

Research on the Innovation Path of Education and Teaching in Higher Vocational Colleges in the New Era

Ming Zeng
Hunan Modern Logistics College
Changsha, China 410131

Abstract—In the new era, higher vocational colleges are facing new situations and changes. The types of students are changed suddenly. A series of constructive measures such as the one-million enrollment expansion plan for national vocational education, vocational education based reform as well as 1 plus X certificate system pilot, “three Ts (teacher, teaching materials and teaching methods)” reform and national vocational education and teaching innovation group are being comprehensively promoted. How to improve the quality of personnel training and do a good job in education and teaching innovation in higher vocational colleges becomes particularly important. Through case investigations, the author obtains real-world information with the hope to provide effective path for higher vocational colleges in making innovation in education and teaching and provide feasible experience reference for innovative development of such colleges.

Keywords: *new era, higher vocational colleges, education and teaching, innovation, teaching resources*

I. INTRODUCTION

In order to effectively promote the innovative development of education and teaching in higher vocational colleges in the new period and improve the quality of personnel training, an investigation and analysis was made on the education and teaching innovation of current higher vocational colleges according to the reform requirements of the National Vocational Education Reform Implementation Plan and in combination with the regional economic development and status of higher vocational colleges. It is hoped to provide reference and basis for innovative development of current higher vocational colleges in education and teaching.

II. OVERVIEW OF THE INVESTIGATION

A. Investigation background

Higher vocational colleges are the cradle for cultivating high-tech talents in China. Education and teaching and management are directly related to the quality of talent cultivation. It is important to maintain the innovative development of education and teaching in line with the development demands of the times. In recent years, higher

vocational education develops rapidly, and is in face of brand new challenge in many aspects such as teaching management concepts, teaching management methods. In order to better meet the needs of higher vocational education development and social development in the new period, it is imperative to comprehensively improve the quality of education and teaching, promote the rapid transformation and sustainable development of higher vocational colleges, and boost the innovation in education and teaching management model. In accordance with the relevant requirements of the research group, a special investigation on education and teaching innovation in higher vocational colleges in the new era was carried out in order to practically study and solve the innovative problems of education and teaching reform in higher vocational colleges in the new situation, and comprehensively improve the quality of personnel training.

B. Investigation status

This research group consists of 13 persons. They visited basic-level colleges, interviewed with partial teachers and students, convened special seminars, and listened to reports from secondary schools. With respect to the problems existing in the colleges' education and teaching innovation, they started from the problems frequently reflected by secondary schools, teaching and administrative departments, and full-time teachers in aspect of education and teaching, made an extensive investigation on the education and teaching innovation of higher vocational colleges, and obtained first-hand data. From Sep.14-Oct.28, 2019, all members of the research group cooperated and held 5 seminars with a total of 46 attendees. They visited 15 higher vocational colleges, interviewed with 38 person-time and listened to the report from 15 person-time of secondary schools.

C. Investigation result

Based on the field investigation and the opinions and suggestions collected through the seminars, 7 categories of hot and difficult issues frequently reflected by them are sorted out and specifically include basic conditions, talent training, education and teaching reform, teaching staff, professional and curriculum construction, industry-education integration, management services, etc. Furthermore, they put

forward 31 innovation points in the field of education and teaching, summarized and sorted out a total of 58 problems of various types, made an in-depth analysis on each issue collected, and put forward relative recommendations to provide data support for higher education colleges to make education and teaching innovation.

III. EXISTING PROBLEMS

A. *Insufficient improvement and insufficient use of basic conditions*

In recent years, higher vocational colleges develop rapidly. The number of students is increased rapidly. Some schools begin to suffer from inadequate basic conditions. Especially in the context of the national one-million enrollment expansion in 2019, the number of full-time students in higher vocational colleges is increased significantly. There is a clear gap between the school's existing floor area and the national requirement for running conditions of higher vocational colleges in China. There is a large lack of teaching and scientific research and auxiliary housings. Insufficient teaching rooms directly lead to insufficient numbers of classrooms and training rooms and very limited teaching space. As a result, many teaching courses are opened at night as well as on Saturday and Sunday and even at night of Saturday and Sunday, causing great inconvenience to teachers and students. On the one hand, there are insufficient school resources, but on the other hand, the existing basic conditions are not better used for serving the routine and innovation works of teaching and education. For example, in all the schools surveyed, some obsolete training rooms are not well used, teaching and training factories are not used under good planning, the existing equipment utilization rate needs to be improved, and equipment maintenance needs to be strengthened. A few training rooms are not used rationally. Especially, there are insufficient computer rooms so that students do not have available computers, and many new computers have no space to place them. Higher vocational colleges should innovate their work ideas, conduct inspections and verification, make reasonable use of resources, and clean up facilities, equipment, and training sites against the utilization problems of existing devices and places.

B. *Monotonous talent training model and lacking innovation*

The mode of talent training and reform implemented by some higher vocational colleges is outdated and not timely innovated, so that it can no longer meet the development needs in the new era. Talent training should be reformed in levels based on professional technology. Teachers and students should be encouraged and motivated to make innovation together. In addition to joining entrepreneurship competition in the innovation activity, extra-curricular activities such as college student science and technology activity festivals can be organized to allow students to study and produce innovative results. The college should attach importance to and issue corresponding plans.

C. *Insufficient teaching reform and focusing on appearance*

At present, the experimental education and teaching reform is relatively weak, and the college's exploration on modular teaching is not enough. It is needed to further rethink the modular teaching and innovatively set up a modular teacher team to allow each teacher to give play to his/her expertise. The distribution of teaching tasks should also be innovatively adapted to modular teaching. For example, when scheduling classes, they should be scheduled by team rather than by person. The key lies in reforming the thinking and environment.

D. *Insufficient number of teachers and poor structure*

Education and teaching innovation must meet the conditions for the construction of teaching staff. The team must be adequately staffed and cultivated in sections, levels, divisions of labor, and blocks so as to create a more professional and concentrated teacher team. In the colleges surveyed, the number of full-time teachers was generally insufficient. According to the national student: teacher standard of 18: 1 (25% part-time teachers are allowed), there is a large lack of the full-time teachers. In some colleges, only 31% teachers are under 35 years old and 42% are over 45 years old. The age structure of teachers needs to be further optimized. Only with sufficient teachers can modular teaching be realized. Enterprise teachers can be invited to further strengthen the full-time teachers and part-time teachers integrated teaching model. Teachers should actively participate in school-enterprise cooperation to gain more growth experience.

E. *Unsolidified professional and curriculum construction*

The professional and curriculum construction of vocational colleges is not solid enough. Especially, it is necessary to revise the professional construction and personnel training plan jointly with enterprises. In addition, there is no school-enterprise cooperation in curriculum construction. In aspects of revising personnel training plan and reforming course content and so on, more attention is paid to network research or it is carried out only by school. Partial courses are taught only on the basis of the textbooks, without practical construction of curriculum standard. School should solidly promote the construction of curriculum standard and innovate the assignment of teachers' tasks. Combined with the current national pilot higher vocational college's promotion to university, a college major's promotion to university should be well prepared to further boost the school's professional and curriculum construction.

F. *Insufficient school-enterprise cooperation and only staying in form*

In general, the talents cultivated cannot meet the demands of enterprises. School should innovate the inevitable path of school-enterprise integration. At present, school-enterprise cooperation is not conducted deep and practically enough. Most of the cooperation just stay in the stage of listing, and needs to be vigorously and practically promoted. Moreover, the advantages and core competitiveness of production-education integration is not fully discovered. On the one hand, school should boost

teachers and companies to jointly develop patents, small systems, and other projects to serve enterprises; on the other hand, existing teachers have many lessons, projects, and events, so that they have no other energy to operate enterprise projects. Besides, the use of some innovative new industrial bases needs to be improved, the cooperation appears bias, the business atmosphere is too strong, and the efficiency of serving the teaching and training is low. Further, it is needed to strengthen the depth and breadth in school-enterprise cooperation, and formulate follow-up plans for school-enterprise training system.

G. Weak management service awareness and insufficient innovation

System unbundling and system innovation should be regarded as the key to the innovation and development of school. Some higher vocational colleges have many transaction reports, complicated procedures, cumbersome formalities, and insufficient innovation in system. This is not conducive to the school's innovation and development of education and teaching. Sometimes they have good starting points and assessment standards, but they are too rigid and should be based adjusted flexibly based on the actual situation of the major and teachers. Secondary school of higher vocational college's initiatives are not fully motivated and thus are unwilling to cope with and cannot devote themselves to teaching innovation. Most secondary schools do not have human rights, administrative power, and financial rights, and there is a phenomenon of "difficulty in doing things." School should focus on teaching. The administration department should serve secondary school, improve their sense of accomplishment, and rationally design the differentiation development of secondary school. Assessment should respect the differences and adjust flexibly, improve the status of teachers and reduce their sense of depression when coping with relevant formalities. The most important innovation is management innovation. It is necessary to firstly clarify the responsibilities of various departments, and pay attention to cooperation between departments to enhance administrative service capabilities, avoid meeting reliance, make full use of data sharing, and avoid repeated work caused by data chaos and repeated submissions.

IV. CAUSE ANALYSIS

A. Cause in ideological understanding

Management personnel in the front line of education and teaching lack initiative, pioneering spirit, innovation consciousness and thinking of seeking different and are accustomed to routine work and regular work, lacking the sense of crisis and urgency. The classroom teaching effect of some teachers is not ideal. Teaching management personnel emphasize that there are many objective reasons, such as poor quality of students, poor management on external teachers, and do not make sufficient analysis on the subjective reasons. They do not pay attention to research new situation and problems, lack in-depth research on the "three Ts" reform and the pilot reform of the "1 + X" certificate

system; they are busy with daily trivial matters, and spend no time in taking specific measures and actions.

B. Cause in management system

The higher vocational schools and departments lack clear boundaries of powers and responsibilities and have overlapped powers and unclear responsibilities, low capacity of inter-departmental collaborative services, and even power and liability disputes affecting its normal performance. An effective secondary teaching management mechanism has not yet been fully developed. Teachers are busy handing in various materials in accordance with the requirements of the teaching management unit all day long. There is not a relatively complete two-level teaching management system, and a two-level teaching management system based on the school's overall planning and department management. The information-based management level is relatively backward, resulting in unsmooth and opaque information, inconsistent processes, multiple reports on school affairs, and many approval processes, which take a lot of time.

C. Cause in condition of teachers

Taking a school in the next semester of 2019 as a case, the investigation revealed that some teachers have heavy workload and pressure ("Table I"). 24 teachers (18 full-time teachers) have more than 320 class hours respectively in the semester. Among the full-time teachers, some teachers are distributed with 444 class hours (the sum of three courses) respectively, including 192 hours for wireless sensor network technology, 180 hours for IoT engineering design and implementation, and 72 hours for wireless sensor network technology training; among the 6 off-campus part-time teachers, some teachers are distributed with 456 class hours (the sum of five courses) respectively, including 72 hours for Dreamweaver web production course training, 120 hours for online customer service (based on experience), 48 hours for computer application foundation, 192 hours for Dreamweaver web production, and 24 hours of college students' science and technology competencies, far exceeding the school's basic workload "160 class hours per semester". Under the existing condition of teachers, it is not available to do modular teaching at all. Among off-campus part-time teachers, there are more postgraduate students studying in postgraduates, and their mobility is relatively large, which brings great problems to teaching management.

TABLE I. TEACHING TASKS UNDERTAKEN BY TEACHERS IN SCHOOL XX (UNIT: PERSON)

secondary school	more than 320 class hours		256-320 class hours		less than 200 class hours
	full-time	part-time	full-time	part-time	full-time
school 1xx	0		15		9
school 2xx	8	5	14	5	3
school 3xx	6		10		3
school 4xx	1		8		3
school 5xx	3	1	6	2	12
school 6xx	0		0		4
Total	18	6	53	7	33

^a. Remarks: This data is sourced from the teaching affairs system of school xx.

D. Cause in insufficient guarantee of teaching conditions

All the higher vocational colleges investigated have not enough floor area for setting up training room and teaching aid room. There is serious lack of computer rooms. In addition, computers in some computer rooms are old and aged, lacking care and maintenance and are difficult to play their due role. For this reason, computer courses are also arranged on weekends and at evening. In some schools, professional course that originally should be completely taught in computer room are partially taught in computer room (50% of the class hours) and partially taught in classroom. In this way, the teaching effect is greatly reduced. In addition, secondary schools need to arrange comprehensive training courses in grouped manner in order to connect with skills spot checks and competitions, and the computer rooms also cannot meet normal teaching needs.

E. Cause in the enrollment quality

The quality of students is directly relevant to the quality of training. From the analysis of the quality of students in a school investigated, the change in students quality are also affecting the development of education and teaching reform and innovation.

First, the enrollment methods are diverse ("Table II"). Existing enrollment methods include nationwide exam, enrollment to the needs of specialty, individual enrollment exam, and integration of secondary and higher vocational educations, and so on. Consequently, the quality of students enrolled is greatly declined and there are large difference in professional foundation and learning methods of the enrolled students. Different types of students are arranged in the same major or even the same class. This brings great difficulty for teaching. During the learning process, students at all levels have the feeling of "insufficient food" and "poor food supply". Over time, "mixed learning" model has taken shape.

TABLE II. STATISTICS OF ENROLLMENT METHOD AND QUANTITY OF SCHOOL XX DURING 2017-2019 (UNIT: PERSON)

Enrollment year	Nationwide exam	Individual enrollment exam	Enrollment to the needs of specialty	Integration of secondary and higher vocational educations
2017	1376	851	187	413
2018	1214	1062	419	348
2019	1840	865	229	157

^{a.} Remarks: This data is sourced from the enrollment office of school xx.

Second, there is large gap between the examinations' scores of students enrolled ("Fig. 1"). Only based on analysis on the students enrolled by nationwide exam (including enrollment to the needs of specialty), their difference in

scores reaches more than 200 points. In order to complete the enrollment plan, some majors have to reduce the enrollment threshold so that the quality of students is uneven and brings inconvenience to subsequent teaching and training.

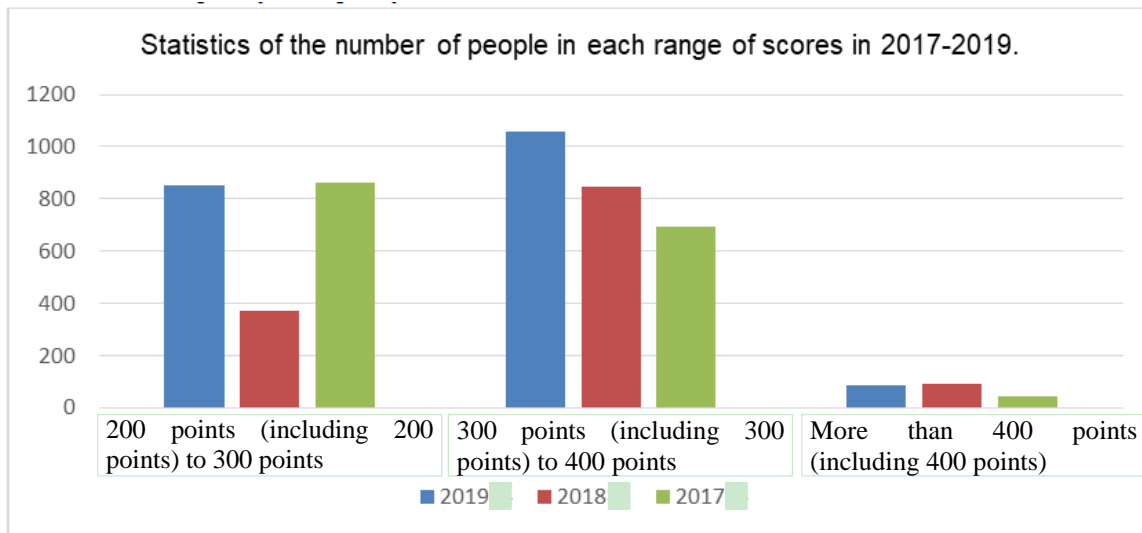


Fig. 1. Statistics of the number of people in each range of scores in 2017-2019.

^{a.} Remarks: This data is sourced from the enrollment office of school xx.

F. Cause in educational research

First, there is lack of topics that focus on hot and painful issues in school. Few of the existing research topics focus on school hotspots and painful points. When enumerating the topic selection of school-level research projects, the

Scientific Research Office lacks guidance topics focusing on modular teaching research, professional construction standards, and integration of production and education. Second, there is lack of teams to study the hot spots and painful points in school. There is a lack of research team led by vocational education experts and business experts. In

particular, there is lack of a team capable of engaging in teaching theory and method cultivation for long term stably, and lack of a long-term and stable training team and talents of an orientation. Third, there is lack of time to concentrate on research and overcome difficulties. At present, teachers in higher vocational colleges, whether they are full-time teachers or teachers in administrative positions, either have many lessons or have many administrative affairs so that they cannot settle their minds to carry out scientific research. This arrangement of school fails to make full use of the role and level of professors and PhD.

V. COUNTERMEASURES AND SUGGESTIONS

A. *Breaking the fixed teaching thinking and strengthening the teaching innovation consciousness*

Breaking through the fixed mindset and fixed mode is the premise to improve teachers' teaching innovation ability. Teachers should not always adopt a constant method to complete teaching tasks but learn and try new teaching methods and concepts, break the traditional educational concepts, and establish a sense of teaching innovation. The first is to improve teachers' consciousness to do teaching reform, cultivate their sense of teaching responsibility, and further update their teaching concepts; the second is to train teachers to strengthen diversified teaching design practices, show diversified teaching models in the teaching process, and form diversified thinking; the third is to encourage teachers to step into the society, strengthen communication with technical backbones in enterprises, and accurately understand the development trend of new technologies; the fourth is to cultivate teachers' innovative spirit, and constantly rethink their teaching methods, innovate teaching methods, and dynamically adjust the teaching content and method to practically teach based on specific conditions in the process of teaching; the fifth is to provide teacher with academic exchange opportunities, encourage teachers to participate in various education and teaching based innovation meetings and actively communicate with other colleges.

B. *Creating an atmosphere of communicative learning and strengthening teaching reflective criticism*

Teachers should continuously improve their professional competencies, timely update teaching materials, strengthen the cultivation of their creativity, and encourage teachers to carry out teaching criticism and reflection in teaching practice, and gradually promote the formation and development of teaching monitoring capabilities. At the same time, school should provide teachers with good learning platform and teaching conditions, hold regular lectures on improving teachers' innovation ability, choose short-term or long-term studies every year according to the actual situation, rationally arranges teachers to develop school professional groups, pay attention to improving practical innovation in the teaching process, pay attention to collaborative communication with enterprise in the process of learning, encourage teachers to take part in enterprise's practical production to practically improve teachers' actual operation ability. This way is in order to make teachers

quickly know about the true needs of enterprise and the society and is convenient for teachers to put the practical skills in classroom teaching and better cultivate students' practice innovation ability.

C. *Innovating teaching mode and deepening teaching reform*

Teaching mode innovation is an important manifestation of teachers' teaching innovation ability. To innovate education and teaching management, it is necessary to innovate the teaching model as well as the teaching content, teaching manner and teaching methods. The first is to innovative the teaching content. The teaching content needs to keep pace with the times, explain new processes and new technologies, and cooperate with industry benchmarking companies to develop workbook and new loose-leaf textbooks, and focus on application and practice. In graduation design, it is needed to actively connect with the reality, select topics from the scientific research projects of enterprises or teachers, and strengthen technology-applied research and development. The second is to innovate the teaching manner. It is needed to make full use of advanced information technology to develop new teaching resources, and apply technologies such as artificial intelligence and big data to education and teaching. The third is to innovative the teaching methods. It is needed to explore innovative teaching methods suitable for the specific teaching goals, stimulate students' learning potential and enthusiasm to the largest extent, focus on method innovation and the all-round improvement of teachers' teaching practice.

D. *Improving the assessment and evaluation mechanism and creating an atmosphere for teaching innovation*

The first is to establish a systematic training assessment mechanism. The survey result shows that the Ministry of Education attaches more and more importance to the improvement of teachers' teaching innovation ability. From the training programs implemented in "National Training Plan" and "Provincial Training Plan", there is still a lack of systematic assessment mechanism, and teachers have no pressure in the training process. After the end of the training, it is difficult for them to really play an exemplary role. Hence, it is necessary to establish a systematic training and assessment mechanism to make teachers recognize the importance of training quality, incorporate training quality and effects into the assessment system, and promote the further improvement of teachers' teaching innovation ability; the second is to improve the assessment mechanism. It is needed to establish a supporting evaluation mechanism, encourage teachers to actively develop their teaching innovation ability, reform the title evaluation, performance salary, reward and punishment system, rationally adjust the teacher salary structure, so that teachers can focus on innovation and reform and obtain both material and spiritual benefits, in addition to encourage teachers to seek development in teaching reform and innovation.

E. Leveraging skills competition to promote the improvement of teaching innovation ability of teachers

The first is to innovate the teaching skill competition. It is needed to actively organize a series of innovation-oriented teaching skills competitions, encourage teachers to participate in teachers' professional competence competitions and teaching lecture competitions, and continuously improve themselves in the competitions. The second is to innovate the professional skills competition. It is needed to cultivate teachers' focus on developing professional innovation ability, and actively participate in various types of innovation and entrepreneurship competitions organized by national and provincial education institutions represented by the "Huang Yanpei Innovation and Entrepreneurship Competition" and the "Internet+Innovation and Entrepreneurship Competition", to effectively stimulate teachers' inspiration of innovation and improve their professional innovation ability. The third is to innovate the training activities. It is needed to pay attention to the improvement of teachers' teaching innovation ability, organize targeted training, organize pre-job training related to improving innovation ability, provide teachers with short-term or long-term learning opportunities regularly, and use winter and summer vacations to practice in enterprise, so as to improve their practical ability, continuously expand teachers' vision, improve their teaching innovation ability and promote the improvement of teaching innovation ability of higher vocational college teachers.

VI. CONCLUSION

In a word, through a lot of investigation and research, it is found that under the background of the new era, the admission of students in higher vocational colleges has changed from fractional enrollment to vocational orientation enrollment, and the learning mode of students has changed from knowledge learning to skill practice learning. Therefore, Higher Vocational Colleges must implement education and teaching innovation, change traditional education and teaching methods, and update education and teaching management. The school must create good software and hardware conditions to enable students to have good living and learning conditions. Through the implementation of the three education reform, innovation of teaching mode, improvement of evaluation mechanism, borrowing skills competition and other ways, the school must constantly innovate education and teaching management mode, and effectively achieve teaching based on materials, so as to achieve the overall improvement of talent training quality.

REFERENCES

- [1] Chen Juan. Research on teaching innovation ability of young teachers in higher vocational colleges from the perspective of "dual innovation" and the improvement countermeasures [D]. Changsha: Hunan Normal University. 2017. (in Chinese)
- [2] Wang Minzhi. An Examination of Young Teachers' Initiation in Universities [J]. Contemporary Teacher Education. 2014-06-15. (in Chinese)
- [3] Qian Jing, Xu Chi. Problems and Countermeasures of Teaching Management in Private Colleges and Universities [J]. Journal of Beijing City University. 2019-08-28. (in Chinese)
- [4] Fan Zhechao, Shi Jiayu. Exploring the ways to improve teaching innovation ability of higher vocational teachers [J]. Intelligence. 2019-08-15. (in Chinese)
- [5] Li Chuanwei, Wang Zuli. Research and Practice of "Three Trends" Talent Training Mode Based on the Diversity of Students in Higher Vocational Colleges [J]. Journal of Tianjin Radio and Television University. 2019-06-25. (in Chinese)
- [6] Zhang Lining. Research on the Educational Management Model of Higher Vocational Colleges: A Review of "Education and Teaching Management of Higher Vocational Colleges" [J]. Educational Review. 2017-04-28. (in Chinese)
- [7] Qian Min. Paying attention to the construction of the state key laboratory [N]. People's Weekly. 2018-07-15. (in Chinese)
- [8] Xu Mei. Research on the Reform of University Administrative Organization [D]. Wuhan: Huazhong University of Science and Technology. 2015. (in Chinese)
- [9] Tao Quansheng. Reform and Innovation of English Teaching for Non-English Major Postgraduates in Engineering Colleges [J]. Journal of Changchun University of Science and Technology. 2014-06-15. (in Chinese)