly improved the quality of professional talents in architectural engineering technology. The passing rate of workers in construction projects in Shandong Province has reached over 90%, while some students have obtained vocational qualification certificates for three-level engineering surveyors. Since 2014, we have won the second prize in Provincial Vocational College Skills Competition held by the Department of Education of Shandong Province (Surveying) for consecutive 4 years and also many awards in measurement competitions organized by industry and enterprises. Our Measurement Association has grown up to a provincial-level excellent society, and graduates are now in short supply as their knowledge, skills and professional quality are highly rated by employers. In the future, we will continue to follow the reference of "Opinions on Deepening the Teaching Reform of Vocational Education to Improve the Quality of Personnel Training in an All-round Way" (Measures for the Administration of Higher Vocational Education (Specialty) Majors in Colleges and Universities, Department of Vocational and Adult Education, Ministry of Education [2015] No. 6), and also the requirements of Standards (GB/T 286-2011) in the occupational standards of the construction industry. Teaching reform of integrating necessary abilities of jobs, skill contests and professional qualification certificates into courses is going to keep on, to comprehensively improve the professional quality of students [5].

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Research on the innovation of modern apprenticeship training mode for construction majors in higher vocational colleges (ZC15074)

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Research on the Development and Application of Three-dimensional Teaching Resources for the Professional Core Curriculum of Civil Engineering Specialty

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Keywords: Internet; Virtual technology; Entity engineering; Three-dimensional; Teaching resources

Abstract: For civil engineering specialty, this article expounds a kind of resource development thinking that is based on the combination of Internet and virtual technology. And the development and application of professional core curriculum teaching resources are practiced. In the process of research, we developed curriculum resources using virtual technology and built a Large-scale online open course platform. The teaching mode of "virtuality and reality combination, online and offline" and the learning mode of "theory with practice integration, in class and outside" were applied. And we practiced "networked timely tracking and evaluation".

1. Introduction

The following is indicated in the notice of the ministry of education on the development plan for education informatization (2011-2020): it is of great significance to improve the quality of education, promote education fairness, and build a learning society and the human resources powers through promoting the popularization and sharing high-quality education resources, promoting the information technology and education teaching depth fusion, and realizing the omnibearing education thought, idea, method and means. The teaching resources of building engineering construction have the following problems. Firstly, in the current "Internet+" mode, the degree of informatization of teaching resources is relatively low. It is not suitable for the teaching mode of "online and offline". Secondly, professional courses are not developed in the same entity engineering. This causes that students only can obtain one-sided and fragmentary knowledge. Thirdly, the long construction period of the construction entity engineering cannot meet the students' training objectives. Construction engineering students have low ability to accept the teaching resources, so the teaching resources cannot meet the needs of students well. It is relatively weak to cultivate students' vocational ability of informatization technology. This is not suitable for the application of information technology in modern rapid development. The teachers in the school are relatively weak in the use of information technology, and cannot meet the construction requirements of digital campus on teaching resources. It become an urgent problem to solve to innovate teaching resources development model of building engineering construction professionals, to develop modern informatization teaching resources under "Internet+", and to seek to teaching resources that adapt to the ability and level of acceptance of construction engineering students.

2. Reform objectives and main content

It is the main goal of the reform to develop the teaching resources suitable for the students of civil engineering.

2.1 The teaching reform idea of "Internet+ entity engineering" is adopted

The project of building entity engineering is developed on the Internet. We pay attention to the informatization of professional teaching. Four kinds of typical structure engineering are selected in

practice, which are brick concrete structure, frame structure, shear wall structure and shear wall structure. They are applied in students' dormitories in school, teaching building, houses and office buildings. Meanwhile, we developed curriculum resources using VR and other virtual technologies and built a Large-scale online open course platform. The teaching mode of "virtuality and reality combination, online and offline" and the learning mode of "theory with practice integration, in class and outside" were applied. And we practiced "networked timely tracking and evaluation". This reflected that teaching reform idea of "Internet+ entity engineering" is adopted, as shown in Fig. 1.

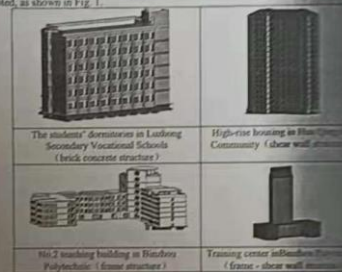


Fig. 1 Internet+ Entity engineering+ Virtual reality

2.2 The teaching mode of "virtuality and reality combination, online and offline" is adopted

The teaching mode of "virtuality and reality combination, online and offline" is adopted.

图 1-27 《土建类专业核心课程立体化教学资源开发与应用研究》，2018.04，张秀燕、杨会芹、任昭君、周松、李玉群，《Advances in Social Science, Education and Humanities Research》(ISSN:2352-5398)

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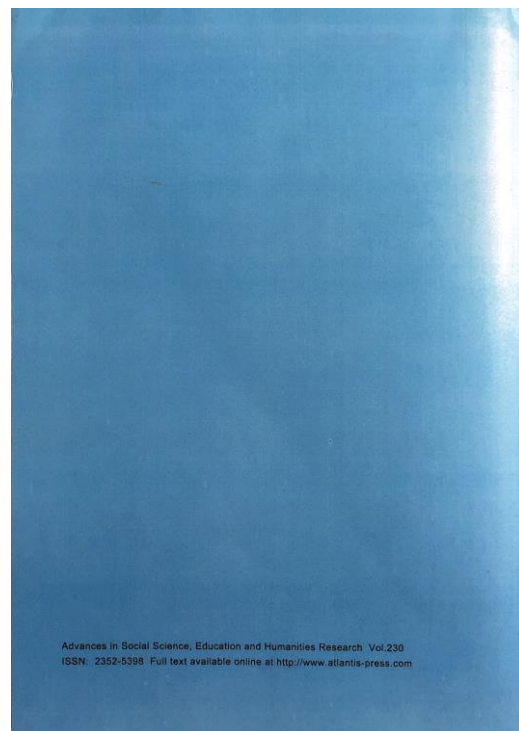
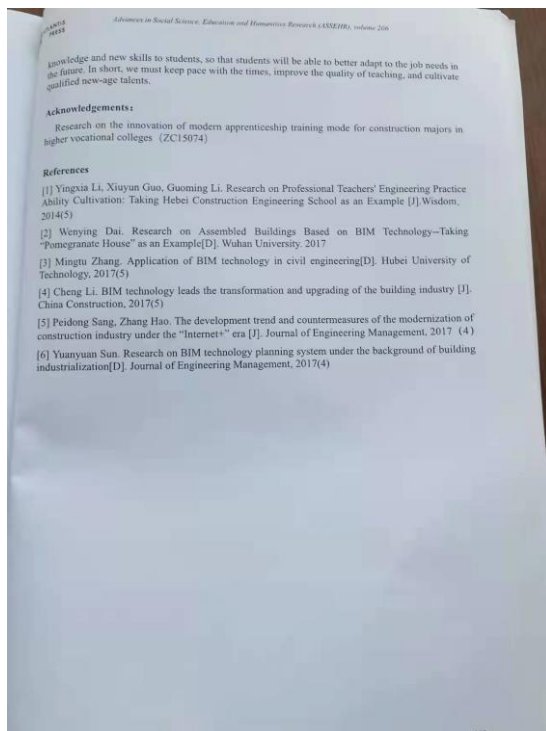
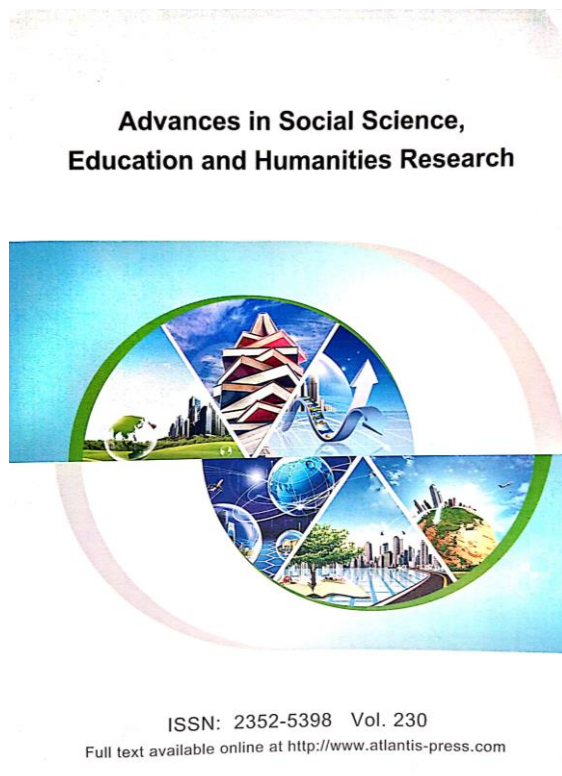


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Research on Development of Integrated Digital Teaching Platform in Civil Engineering in Higher Vocational Colleges

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Keywords: Internet, BIM, Civil Engineering, Integration, Teaching platform

Abstract: In the teaching practice of civil engineering, the Binnzhou Polytechnic adheres to the principle of "deriving from school, and serving for the school". It has exploited teaching resources by using BIM technology all at once, built a "3+3" teaching system consisted of "three-stage teaching" and "three-level teaching platform" taking physical buildings on campus as a carrier, shared teaching resources by means of mobile Internet technology to make the teaching reform of civil engineering in higher vocational colleges.

1. Research background

Building Information Modeling (BIM), is a three-dimensional architecture model based on all information data in the constructional engineering project to stimulate all real information of the architecture virtually by digital information. In August 2016, the Ministry of Housing and Urban-Rural Development of China issued the Outline of informatization development of construction industry 2016-2020, proposed that it is necessary to promote the popularization of BIM application, and advance the "Internet Plus" cooperative working model. And currently, the "Internet+BIM" technology has become a hotspot in the construction industry.

More than 10 higher vocational colleges in Shandong has opened the BIM modeling curriculums, and BIM games and certification tests are held regularly each year in the province dominated by modeling. In the construction of IT teaching platform in colleges, inconvenient resource access often causes low rate of usage, and the teaching platform provided by professional 3D stimulation development companies also has some defects, for example, teachers cannot upgrade or maintain the resources in the model independently.

BIM technology boasts imitiveness, visualization, which can be integrated with IT teaching building of schools. The "Internet+BIM" technology can not only upgrade the teaching resources, but transform the teaching management method as well as the assessment criterion of students.

2. Research objectives

2.1 Deriving from school and serving for school

The author has selected three typical buildings on campus, and constructed a comprehensive integrated digital teaching platform modeling with Revit of BIM software and working drawing, construction organization design, settlement data, photos and videos in practical construction. The integration of teaching resources is conducive to classroom teaching and the self-learning after class. In the process, students can enter the buildings, combine physical buildings with 2D drawings and 3D models, learn deeply by accessing teaching resources via computers and tablet computers.

The integrated digital teaching platform not only serves for teaching, but realizes virtual exhibition of campus environment utilizing the advantages of BIM technology. Students, thus, can know campus building environment, repair and maintenance of electromechanical pipelines of campus building and smart campus by virtual tour, and teachers can access resources to take part in IT teaching skills contest, Micro-course contest, guide the technical innovation projects of college students.

2.2 Teaching resource pool

Integrated digital teaching platform gathers resources into a project, taps and develops teaching resources in the project according to the teaching task. Students, through the professional curriculum group, study gradually deeply, learn engineering projects selected by the platform, understanding a single project thoroughly. As the project itself is on the campus, students can integrate the physical buildings, 2D drawing, with 3D model by virtue of Internet+BIM technology.

2.3 Cut learning costs

In order to ensure students are free to use software, popular software like QQ, WeChat, Baidu Netdisk is selected in storing resources and visiting the carrier, and the BIM software is Revit, Navisworks, Glodon which has been taught in the school. In adding resources and upgrading BIM models, teachers do not have to study new software, relieving stress of both teachers and students, cutting learning costs.

2.4 Focusing on the resource sharing on the mobile terminal

Due to the popularization and portability of mobile phone, and full wireless network coverage on campus, integrated digital teaching platform puts resource sharing on the mobile terminal as top priority. The selected software can be applied in the mobile terminal and the PC, so students can forward documents autonomously to finish different studying tasks. The classroom test, homework, questionnaire and teaching evaluation can be achieved via APP like Duifene, and Moso Teach.

3. Research on construction and practice of integrated digital teaching platform

3.1 Platform construction

The paper takes the teaching platform of student apartment building project as an example which is completed by resource collection and collation, virtual-real synthesis, and resource sharing.

3.1.1 Resource collection and collation

Substantial resources in the project are accessed by collecting and editing construction photos, videos on the site.

The 2D drawing, chart and text resources are acquired by gathering and optimizing drawing (CAD/PDF) to meet the teaching needs. The construction organization design information is gathered and the aggregate schedule database is set up via the Microsoft Project.

Resources of 3D BIM model is obtained by building Revit model of student apartment building project, rendering and optimizing its Navisworks model, and constructing GGG, GCL model of the apartment building by Glodon.

3.1.2 Virtual-real synthesis

The virtual video of student apartment building construction is produced by utilizing Navisworks model and aggregate schedule database. Quality rendering video of buildings is derived from the rendering software--Lumion. Teachers will explain the knowledge combining the photos and videos of the construction and record micro-course online.

The classified resources are uploaded to the network disk so as to generate the QR code of each resource file, which is inserted in to the drawings in PDF. And its digital drawings are made to print for students as the teaching resources in the classroom. The QR code is posted on the corresponding architecture component for students to scan, and learn related knowledge, BIM model, pictures and videos via the link.

3.1.3 Realize resource sharing

The realization of resource sharing is explained by the course teaching of Construction Technology of Engineering (Jianzhu Gongcheng Shigong Gongyi).

Teachers will push teaching resources like virtual construction video, drawing, and micro-course

video to students via the mobile phone before class so as to help them finish reviewing. In the class, teachers will display key points in the construction from multiple perspectives by looking through BIM models via Revit or Navisworks. After class, students will ask questions for teachers via screenshots of WeChat and QQ and teachers will assign homework via the APP in the mobile phone. Students are encouraged to browse BIM Model or enter the physical buildings to finish the homework, which will be automatically accessed and collected in real time on the cloud. After the teaching assessment, teachers will upgrade and upload teaching resources according to students' feedback, new materials, technologies and techniques.

3.2 Application practice

In the teaching practice, the integrated digital teaching platform, by gradual summary and improvement, has established a "3+3" teaching system comprised of "three-stage teaching" and "three-level teaching platform".

3.2.1 Three-stage teaching model

According to the professional course setting in the talent training program, a three-stage teaching model is devised including model learning, model construction and model use. In the early stage, browsing and learning BIM model will help students complete the introduction of the professional basic courses. And then, the opening of BIM technology course will guide students construct models independently by using BIM software. Finally, course practice will be realized according to the information about schedule, cost information with the construction cost software as shown in table 1.

Table 1 Three-stage teaching model

Stage	The first and second semesters Learning model	The third semester Constructing model	The fourth and fifth semesters Utilizing model
Major service courses	Construction Materials Construction Map Identification Construction technology in Real Project Construction CAD Construction Equipment, etc.	BIM Technology	Project management Project metering and Valuation Application of Project Cost Software Metering and Valuation of Installation Project, etc.

3.2.2 Three-level teaching platform

In the teaching practice, the feedback of students should be gathered so as to enrich and improve the resources on the platform, and a three-level teaching platform differing in complexity, structure, has been established as shown in table 2.

Table 2 Three-level teaching platform

level	primary	secondary	senior
Buildings selected	Student apartment	High-rise housing in Huaqing Garden	Yellow River Delta High-skilled talent training center
Structural style	Frame structure	Frame-shear wall structure	Frame-shear wall structure
Floor area	7000 m ²	16000 m ²	60000 m ²

4. Expansion and achievement

4.1 Enrich the IT teaching resources

By utilizing teaching resources on the integrated digital teaching platform, five textbooks and digital drawings are compiled, three provincial-level resource sharing courses and one department-level resource sharing courses are constructed, and two provincial resources sharing courses are declaring.

4.2 Promote contest, innovation, and scientific research

Teachers, making use of resources provided by integrated digital teaching platform, take part in micro-course contests, and IT teaching contests, and win the first prize once, the third prize for two times in the IT teaching contest held by Shandong Polytechnic. At the same time, students have won the second prize and the third prize in college student scientific and technological innovation contest in the Binzhou Polytechnic and achieved outstanding results in the "Lu Ban" architectural engineering drawing contest of civil engineering of national higher vocational colleges.

4.3 serve the society and the industry training

Integrated digital teaching platform has not only helped students complete the virtual practical training, but launched exam training for spring entrance examination and BIM grade test, induction training of construction companies, and safety education training, which has been widely recognized by the society and the industry.

5. Conclusion

The research and practice of integrated digital teaching platform under the Internet+BIM technology sticks to the principle of "deriving from school and serving for school", develop and share teaching resources by BIM technology based on the physical buildings on campus. By using mobile internet technology, a 3+3 teaching system including three-stage teaching model and three-level teaching platform has been constructed, realizing the teaching reform in civil engineering in higher vocational colleges.

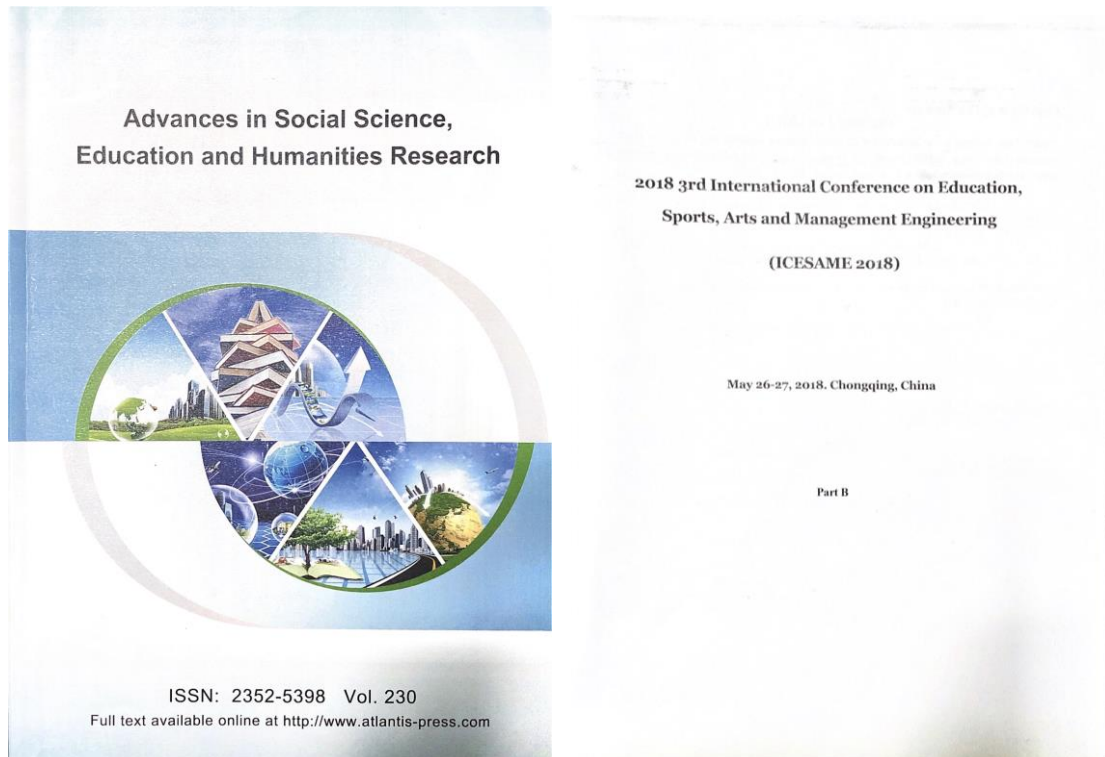
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Development of integrated digital teaching platform for civil construction in higher vocational colleges under the "Internet +BIM" technology (2017232)

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图 1-29 《高职土建类专业综合数字化教学平台开发研究》，2018.04 ， 张晓霖、刘伟、丁友平、张荣美、吴占东，《Advances in Social Science,Education and Humanities Research》(ISSN:2352-5398)



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Research on Teaching Methods and Means of Civil Engineering in Vocational Colleges

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Keywords: vocational colleges; civil engineering; teaching methods and means

Abstract: This paper takes the civil engineering in vocational colleges as the research object, it analyzes the social responsibility of vocational education under the new situation of economic development. The paper summarizes the two major problems facing the civil engineering majors in vocational colleges, which are student issues and traditional education issues, and asserts that the reform of teaching methods and means is imperative. On the basis of practical argumentation, the paper gives corresponding suggestions on the reform of teaching methods and means from five aspects: student subject, informatization teaching, project-driven, school-enterprise cooperation, evaluation mechanism, which provide reference for improving teaching quality.

Vocational education is an important part of our education system. For a long time, vocational education has been devoted to cultivating applied talents for the country, which are oriented to the first production line and services management at the grass-roots posts. In June 2014, the State Council issued twenty-eight important guidelines in the "Decision on Accelerating the Development of Modern Vocational Education", which emphasized the need to "innovate and develop higher vocational education." In recent years, China's economic construction has developed rapidly, and professional education has also made tremendous progress. Under the new economic situation, how to respond to the country's call for developing vocational education is an issue that every educator in a vocational college should meditate deeply. For the first-line teachers, we must start from the grass-roots education and teaching, innovate and improve education methods and means to improve the teaching level. Only in this way can we better serve the country's economic construction and cultivate high-quality skilled talents for the society.

This paper takes the civil engineering as an example to analyze the reform of teaching methods and means in vocational education. In recent years, with the development of the construction industry, the demand for professional talents in the civil engineering industry has remained high. The construction industry often requires a large number of grassroots workers. Compared with the traditional construction industry, the mechanization and intellectualization of the modern construction industry are increasingly improving, and the requirements for the quality of laborers are also growing. Skilled personnel with a certain theoretical knowledge and professional qualifications will become the main force in the construction industry. Vocational colleges should keep pace with the times, conform to social development, and serve the needs of society to cultivate the professional talents for civil engineering.

1. The main dilemma of civil engineering teaching in vocational colleges

At present, there are still some common problems in the education of civil engineering professionals in vocational colleges. The problems can be attributed to two major aspects of student issues and traditional teaching issues.

1.1 Student aspects

The students' problems are mainly reflected in the following three aspects. Firstly, the pre-school knowledge of vocational college students is relatively weak; while the curriculum of civil

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engineering has relatively high requirements for math and physical literacy, so it exists some certain difficulties in theoretical teaching. Secondly, during the previous learning stage, quite a few students from vocational colleges did not have developed good study habits, and even had a feeling of school-weariness. How to reverse student's prejudice towards learning, guide students to rebuild learning interest, cultivate learning ability and learning awareness are major issues faced by professional teachers. At last, the students' capacity for self-restraint and self-management needs to be improved, and civil engineering courses mostly have practical training and practice links, which puts forward higher requirements for the discipline organization, order maintenance and safety promotion of schools and teachers.

1.2 Traditional teaching methods

The main drawbacks of the traditional teaching methods are as follows. The first is that the participation of students in traditional classrooms isn't high. In traditional classrooms, teachers often adopt "cramming" teaching methods. According to the content of lesson plans, they teach the knowledge points which in the textbooks in sequence, and occasionally question in the classroom. This kind of one-way teaching means that students are like "audiences", and they watch the teacher's "performance". The overall participation of students is very low and the atmosphere in classroom is boring. Students are easily distracted, and it is difficult to cultivate interest in professional courses. It is obvious that students' "subject" status has not been exerted in such traditional classroom. At the same time, the degree of informatization in such classes is low and it is difficult to effectively use network resources. In the "Decision of the State Council on Accelerating the Development of Modern Vocational Education," it is clearly stated that the development of vocational education should "increase the level of informatization." With the development of information technology and the completeness of schools' infrastructure, the introduction of multimedia tools, online courses, and simulation software for civil engineering majors will greatly assist classroom teaching and improve students' interest and cognitive ability. But the traditional teaching methods has been difficult to synchronize with modern teaching means due to lacking of information technology and network resources. The third aspect is that the practice link is weak, and students have poor hands-on skills. Civil engineering courses need practicing, but the traditional teaching methods are often like empty talk, just use theory to explain the theory, using words to elaborate words, which can't effectively combine practical resources for project teaching. This makes students can't understand the theoretical knowledge deeply, and it is difficult to master practical skills to meet business needs.

Based on this, the teaching methods and means for civil engineering majors in vocational colleges must undergo in-depth reforms in order to respond to the country's decision to accelerate the development of vocational education and make the civil engineering talents meet the requirements of industry development, and it will constitute the basic guarantee for the professional skills and students' own development.

2. Suggestions on the reform of teaching methods and means

The reform of teaching methods and means for civil engineering majors in vocational colleges is imperative, which requires the educators to seriously study the twenty-eight key guiding opinions in the "Decision of the State Council on Accelerating the Development of Modern Vocational Education" and know clearly the talents demand for the development of the construction industry under the new era. At the same time, we should actively study the advanced concepts and teaching techniques of vocational education at home and abroad, and get it repeatedly argument, diligently summarized, and continuously improved in teaching practice and personnel training. The reform proposals for teaching methods and means for civil engineering in vocational colleges are summarized below.

2.1 Exchange roles, pad class, and improve students' participation in teaching activities

Give full play to students' subject-role, and actively guide students to participate in classroom

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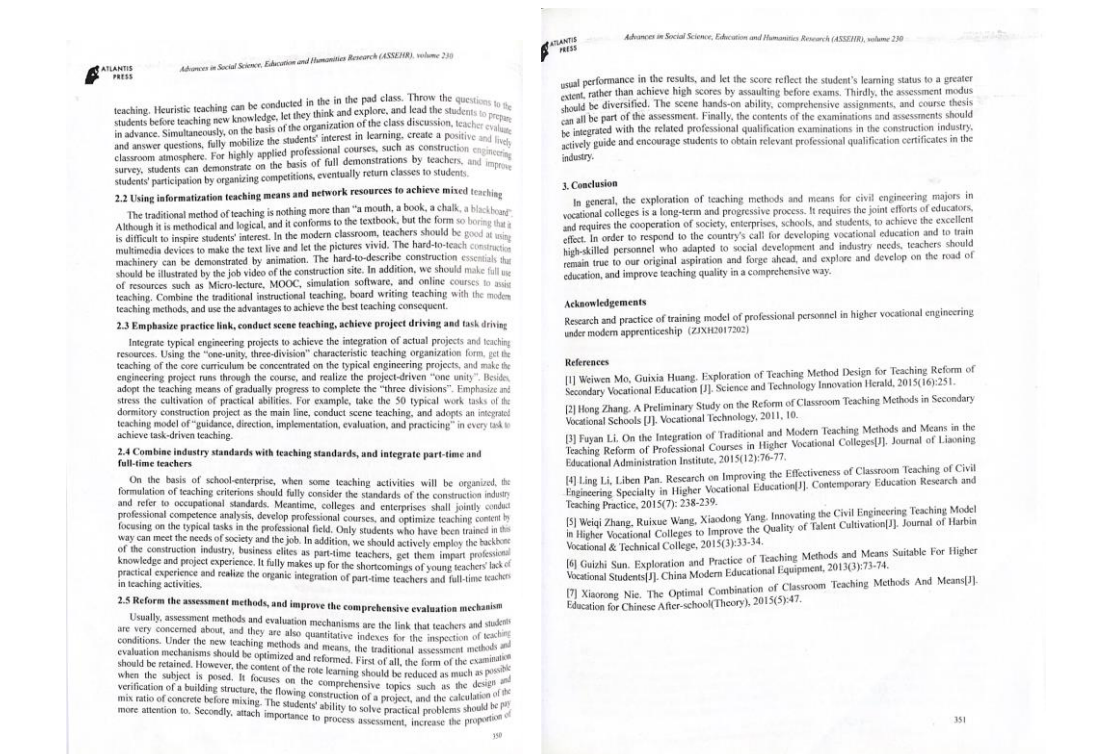
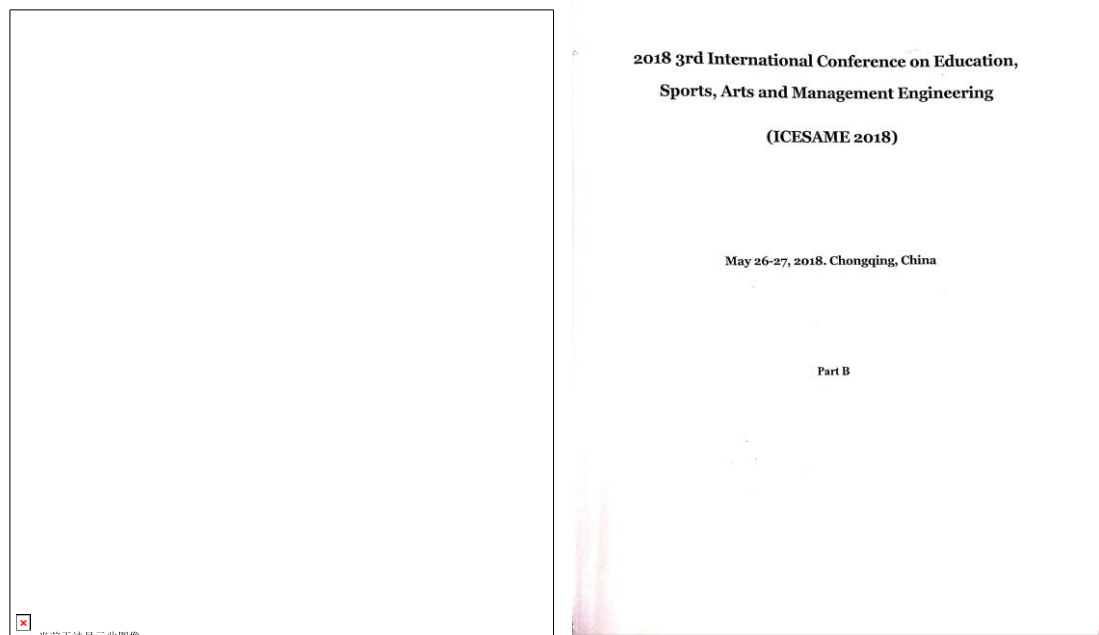


图 1-30 《职业院校土建类专业的教学方法与手段改革研究》，2018.04，李娜、卞晓雯、栾成洁、潘伟，高丽燕，《Advances in Social Science,Education and Humanities Research》（ISSN:2352-5398）



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upgrading of the construction industry, determine the goal and direction of talent training, so as to determine the shortage of the ability and development direction of civil engineering professional teachers.

3.1.2 According to the professional teaching guidance plan, we should constantly improve teachers' promotion target of their ability.

In accordance with the "views on the comprehensive start of the development of teaching guidance program for higher vocational education" (No. 4 of Lu teaching and service [2015]), the teaching guidance scheme of civil engineering majors in higher vocational colleges is taken as an opportunity to determine the goal of improving teachers' ability. The teaching guidance scheme of Civil Engineering Specialty in higher vocational colleges has the characteristics of serving the career development of the students, the modular new curriculum system based on the typical work items, curriculum content development focusing on school-enterprise cooperation, the "teaching and doing" integration, the professional standard and the industry standard as the reference, the rich and colorful teaching resources, the scientific and pluralism teaching evaluation, and the ability to promote the organic cohesion in the middle and high vocational colleges. According to the professional teaching guidance plan, we should constantly improve teachers' Promotion target of vocational colleges. Focusing on the teaching guidance program of Civil Engineering Specialty in higher vocational colleges, we determine the goal of improving teachers' ability.

3.2 We should carry out the project of improving teachers' double quality and speed up the training of high level "double qualification" teachers

3.2.1 A double quality training mode of "school enterprise parallel" should be established

We make enterprise experts to school teaching normalization. Experts from related enterprises are invited to proofread teachers' training, including applications of the latest professional software applications, new industry dynamics analysis, and training of new construction technologies. The number of the training from the technical experts and skilled craftsmen hired industry enterprises accounted for more than 80% of total number of teacher training in school.

Meanwhile, we make the teachers' participating to the enterprise practice and study training problems, participating in the technology research of cooperative enterprises, and overseas training of employees.

3.2.2 "Coach type" teachers should be trained.

According to the selection and management method of teaching masters, we organized the "coach type" teaching teacher selection. It will have certain enterprise experience and industry ability as an important index for evaluation. Through school based training, enterprise training, domestic study, study abroad and other measures, we will train and bring up a number of "coach type" teachers that is well-known in the society and have great influence in related industry enterprises.

3.2.3 Professional leaders who have an impact on the industry should be fostered.

Professional leader selection criteria is established, we gradually improve the selection, training and assessment mechanism of professional leaders, and cultivate professional leaders with strong teaching ability and the influence in industry enterprises. The school enterprise "double professional leader" system is put into practice. In addition to the professional leaders in the school, 1 other leaders are selected to participate in academic exchanges, advanced study, and overseas training. This gives full play to the leading role of professional leaders in teaching research, teaching reform.

Research and Practice on improving the teaching ability of civil engineering teachers in Higher Vocational Colleges

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Keyword: civil engineering; teachers; Lifting scheme

Abstract: This article study the problems existing in teaching of Civil Engineering Specialty such as poor docking between the students' position ability and enterprise demand, the teachers' weak ability of information teaching and so on. Then lifting scheme of teaching ability is proposed from determining the goal of improving teachers' ability, speeding up the training of high level "Double Teachers" teachers, improving the application ability of teachers' new technology and teaching research ability. In practice, good results are achieved.

1 Introduction

The birth of new technology in the construction industry, especially the BIM technology, the assembly technology and the development of the concept of green building, has brought new opportunities and challenges for professional teachers in Vocational Colleges and universities. Under the new demand for industrial upgrading, the teachers of civil engineering in higher vocational colleges have been put forward new requirements in the aspects of new knowledge and new skills. They need urgently to grasp the information products of the new era in order to be competent for teaching.

2 The main problems in the teaching of Civil Engineering

2.1 the poor docking between the students' position ability and enterprise demand

Under the new requirements of BIM technology, assembly construction, green intelligent building and other construction industry upgrading, the students' position ability in the traditional talent training program is not well connected with the needs of enterprises. The students need to master new knowledge and new skills urgently to adapt to the transformation and upgrading of the construction industry.

2.2 the teachers' weak ability of information teaching

Under the new requirements of the upgrading of the construction industry, information technology has been an inevitable teaching tool. If the teachers still stay in the traditional teaching methods, they can not meet the information teaching needs of BIM technology, assembly construction, green building and other aspects. The teacher is very difficult for the development of three-dimensional teaching resources, and they can not meet the current teaching mode of current "Internet plus" online and offline.

3 Countermeasures to improve the information ability of professional teachers

3.1 the program that the teaching needs guide engineering is carried out and the improvement goal of the teachers' teaching ability is set

3.1.1 Research activities for civil engineering majors in vocational colleges is carried out in order to determine the need for improvement

We will carry out research activities on the development trend of the construction industry, the

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3.2.4 The construction of the backbone teachers should be strengthened.

We should optimize the selection and management of the backbone teachers, formulate the criteria for selecting the backbone teachers, and improve the participation of the backbone teachers in all kinds of business training, domestic visits, academic exchanges, and practicing in enterprises. We gradually improve the ability of the application of information technology, the basic teaching ability, the professional practice ability and the learning ability of the new knowledge and new technology. The backbone teachers should be selected to train outside the country in order to learn the idea of international advanced teaching and explore the international perspective of teachers.

3.2.5 A first-class teaching and scientific research team should be built.

Through project research and results development, we can enhance the overall level of professional research in order to research how to integrate the latest technology of construction industry into teaching.

3.3 The implementation of teacher training program to enhance teachers' new technology application ability and teaching research ability.

3.3.1 We should implement the training system of the whole staff.

A full training program is established in order to organize regular training such as teaching and research exchange training, enterprise expert training, cold and summer vacation education staff training, and participate in the training of various industry associations, provincial training and national training. The professional skills, information technology and teaching ability are included in the training content. Every semester, more than 20% of the professional teachers are selected to sent to the industry enterprises and the school training base for practice and training. Each year, 20% teachers are selected to take part in national and provincial training and select 2 backbone professional teachers to train abroad. We actively strive for 1 provincial training projects of professional backbone teachers in higher vocational colleges.

3.3.2 We should improve teachers' teaching research and practice innovation ability.

With policy guidance and intensive training, the teaching ideas of teachers are constantly improved, teachers' teaching ability and the sustainable development of teachers are improved by the forms of lecture training, Teaching observation, teaching and research competition, and personality guidance. By the way of researching and studying in enterprise, part-time or hang up, the teachers participate in enterprise training, product research and development, undertake horizontal topics, technical services in order to improve teachers' practical innovation, application research and social service ability, we organize teachers to participate in information teaching and training, information teaching contest, micro class competition and other activities, so as to improve teachers' information technology application ability. The backbone teachers are selected to visit the developed countries in the vocational education by visiting studies, cooperation and communication, subject study and teaching in the short term. This can broaden the horizon of teachers' internationalization and improve teachers' international quality.

3.4 The projects of the construction and sharing of high-quality courses can enhance exchange of the advanced technology and the high-quality courses.

3.4.1 Construction of high-quality resources sharing courses promote the sharing and mutual construction of course resources.

The construction of excellent courses should be led by teachers with profound academic attainments, rich teaching experience and distinctive teaching characteristics, and the team members should include professional teachers and enterprise technical backbone. In the process of the construction of excellent courses, we should speed up the transformation of education and teaching ideas, promote the reform of teaching content and teaching methods with the integration of modern information technology means and new professional technology to the curriculum resources and

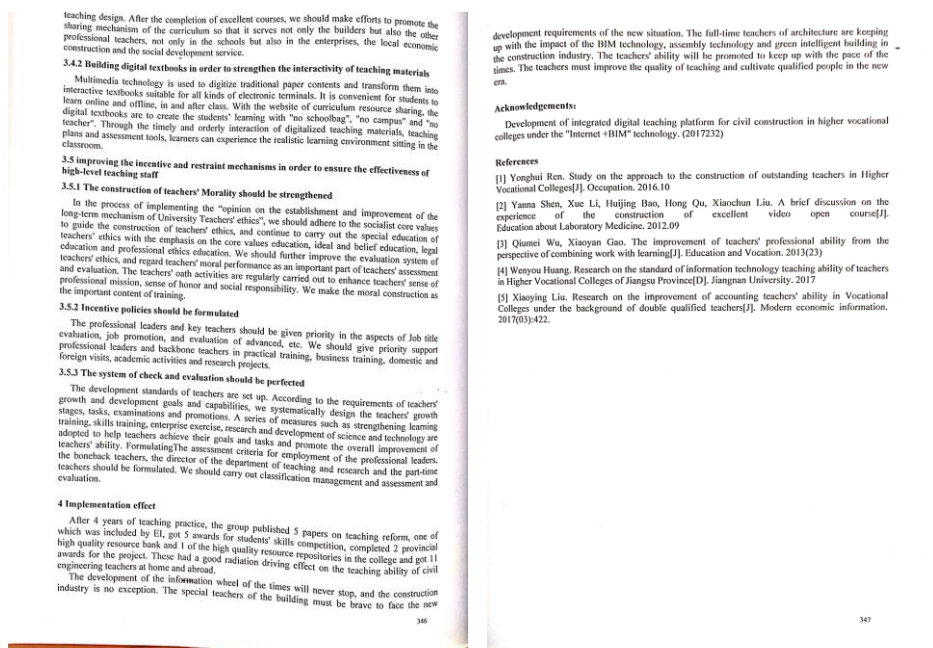
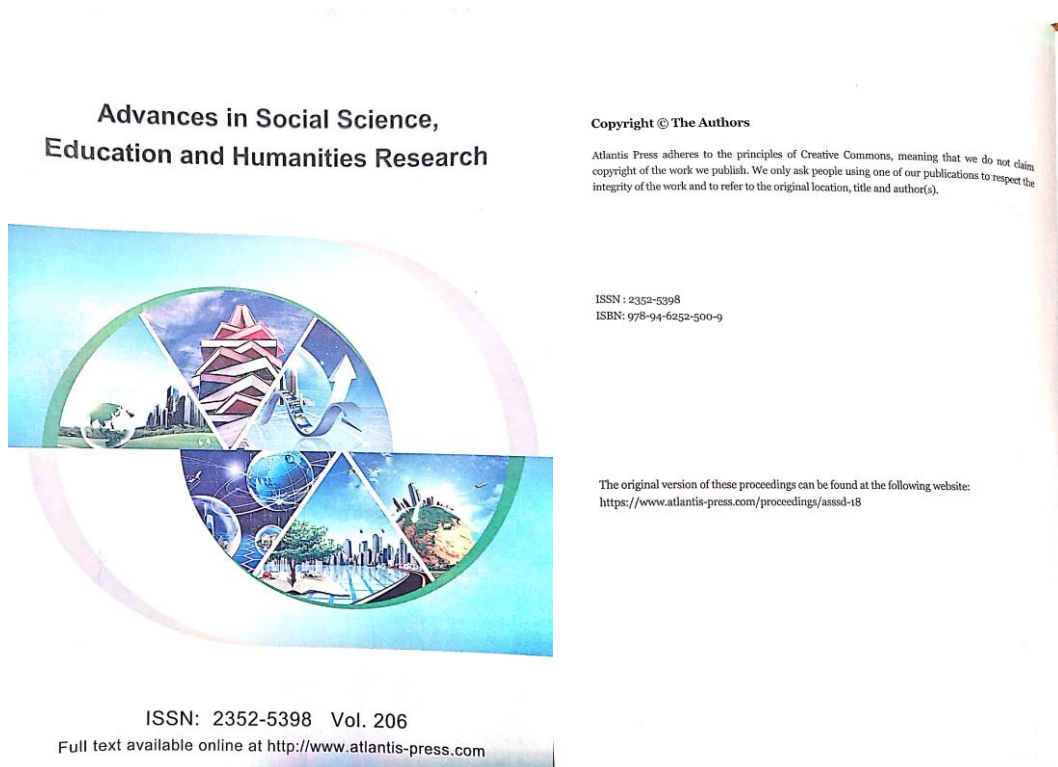


图 1-31 《高职土建类专业教师能力提升方案研究与实践》，2018.04 ，卞晓雯、栾成洁、夏峰华、李杨、任昭君，《Advances in Social Science,Education and Humanities Research》(ISSN:2352-5398)



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The construction of excellent resource-sharing course based on large-scale online open platform

--A case study on "Construction Technology of Building Engineering" course

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Keywords: Excellent Resource; Sharing Course; Course Design; Open Platform.

Abstract: Based on the research on the construction and application of teaching resource platform of "Construction Technology of Building Engineering" course, this paper expounds the main contents of curriculum design, construction idea and resource construction in the course construction of excellent resource-sharing courses based on large-scale online open platform, and provides a set of effective construction plan of excellent resource-sharing course, which provides reference for the construction of excellent resource-sharing course.

1. Introduction

The construction of excellent resource-sharing course is an important measure to speed up the reform of vocational education and teaching by using modern information technology^[1]. It is of great significance for improving teachers' teaching ability, innovating teaching methods and improving the quality of personnel training. In this paper, based on the core course of engineering cost majors—"Construction Technology of Building Engineering", the course construction concept based on large-scale online open platform, and sum up the experience and deficiencies in the development of excellent resource-sharing course, through curriculum design, construction plan, resources construction, and provides some references for improving the construction quality of other courses in civil engineering.

2. Integrated design of course

2.1. Accurately grasp the orientation of curriculum

It is clear that the orientation of the excellent resource-sharing course in the curriculum system, combining with the students' cognitive law, arranging the relevant courses before and after the order, so as to make the high-quality resources courses play a key supporting and promoting role in the training of students' vocational post ability^[2].

Construction technology of construction engineering is a core competence training course of engineering cost specialty. It is an important part of the course system of engineering cost specialty, and it is a strong support for professional employment—Cost engineer. This course takes the courses of "Architectural drawing and construction", "Building Materials", "Engineering survey" and so on as the former courses, and also provides services for the following courses, such as "Construction Engineering Measurement and valuation", "Analysis of Engineering cost case" and so on play a connecting role. Through the study of this course, the students can master the construction procedure of the building project, master the main construction methods, construction technology, and can make the construction plan, control the construction quality, etc. And they can solve the general technical problems in the construction, so as to meet the requirements capacity of cost engineer.

2.2. Optimize the content of the course

Through the analysis of the professional ability of Cost engineer, the corresponding training

objectives of this course are formulated, and the construction process of the real project of the school student apartment dormitory is taken as the clue. Abstract typical technological process and task as course content and resource carrier adopt "Project Oriented, Task Driven" teaching methods, take construction procedure as the main line, connect each construction craft in series in turn, ensure the integrity of the construction process, but also meet the practical requirements of teaching content.

On the other hand, relying on the joint council of schools and enterprises, through the integration of the "professional standards for construction site professionals", industry and enterprise standards, cost engineer division, constructor division, to realize "course certificate financing", "school enterprise financing", and to further optimize the structure of the curriculum and the corresponding content.

2.3. Innovative teaching model

In the construction and application, this course explores the teaching mode based on "large-scale online open curriculum platform". This model divides teaching into three processes: before, during and after class. Through the information-based instructional design, and the teaching implementation, using the Internet technology, the digital resources and the information teaching environment, the system optimizes the teaching process.

Before class, teachers send out teaching tasks through the "large-scale online open curriculum platform". Students log in to the curriculum platform to watch the "micro video" for pre-class preparation, to find out the difficulties and doubts in learning. In class, create situations, using the "Project Oriented, Task Driven" teaching methods, the teacher uses the course platform to teach, and the student carries on the study practice with the curriculum resources after class, students upload the tasks assigned by the teacher to the curriculum platform and complete the test exercises. They can also communicate, discuss, and learn independently through the course forum.

3. planning curriculum construction scheme

This course is based on a real construction project and "large-scale online open course platform", follow the principle of "Resource available", in accordance with the "fragmented resources, systematic design, structured curriculum" train of thought for construction, mainly includes two aspects of curriculum content development and construction of curriculum resources.

3.1. Design of curriculum content construction.

Relying on the new student dormitory building projects as the carrier, the actual construction process as the main line, with an emphasis on the cultivation of vocational ability, selecting typical project (task), to form teaching module, and breaking down the content of the module in accordance with the corresponding "knowledge points" and "skill points". The organization and arrangement of teaching content adopts "Project Oriented, Task Driven" teaching methods to realize the training of students' vocational position ability [5].

3.2. Design of curriculum resources construction.

According to the typical project of teaching content, the diversified course resources are built with "micro-lecture video, 3D virtual digital model and Video of building construction".

In accordance with the project and categories of resources for unified coding, ensuring that the teaching resources are uploaded to the large-scale online open platform, the corresponding content and resources can be found quickly and easily. And facilitate the use, maintenance and promotion of resource platform. A partial list of course resources is shown in Table 1.

Table 1 List of Basic Resources for Courses(Portion)

Teaching Project	The subtasks	Resource coding	Resource Name	Format	Quantity	Completion time
01 Land Leveling Earthworks & Earthwork Calculation		010101	Microlecture	MP4	4	2017.10
		010102	Multimedia Courseware	PPT	4	
		010103	Video of Construction	MP4	5	
		010104	The engineering case	Word	2	
		010105	Teaching Plan	MP4	1	
		010106	Construction Pictures	JPG	5	
		010107	Simulation Animation	Flash	2	
		010108	Virtual Simulation	BIM, CAD	3	

4. Building diversified and high-quality resources

This course is relying on the new student dormitory building, selection of typical work tasks, to collect, organize and integrate resources. Finally, it has built a diversified resource platform, including teaching courseware, engineering pictures, teaching micro-lecture video, acquisition library, construction live video, virtual simulation model, animation demonstration, engineering case, etc.

(1) The construction of serialized curriculum resources based on "construction procedure".

The construction project is divided into seven serialized typical projects according to construction procedure and construction schedule, and perform uniform coding after resource integration for several sub-items of the seven items. The teaching organization form of the serialization, able to ensure that students according to the process of building to complete the construction task until completion inspection and acceptance of the project, and conforms to the students' cognitive learning rule.

(2) "Online Internet learning + offline construction simulation practice" resources combination. Students study online on a large online open platform.

Offline students can enter the construction entity at any time for comparison and study (when the project is finished, it can be replaced with 3D model and live video). Using the resource combination of "online Internet learning + offline construction simulation practice", the "online + offline" dual-wheel drive is realized.

(3) Build the resources of "strengthening cultivation capacity".

Principles of the construction of the curriculum resources is the material of tiny, granular, with "the smallest unit of knowledge and skill points" as the foundation, using resource "availability and recognition" as the fulcrum, closely integrated theory and engineering entity, through the "micro-lesson to teach knowledge, live video to learn operation, the virtual simulation to Practice" of supporting learning. Through "from knowledge point to knowledge", finally develop the students' comprehensive ability [3].

(4) "Keeping up with The Times" of resource content

In recent years, with the changes and revisions of building standards, codes, and drawings this course utilizes the opportunity of students' dormitory building to update and improve the original teaching content and teaching resources, and eliminate backward and obsolete resources. In addition, a curriculum development resource library should be established to broaden the horizon of students, enrich the forms of resources, and supplement and improve new Building technologies and craftwork [4].

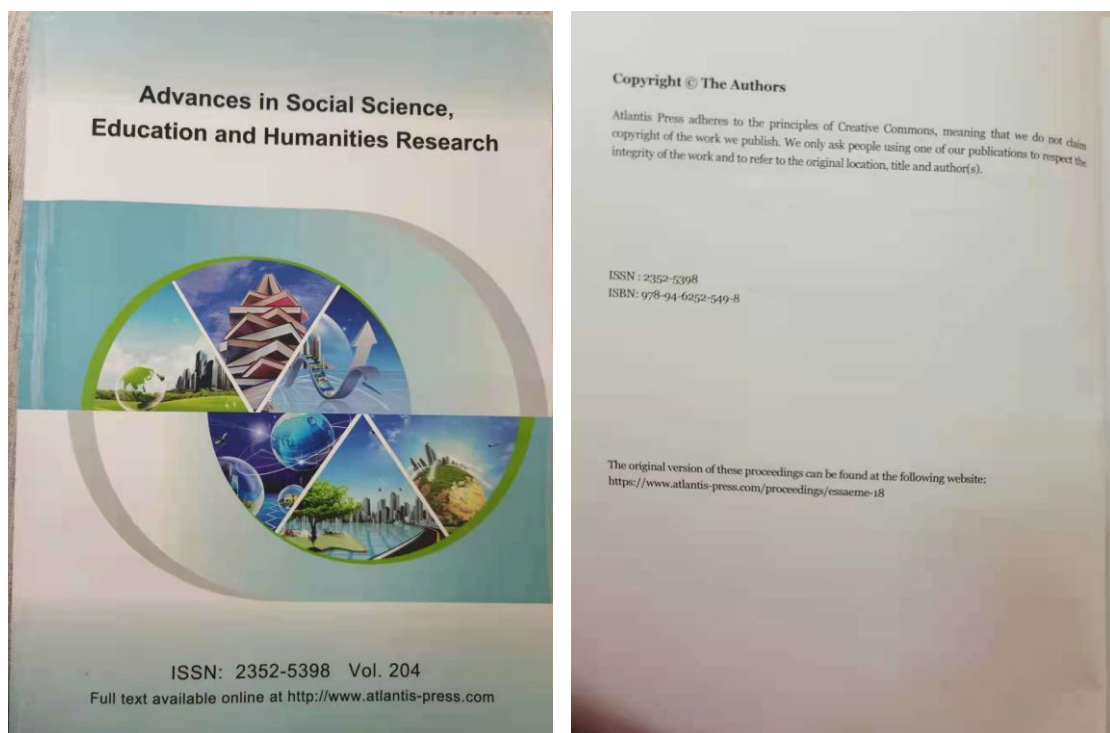
5. Conclusion

The construction of the excellent resource platform of the course "Construction Technology of Building Engineering" already has a certain scale and hardware guarantee, it will enrich and perfect the resource platform continuously in the later period, and actively promote the application of the resource platform. And it will improve the value of sustainable utilization of curriculum resources, promote the construction of other courses of specialty, push the construction and application of curriculum resources to a new height.

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The brief analysis on the key problems in the process of building modern apprenticeship talent cultivation mode in Higher Vocational Colleges—Taking the engineering cost specialty as an example

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Keywords: modern apprenticeship, talent cultivation mode, the engineering cost specialty, the key problems

Abstract: With the improvement of technology level, the construction industry has more and more requirements for practitioners. Higher vocational colleges must closely follow the pace of industrial upgrading, and actively improve the talent cultivation mode, so as to meet the new demand for talents in the development of the industry. Taking the engineering cost specialty as an example, this paper discusses the key problems in the process of building modern apprenticeship talent cultivation mode. This paper analyzes the five aspects of the orientation of the training objectives, the construction of the curriculum system, the optimization of the teaching staff, the reform of the teaching method and the improvement of the evaluation mechanism. Then the corresponding suggestions are given. It provides a theoretical reference for the construction and improvement of modern apprenticeship talent cultivation mode for higher vocational colleges.

1. Introduction

With the progress of society and the development of science and technology, great changes have taken place in the mode of production in the construction industry, and the level of industrialization and the degree of intelligence have been greatly improved. Building information model, building assembly construction, green building and other new design and production methods have attracted more and more attention. Based on this, the requirements of the construction industry and employees are becoming higher and higher. The skilled workers who only master the simple and repetitive work have become more and more difficult to meet the needs of the industry. They are replaced by those highly skilled persons with solid theoretical foundation, excellent practical skills, excellent professional cultivation and certain innovative ability. As the training and output of organization of skilled personnel, higher vocational colleges shoulder the responsibility of providing backup support for the transformation of the construction industry. It is necessary to follow the pace of industrial upgrading and actively improve the talent cultivation mode. In 2014, the State Council issued the "decision on accelerating the development of modern vocational education by promoting backstop power for the transformation of the construction industry". In 2014, the State Council issued the "decision on accelerating the development of modern vocational education by promoting backstop power for the transformation of the construction industry". In 2014, the State Council issued the "decision on accelerating the development of modern vocational education by promoting backstop power for the transformation of the construction industry". It pointed out that "promoting the innovation of modern vocational education by developing the pilot of the modern apprenticeship in school-enterprise joint enrollment and joint training, perfecting the support policy, and promoting the integration of school and enterprise to educate people". Taking the engineering cost specialty as an example, this paper discusses the key problems in the process of building modern apprenticeship talent cultivation mode in higher vocational colleges.

2. Applicability analysis of modern apprenticeship talent cultivation mode to the engineering cost specialty

The department of architecture engineering of our college has three professional directions, namely construction technology, engineering cost and architectural art design. Among them, the

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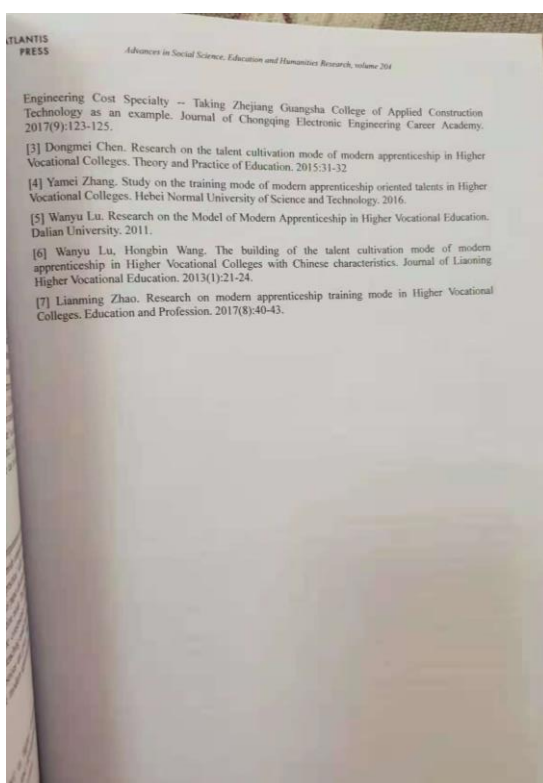
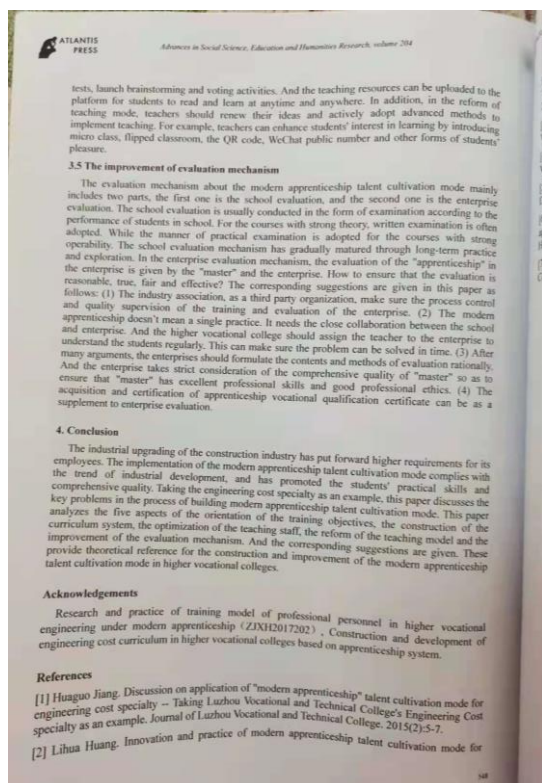
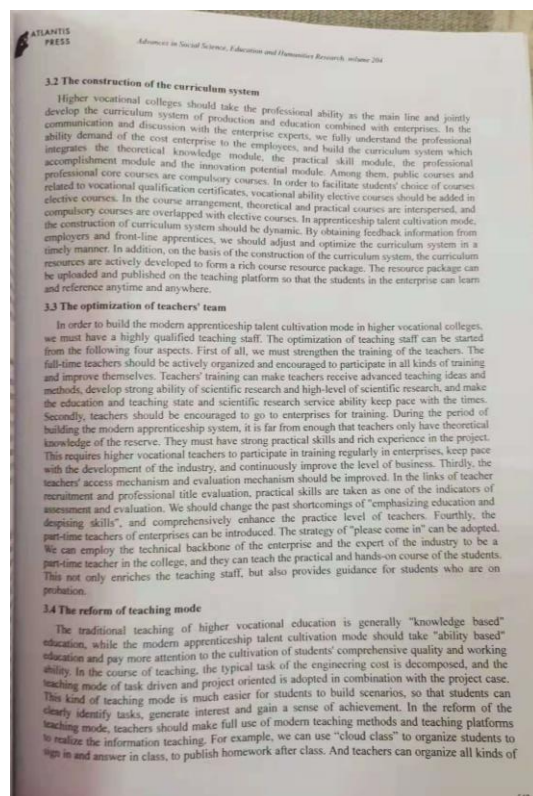
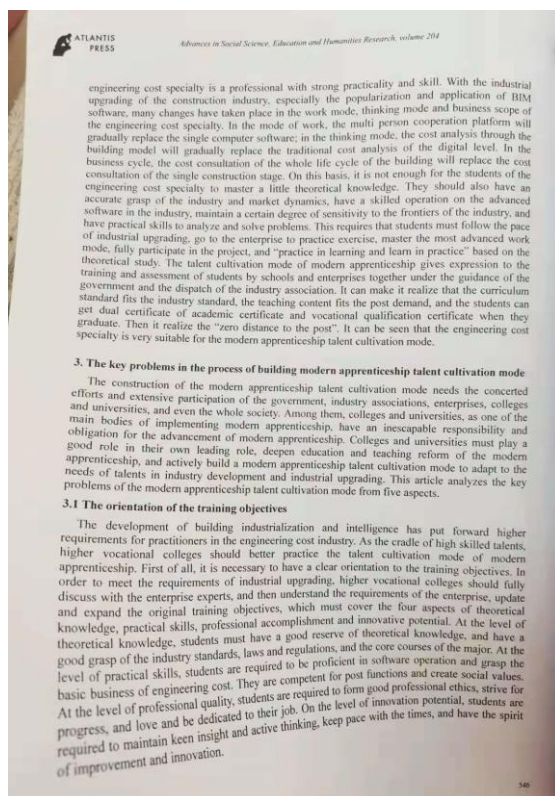
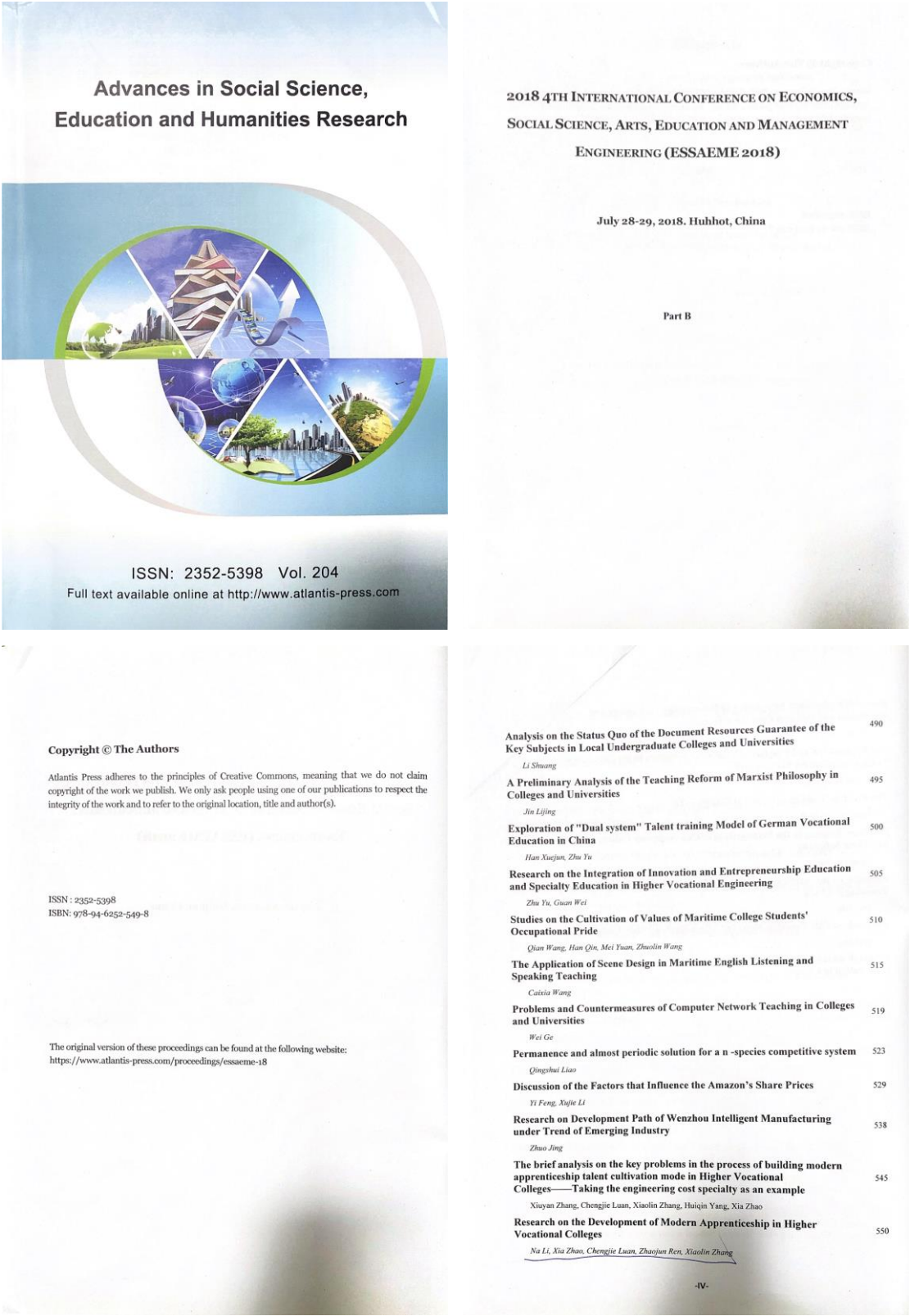


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Research on the Development of Modern Apprenticeship in Higher Vocational Colleges

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Keywords: modern apprenticeship, project cost, existing problems, measures and suggestions

Abstract: The modern apprenticeship system is a research hotspot in the process of education and teaching reform in China's Higher Vocational Colleges in recent years. It is an effective way to alleviate the contradiction between the supply and demand of the labor force in the present society. Taking the engineering cost major as an example, this paper explores the problems faced by the modern apprenticeship in the implementation process and puts forward corresponding measures and suggestions for these problems.

1. Introduction

In recent years, along with the vigorous development of our national economy and the continuous promotion of scientific and technological strength, on the one hand, the demand for talents is increasing, and many enterprises are facing the problem of "labor shortage". On the other hand, higher vocational colleges must constantly improve and improve their teaching mode so as to adapt to the new needs of the society to solve the problem of "difficult employment" for students. In 2010, the outline of the <National medium and long term education reform and development plan (2010-2020)> explicitly proposed that "the development of vocational education is the key link to alleviate the contradiction between the labor supply and demand structures". Based on this, the modern apprenticeship has become a hot topic in the process of education and teaching reform in Higher Vocational Colleges in recent years.

2. The problems in the implementation of the modern apprenticeship system

The implementation of the modern apprenticeship training model has promoted the students' practical skills and professional qualities, and promoted and improved the employment of graduates in higher vocational colleges. At the same time, the implementation of the modern apprenticeship system of talent training mode makes it possible for higher vocational colleges to deliver more high-quality and highly skilled talents to the society, which is conducive to the improvement of the plight of "labor shortage". However, there are some problems to be solved in the implementation of the modern apprenticeship system. This paper analyzes the two aspects of the external environment and internal factors, and summarizes these problems into four aspects: the government, the enterprise, the school and the students.

2.1 Government aspects

At present, the relevant laws in vocational education can be based on <the Law of Higher Education> and <the Law of Vocational Education>. In terms of modern apprenticeship and school enterprise cooperation, there is no special legislation or regulations to guarantee the interests of both schools and enterprises and to restrain the behavior of both schools and enterprises. However, in the process of implementing modern apprenticeship, there are many matters requiring detailed rules and legal documents. For example, stipulates the obligations that enterprises should perform in the process of implementing modern apprenticeship, and offers preferential policies to enterprises participating in apprenticeship. Without the guarantee of the relevant legal system, the enterprise

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side often lacks the motivation and sense of obligation to participate in the modern apprenticeship system. In addition, the process of modern apprenticeship implementation is a process of capital investment. Students enter the enterprise from the school. For the enterprise, the training cost is difficult to recover in a short time. If there is no special financial subsidy and preferential policy, it is difficult to arouse the enthusiasm of the enterprise to participate in the apprenticeship. In addition, in the process of the construction of modern apprenticeship, the innovation of talent training mode, the construction of the teachers' team, the improvement of the assessment methods and the improvement of the training conditions require funds to be started and maintained in many aspects. Once the education funds are short or lagged, it is very likely that the apprenticeship system will become a mere formality.

2.2 Enterprise aspects

A prominent phenomenon in the implementation of modern apprenticeship is "enterprise cooling, school craze". The enterprise is a profit-making organization that pursues profit and rate of return, and the school is a public welfare organization, taking education as its responsibility. The two subjects of completely different nature need to carry out the modern apprenticeship system together. There are many problems in the unity of goals and the interests of coordination, and most of these problems come from the enterprise. In the implementation of apprenticeship, many enterprises are unable to provide the necessary technical backbone to guide and train them, while also taking on the wages of the students and the security problems during their work. The actual productivity of the students is often lower than the capacity requirements of the enterprise. Even after a period of training, the apprenticeship when the internship expires, they do not have to choose to be employed in the internship. This leads to the difficulty of reclaiming profits for enterprises in the short term. Besides, in the process of participating in apprenticeship, enterprises have too much freedom and lack effective constraints, so it is difficult to establish a long-term mechanism for apprenticeship in schools and enterprises. When the labor force is short, some enterprises actively participate in the apprenticeship system, only in order to obtain the short-term cheap labor force, and do not train talented people well. But when these enterprises have sufficient labor force, they will close the gate of school enterprise cooperation, which makes the modern apprenticeship system do not have the basic guarantee.

2.3 School aspects

Higher vocational colleges are the main organizers and leaders of the modern apprenticeship system. The success of the modern apprenticeship training mode depends partly on whether the efforts of the schools are in place. First of all, schools must work together with business experts to discuss and formulate curriculum standards to ensure that the curriculum standards meet the industry standards and the teaching content meets the needs of the post. However, some schools do not strictly carry out this point. Only on the basis of the original curriculum standards, they have made a simple adjustment against the job characteristics of the enterprise, and it lacks the effective participation and repeated argument of the enterprise experts. This makes students lack of targeted theoretical knowledge as support after entering the internship. Secondly, the modern apprenticeship training mode needs a team of teachers with double certificates, while many vocational colleges have academic qualifications and neglect skills, when they set up a teaching team. As for the engineering cost specialty, the teachers who lack practical experience often have little connection with the actual production, which is difficult to make good connection with the practice teaching of enterprise teachers. Thirdly, the examination and evaluation of the modern apprenticeship personnel training mode adopts the double standard, that is, the school and enterprise jointly formulate the examination content and standard, and strictly implement the method of combining the school assessment and the enterprise assessment. However, in practice, the school side has not been able to improve the quality of enterprise assessment very well. Even if the school sends teachers to the enterprise, it will become a mere formality. The development of modern apprenticeship is not to send students to enterprises and ignore them, but to strengthen the cooperation and communication

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with enterprises more frequently.

2.4 Student aspects

Students are the biggest beneficiaries of modern apprenticeship training mode. The implementation of apprenticeship enables students to get good internship opportunities. The promotion of practical skills and post literacy can effectively promote students' employment and achieve zero distance job placement. However, in the implementation of modern apprenticeship, students' problems should not be underestimated. The problem of students is first manifested in the lack of understanding of modern apprenticeship and improper attitude to practice. Some students do not understand the significance of the modern apprenticeship training model, mistake the apprenticeship is the transaction between schools and enterprises, and students only act as cheap labor. Although the students can understand the meaning of modern apprenticeship, they do not have a correct attitude, just take the practice training as means to get credit and diploma, which is often difficult to harvest good practice effect. Besides, for most students who participate in apprenticeship, the most prominent problem is that it is difficult to adapt to the transformation of "dual identity". The students must adapt to the living environment, adapt to the working atmosphere, adapt to the relationship between teachers and apprenticeship, and adapt to the group of colleagues, which are the challenges they need to face. We have to admit that there are still some students who have not been able to complete the transformation of "dual identity" well and deviate from the original intention of practicing the modern apprenticeship system.

3. Measures to improve the modern apprenticeship system

Through the analysis of the above, we know that the implementation of the modern apprenticeship system still has some aspects to be improved. In view of the existing problems of the modern apprenticeship, this paper puts forward the corresponding measures and suggestions from the four aspects of the government, the association, the school and the students.

3.1 Government should further strengthen its support

In the modern apprenticeship mode of school enterprise cooperation, enterprises often show a "cold" feature. This is because that enterprises as for-profit organizations, which in the process of the implementation of modern apprenticeship, do not feel the benefits of "lucrative", and the initial investment is difficult to recover profits, so its enthusiasm is low. Based on this, the government should increase the support for the apprenticeship from two aspects of legislation and finance. Firstly, the government can promulgate special laws and regulations to clearly stipulate the rights and obligations of both schools and enterprises in the construction of modern apprenticeship. At the same time, preferential policies should be given to enterprises that are actively involved in modern apprenticeship construction, and corresponding punishments should be given to those enterprises that are in negative conflict with the construction of modern apprenticeship. Secondly, by increasing the financial subsidy, the government will share the cost of the modern apprenticeship construction, so as to reduce the economic pressure of the enterprise. Thirdly, the government can also set up special funds to help the school side to train teachers and improve training places in the construction of modern apprenticeship.

3.2 Industry associations fully play the role of coordination

Taking engineering cost enterprises as an example, in a certain scope of administrative division (such as city), we can take the lead of several large cost companies to gather local cost enterprises and to form association organizations. The association organization represents the common interests of the local cost industry, and has the functions of organization, coordination, supervision and service function. In the process of promoting the construction of the apprenticeship system, the industry association should give full play to its coordination function and become the medium for the government and the university to contact the enterprise. At the same time, it can also express the demands of the enterprise to the government and the school to maintain the common interests of the

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enterprises in the industry. In addition, the industry association should also provide experts, serve as consultants for modern apprenticeship construction, who will fully participate in the formulation of curriculum standards and assessment standards, and fully participate in the identification of professional competence and the issue of qualification certificates. The emergence of industry associations can not only effectively safeguard the interests of enterprises, but also integrate the dispersed enterprises into an organic and orderly group, which is beneficial to the development and implementation of the modern apprenticeship system.

3.3 Higher vocational colleges continue to improve self-construction of modern apprenticeship

As the main body of the modern apprenticeship construction, the higher vocational colleges should give full play to their own leading role. Under the guidance of government and the participation of the industry association, the process of the modern apprenticeship should be actively promoted by higher vocational colleges. The establishment of curriculum standards, teaching content and assessment system in higher vocational colleges should be discussed and repeatedly demonstrated with enterprises to ensure the adaptation of teaching standards to industry standards, the adaptation of teaching content to post requirements, and the adaptation of assessment system to professional qualifications. In addition, the higher vocational colleges should strengthen the construction of a teacher team with double certificates. On the basis of paying attention to the level of teachers' theory and teaching ability, higher vocational colleges should improve the practical operation skills of the teachers and encourage the teachers to participate in the training of the enterprises. In addition, higher vocational colleges should strictly control assessment mechanism and work together with enterprises to formulate assessment standards and implementation methods, especially to ensure that the assessment is strictly, truthful, fair and effective in the enterprise training stage. This requires the school side to do a good job in process supervision and quality

3.4 Schools and enterprises assist students to adapt to their identity conversion

Under the modern apprenticeship mode, the students need to enter the internship stage after completing the theoretical study inside the school. The transition from student to apprenticeship is a challenge for students themselves. This requires both sides of the school and the enterprise to care and help students complete their identity transformation. The school should be equipped with a mentor teacher as intern instructors. An internship instructor is responsible for guiding several intern students. At the same time, the intern instructor should strengthen the concern for students, and go to the enterprise regularly to understand the life and work of students and find out the problems in time. For the enterprise, the enterprise technicians who serve as "teacher" are in contact with the interns most. The enterprise should strengthen the investigation of the professional skills and moral character of the "teachers" to ensure that the students can effectively improve the practical ability and establish a good and harmonious relationship between them. In addition, enterprises should cooperate with schools to arrange students' daily life during internship so as to ensure students' physical and mental health.

4. Summary

Taking the engineering cost specialty as an example, this paper studies the problems faced by the higher vocational colleges in the process of implementing the modern apprenticeship system, and analyzes the root of the problems. On this basis, the paper puts forward some suggestions on the development of modern apprenticeship from four levels: government, industry associations, enterprises and students. It provides a theoretical reference for higher vocational colleges to promote the construction of modern apprenticeship.

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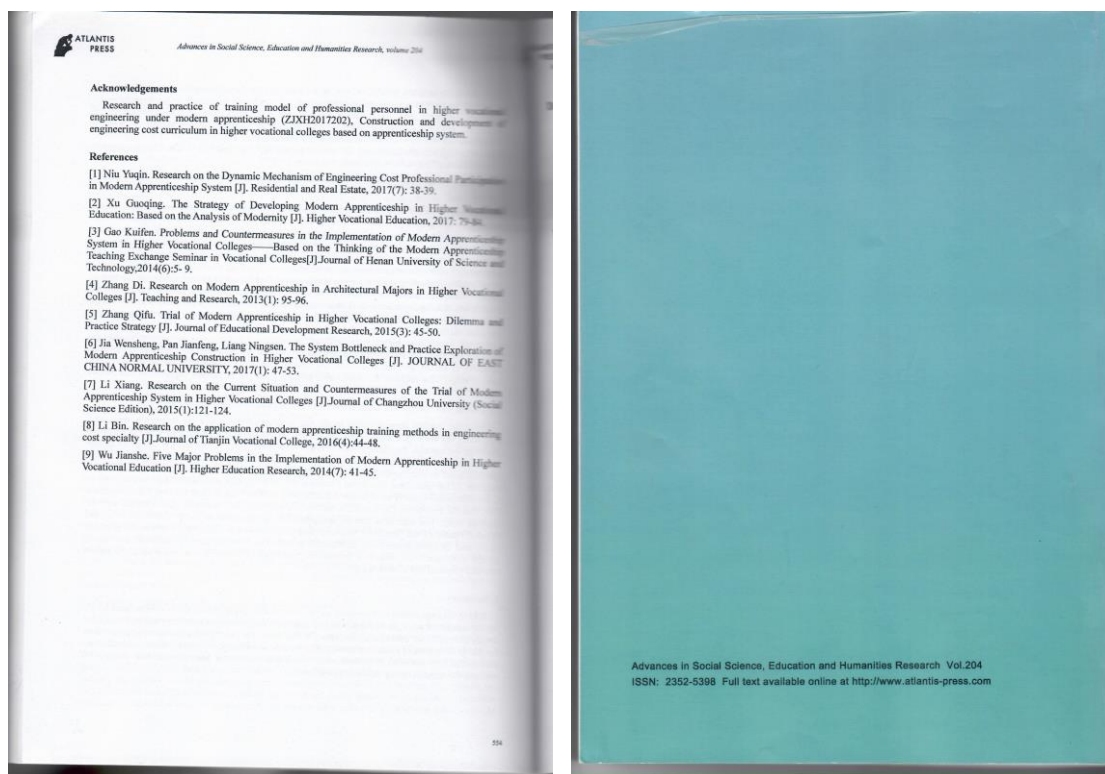


图 1-34《高等职业院校工程造价专业现代学徒制发展现状研究》，2018.07, 李娜、赵霞、栾成洁、任昭君、张晓霖，*《Advances in Social Science, Education and Humanities Research》*（ISSN:2352-5398）