

# Analysis of the Teaching Reform Path for Environmental Engineering Technology Majors in Higher Vocational Education Based on the “1+X” Certificate

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**Abstract:** In the context of building an innovative country, the country has put forward higher requirements for talent cultivation in vocational colleges. Vocational colleges should continuously explore and improve talent cultivation work to meet these requirements while cultivating more professional and practical talents for the country and society. This article takes the Environmental Engineering Technology major as an example. Integrating the concept of “1+X” certificate into environmental engineering technology teaching can better construct the curriculum system of the Environmental Engineering Technology major, make the curriculum structure more scientific, complete and standardized, and help students understand the connection between certificates and education from multiple perspectives, thereby achieving effective reform of the curriculum of the Environmental Engineering Technology major. Based on this, the article will elaborate on the concept and significance of the “1+X” certificate and analyze in detail the teaching system construction ideas of the environmental engineering technology major courses in higher vocational education under the background of the “1+X” certificate. Studying the shortcomings in the current development of environmental engineering technology education in higher vocational education in China and proposing improvement measures for the environmental engineering technology major courses in higher vocational education to address existing problems will provide certain references and assistance for the subsequent reform of environmental engineering teaching in higher vocational education in China.

**Keywords:** Vocational education; “1+X” certificate; Environmental Engineering Technology

**Online publication:** September 27, 2024

## 1. Introduction

In recent years, with the acceleration of China's modernization construction, the ecological environment issues in China have received more and more attention with environmental protection work reaching more people. Therefore, in recent years, China has attached great importance to environmental protection issues and accelerated establishing a sound ecological protection policy system through a series of policy advances. With the continuous improvement of China's economic level and national cultural literacy, people's environmental protection awareness has also been enhanced. Especially with the national dual carbon strategy proposal, people will pay more attention to ecological and environmental protection issues in their daily lives. Therefore, the demand for environmental protection talents is increasing today. To meet this market demand, some vocational colleges have gradually emphasized cultivating environmental professionals in recent years.

The Environmental Engineering Technology major is a highly practical field that includes knowledge from multiple disciplines such as natural sciences, social sciences and technical sciences. Its establishment aims to cultivate more professional and practical talents with solid environmental pollution prevention skills and basic governance theories for society. In environmental engineering technology, most students will engage in frontline technical positions in related industries after graduation, helping enterprises solve the environmental pollution problems faced in current production or development transformation. For vocational colleges, how to improve the quality of talent cultivation has become a problem that vocational colleges need to consider. It is necessary to ensure that talent cultivation is not only the transmission of professional knowledge but also the satisfaction of social needs<sup>[1]</sup>.

## 2. Policy guidance for teaching reform of environmental engineering technology majors in vocational colleges based on the “1+X” certificate

In February 2019, the State Council issued the “Implementation Plan for National Vocational Education Reform”<sup>[2]</sup>, which proposed the implementation of a diploma certificate and several vocational skill level certificate systems (the “1+X” certificate system) in vocational education to achieve mutual connection between diploma certificates and other vocational skill level certificates, improve the matching degree of talent cultivation work with current social and industry development and thus fully promote the “1+X” certificate system in China. In April 2019, the Ministry of Education, together with the National Development and Reform Commission, the Ministry of Finance and the State Administration for Market Regulation, jointly formulated the “Pilot Plan for Implementing the ‘Academic Degrees Certificate + Several Vocational Skills Level Certificates System’ in Colleges and Universities”<sup>[3]</sup>. The plan proposes effectively combining curriculum construction, professional construction and teacher training with the “1+X” certificate system to improve the training effect of composite technical talents.

In June 2019, the Ministry of Education of China issued the “Guiding Opinions on the Formulation and Implementation of Professional Talent Training Plans in Vocational Colleges”<sup>[4]</sup>. The statement points out that the future direction of teaching work in vocational colleges is to ensure the integration of documentary evidence, make skill level standards a part of talent training plans, carry out “1+X” certificate pilot work in schools, comprehensively optimize the talent training mode of vocational colleges and improve the talent training effect of vocational colleges. At the same time, the issue also put forward clear requirements for the ideological and political work of courses in vocational colleges. It is necessary to strengthen the construction of ideological and political courses, build a talent cultivation pattern of “ideological and political courses +

ideological and political courses” within universities, organize relevant education and professional talents to develop new teaching standards and content, accelerate the reform of professional teachers, professional textbooks and teaching methods, promote the integration effect of information technology in vocational education and innovate teaching evaluation mechanisms. In the 2021 government work report, it was proposed to enhance the adaptability of vocational education, deepen the integration of industry and education, school-enterprise cooperation and deeply implement the vocational skill level certificate system. The series of guiding policies mentioned above have effectively promoted the implementation of the “1+X” certificate pilot program and provided a new direction for innovation in vocational talent cultivation.

### **3. The concept of “1+X” certificate system and its reform significance for higher vocational education teaching**

Vocational education is different from general education. In the education process, there should be a set of special education systems suitable for oneself, ensuring that the educational goals of vocational education and the development needs of the industry can be effectively reflected. In vocational education, the most obvious feature is the collaborative education between schools and enterprises, where individual development aligns with career development goals. Under this characteristic, higher vocational education determines the integration of personalized and socialized academic certificates with vocational skill level certificates that reflect job and industry professional abilities. The “1+X” certificate system is a brand-new education system born under this requirement.

#### **3.1. The concept of “1+X” certificate system**

In the “1+X” system, “1” refers to a student’s academic certificate, which is the diploma certificate obtained by learners after completing a certain stage of learning tasks within the learning system. “X” refers to several vocational skill level certificates. In the “1+X” certificate system, society pays more attention to “X.” However, academic certificates are proof of the smooth completion of students’ studies and the foundation for future work and development. Therefore, teachers should handle the relationship between the two types of certificates well with the use of the “1+X” system. Only by connecting and integrating the two types of certificates can the “1+X” certificate system truly play its role.

The vocational skill level standards correspond to the teaching standards of various levels of vocational education, and the educational and vocational education goals corresponding to different levels of vocational skill standards are also different. Teachers should maintain consistency between talent cultivation and teaching direction when carrying out teaching work. The training content of the “X” certificate is highly integrated with the curriculum design content in the talent cultivation plan. This is because the vocational skills training of the “X” certificate is not a separate training curriculum system but needs to be organically integrated with the professional talent cultivation plan in academic education. Besides, it is important to ensure that the knowledge taught in professional courses meets the needs of certificate vocational skills training and supplement any training content not covered through vocational skills training .

#### **3.2. The reform significance of the “1+X” certificate system for higher vocational education teaching**

The “1+X” certificate system is an important part of the national vocational education system reform and a basic system for building a vocational education system with Chinese characteristics. The implementation of

the “1+X” certificate system can accelerate the speed of teaching reform in vocational colleges and improve the effectiveness of teaching reform.

Firstly, through the “1+X” certificate system, vocational education and training systems can be further improved, helping vocational colleges achieve a balance between academic education and vocational skills training, deepening talent cultivation models and reforming teaching evaluation standards while ensuring that educational work can better serve local socio-economic development. With the integration of educational resources from all sectors of society to participate in vocational education, the system can enhance the social influence and status of vocational education, promote the coordinated development of vocational education and local industries, and ultimately form a diversified vocational education pattern of school-enterprise cooperation and industry-education integration.

Secondly, the application of the “1+X” certificate system can achieve the coordination of vocational skill level standards and professional teaching standards, practical training content and classroom knowledge, which is conducive to vocational colleges timely integrating new technologies, standards and equipment adopted or involved in current social and industry development into talent cultivation and teaching, ensuring that teaching work can meet the current social development trends and industry development needs. This can further deepen the reform of the “Three educations” and improve the adaptability of vocational education in the current market economy.

Finally, the emergence of the “1+X” certificate system has brought new evaluation standards for vocational skills training, allowing third-party institutions to develop, verify and issue certificates for textbooks and learning resources. By separating educational institutions from assessment institutions, it is possible to ensure a more comprehensive and fair evaluation of teaching work, thereby promoting the reform of teaching work in vocational colleges and improving the quality of teaching in vocational colleges.

## **4. The idea and process of integrating the “1+X” certificate system into talent training programs**

### **4.1. Emphasis of the effective combination of vocational skill level standards and professional teaching standards**

In the “Professional Teaching Standards for Higher Vocational Schools” issued by the Ministry of Education, clear instructions are given for the teaching standards of the Environmental Engineering Technology major and the future professions that the major can engage in are also listed. This provides corresponding reference and assistance for developing talent training programs for environmental engineering technology majors in vocational colleges. In addition, vocational colleges should combine their educational positioning and distinctive advantages, effectively combining the upper, middle and lower levels in the field of energy conservation and environmental protection. More targeted content should be selected from the environmental protection industry, such as “environmental monitoring technology services,” “environmental technology consulting,” and “clean production and energy conservation and emission reduction,” to be included in the training program for environmental engineering technology professionals. In the integration of the “Professional Teaching Standards for Higher Vocational Schools” and the “National Vocational Skills Standards,” vocational colleges should focus on the current advanced energy-saving and environmental protection industry technologies in China. Based on the current demand for professional talents in the environmental protection industry, vocational colleges can invite relevant industry experts and frontline teachers to form a talent training plan discussion committee, optimize the current training plan for environmental engineering and technology

professionals in vocational colleges, integrate the needs of enterprise talents into the teaching plan, standardize new technological processes, permeate the cultivation of environmental science concepts and legal thinking in professional teaching, improve the educational strength of vocational colleges and develop a professional talent training plan with a “1+X” certificate system orientation <sup>[5]</sup>.

## **4.2. Integrating the process of the “1+X” certificate system into the talent training program**

In the process of integrating the “1+X” certificate system into the talent training program for environmental engineering and technology majors in higher vocational colleges, universities should deeply study the current national policies, understand the current policy support and industry trends, especially the green revolution brought about by the dual carbon strategy to find the future direction of education, combine local advantageous resources and the talent needs of the local energy-saving industry, as well as determining the types of “X” certificates in subsequent talent training. For example, vocational skills in sewage treatment, water environment monitoring and treatment, atmospheric environment monitoring and treatment, enterprise environmental management, green production and maintenance of environmental protection equipment. Universities can appropriately consider obtaining some skill certificates as one of the graduation requirements for students and design targeted teaching systems according to the different development needs of students. Through curriculum design, faculty team building, innovative teaching methods and improved teaching evaluation, vocational colleges can rearrange the talent training plan under the “1+X” system and cultivate more high-quality technology-applied environmental protection professionals for society and industry <sup>[6]</sup>.

## **5. Shortcomings in the teaching of environmental engineering technology courses**

At present, there are still some problems in the teaching process of environmental engineering technology in vocational colleges in China, mainly manifested in the following aspects.

### **5.1. The teaching content is single, and students have weak learning enthusiasm**

Most vocational colleges are influenced by traditional teaching concepts when carrying out teaching work, resulting in teaching content mainly focusing on theoretical teaching and teaching scope limited to textbooks. This leads to limited professional knowledge and skills that students can learn on campus. The degree of compatibility between the learned content and the needs of local enterprises is not high. Under this premise, the teaching materials of vocational colleges cannot be updated on time, and the latest environmental protection technologies and achievements in China have not been introduced. With the rapid development of China’s social economy and technology, the attention of all sectors to environmental protection work has greatly increased. Therefore, vocational colleges are gradually increasing their efforts to cultivate environmental engineering and technical talents. However, the Environmental Engineering Technology major has strong comprehensiveness and involves multiple disciplines in professional learning. Therefore, the cultivation of environmental engineering technology talents is a long-term battle. Teachers should adhere to the principle of keeping up with the times, actively learning the latest professional knowledge and technology, and applying it to environmental engineering technology teaching, providing students with more new technological learning opportunities and continuously improving the effectiveness of professional talent cultivation. However, due to the relatively single curriculum and lack of timely updates in textbook content in many vocational colleges, the learning effectiveness of students majoring in environmental engineering is difficult to guarantee. Over time, students’

learning enthusiasm will be greatly reduced, ultimately leading to a psychological aversion to learning, which greatly impacts the development of environmental engineering technology teaching in vocational colleges in China and hinders the good development of China's environmental engineering industry<sup>[7]</sup>.

## **5.2. Insufficient opportunities for hands-on practice and the ability to apply knowledge needs to be improved**

At present, many vocational colleges in China have not correctly recognized that the biggest difference between vocational education and regular undergraduate education is that vocational education has a stronger tendency for career development and the development of teaching work is also moving towards the future employment direction of students. Therefore, emphasis should be placed on cultivating students' professional and technical application abilities in higher vocational education. However, students in higher vocational colleges generally have poor hands-on practical abilities currently. This is because many higher vocational colleges only focus on theoretical knowledge in environmental engineering technology teaching and lack corresponding attention to students' hands-on practical teaching work. As a result, students' hands-on practical abilities are not cultivated. Over time, their hands-on practical abilities are generally weak, making it difficult to have sufficient competitiveness in future work development. In addition, vocational colleges often carry out professional talent training following the theoretical training model, which leads students to accumulate more professional knowledge reserves in their learning. However, due to the lack of corresponding practical training, students cannot apply the knowledge learned in the classroom to solve practical problems. Therefore, the importance of constructing the curriculum system for environmental engineering technology is self-evident<sup>[8]</sup>.

## **5.3. The teaching content is disconnected from industry development**

In the teaching process of environmental engineering technology courses, the strong sense of disconnection between teaching content and industry needs is a difficult problem for teachers. The main reason for this problem is that the teaching of environmental engineering technology courses has not been fully integrated with relevant enterprises. The implementation of industry education integration work is not in place, resulting in a mismatch between the training direction of professional talents and the types of talents required for industry development or the insufficient technical level of the professional and technical talents cultivated. Many vocational colleges strictly follow the teaching syllabus and established talent training plans when cultivating talents in environmental engineering technology, without investing energy in connecting and cooperating with local relevant enterprises. This makes it difficult to explain the latest technological methods and equipment in the industry to students during the teaching process, resulting in most students in the field of environmental engineering technology being unable to adapt to the recruitment needs of relevant enterprises in the future and their insufficient social competitiveness. As a result, students gradually lose interest in learning, lack subjective initiative and ultimately lead to the situation of "unemployment upon graduation"<sup>[9]</sup>.

# **6. Reform measures for the curriculum system of environmental engineering technology in higher vocational education by integrating the "1+X" certificate**

## **6.1. Reform the curriculum system by aligning it with vocational skill requirements**

To ensure that the teaching work of the Environmental Engineering Technology major in vocational colleges can better meet the requirements of the current industry development for talents in this field, teachers of the

Environmental Engineering Technology major should actively try to reform the curriculum system of this major. When innovating the curriculum system, it should align with the requirements of vocational skills. This is because, under the “1+X” certificate system, vocational colleges should focus on cultivating professional skills when carrying out talent education and training. Through long-term observation of the teaching of the Environmental Engineering Technology major, the reform of the curriculum system for the Environmental Engineering Technology major should not only improve the pass rate of professional certificates but also incorporate the abilities required for relevant talents in the skill certificate examination into the talent training plan for the course in higher vocational education. This is to ensure the effectiveness of the curriculum reform for the Environmental Engineering Technology major and further improve the integration effect between professional courses and professional certificates.

In the first teaching semester, teachers can adjust the “Basic Chemistry” course appropriately. In traditional teaching methods, basic skills training is the main focus. After the adjustment, teachers can focus on cultivating students’ standardization, such as training students in weighing skills, solvent dilution transfer skills, etc. Teachers can offer courses such as “Chemical Analysis” and “Chemical Safety Technology” in the second learning teaching. In teaching chemical analysis experiments, teachers should retain a series of classic experimental contents, such as titration analysis and quality analysis and use these contents to comprehensively improve students’ innovation ability and professional knowledge application ability. In addition, teachers can also use the HSE management system to carry out teaching work based on the people-oriented concept, permeating the idea that “all safety accidents in learning and work can be avoided through effective preventive measures” into students, strengthening their safety awareness and thereby improving their safety skills. In the third semester, teachers can teach content such as “Instrument Analysis” and “Water Pollution Control.” Through the “Instrument Analysis” course, students can effectively improve their skills in operating spectrophotometers and processing related data. Teaching sewage treatment technology can effectively improve students’ practical abilities in sewage treatment.

Adjusting the teaching content of the Environmental Engineering Technology major for three semesters and integrating all the skills involved in the Environmental Engineering Technology major under the “1+X” certificate system into daily teaching can effectively improve students’ mastery of professional skills and help them deepen their theoretical understanding of the Engineering Technology major. As a result, students’ practical abilities can be continuously improved, ensuring that vocational education can lay a good foundation for their future work development <sup>[10]</sup>.

## **6.2. Reform teaching methods based on the learning situation**

To improve the effectiveness of the reform of environmental engineering technology courses in vocational colleges and ensure that teaching work meets students’ current learning and development needs, teachers must fully understand the current learning situation of students and reform teaching methods based on their learning situation. Compared to students from regular undergraduate colleges, the most obvious characteristic of vocational college students is their poor learning ability, low knowledge reserve and low subjective initiative. They do not clearly understand their future development direction, and their career development plans are not comprehensive enough. These situations have led to a lack of emphasis on relevant skill certificates among students in vocational colleges, and their willingness to obtain certificates is not strong enough. Therefore, teachers of environmental engineering and technology majors in higher vocational colleges should pay attention to the situation of students, provide more care and assistance to students in daily teaching and campus life,

guide students to establish correct ideological and value concepts, correctly view the help of relevant skill certificates for their future career and development and actively learn new teaching methods, bringing students more interesting and practical value in environmental engineering and technology classrooms.

In the construction of the teaching system for environmental engineering technology courses, teachers can base themselves on the background of the information age, fully utilize information technology to carry out teaching work, accelerate the informatization transformation of environmental engineering technology classrooms and enable students to fully integrate their professional theoretical knowledge with work practice. Teachers should also use digital information technology in teaching to provide more learning materials for students' professional learning through many online teaching resources. Teachers should also fully value the practical value of environmental engineering technology courses while teaching theoretical knowledge, appropriately increase the proportion of practical teaching content, improve students' professional knowledge application ability, help students deeply understand the knowledge learned in the classroom and effectively stimulate their learning interest. With students' learning interests as the starting point, the comprehensive improvement of teaching quality and efficiency in environmental engineering technology can be achieved.

Teachers should also fully integrate professional knowledge education and skill training for students in constructing the curriculum system of environmental engineering, establish a talent cultivation concept that combines training and education and continuously explore the ideological and political elements contained in the teaching materials of their major. In daily teaching, they should combine the characteristics of environmental engineering technology to carry out ideological and political work in courses to subtly enhance students' ideological and moral awareness and fully exert the effect of the vocational college education. In addition, teachers should also attach importance to the role of teaching cases in teaching. Through real teaching cases, students can effectively enrich their classroom learning materials, make teaching content no longer dull and boring, and stimulate their learning enthusiasm. For example, teachers can present vivid cases of various safety accidents that have occurred in the operation of various enterprises in China in recent years, which can provide students with sufficient visual and spiritual shock and enhance their safety awareness. At the same time, teachers can also integrate the concept of green development into classroom teaching, enhance students' awareness of environmental responsibility and enable them to understand the help that their major can bring to the development of environmental protection. This will enable them to actively participate in environmental engineering construction in the future, reflecting the educational effect of vocational environmental engineering technology teaching <sup>[11]</sup>.

## **6.3. Fully carry out practical teaching**

### **6.3.1. Building an on-campus simulation training base**

To improve the reform effect of the curriculum system of environmental engineering technology in vocational colleges, teachers should attach great importance to the significance of practical training for students' learning and development. To better carry out practical teaching, vocational colleges can build simulated training bases within the school to provide convenience for students' professional training and teaching. In the context of digitalization, further improving the construction of simulation training bases for environmental engineering technology majors and building an information network teaching management platform for students through a series of digital simulation technologies, such as virtual reality. It can provide more opportunities for students practical training and promote improving information technology teaching levels in vocational colleges. Virtual reality technology can also concretely display the future employment direction and environment of



environmental engineering students, enabling practical teaching work to break free from spatial limitations and strengthening students' understanding of theoretical knowledge, professional skills and practical abilities.

### **6.3.2. Deeply carry out school-enterprise cooperation**

The cooperation of schools-enterprises and industry-education, as an important link that cannot be ignored in teaching vocational colleges, has naturally become a core lever for achieving the reform of the curriculum system of environmental engineering and technology majors in vocational colleges. Implementing the “1+X” certificate system can further demonstrate the importance of school-enterprise cooperation in vocational education, thereby promoting cooperation between vocational colleges and local enterprises. This can accelerate the formation of an integrated industry and education teaching model. The “1+X” certificate system can effectively combine the education work of vocational colleges with the job requirements of related industries and integrate the skill training goals of relevant vocational positions into the talent training plans designated by vocational colleges. This enables students to improve their professional skills while completing academic education continuously. The combination of professional knowledge and practice helps vocational colleges achieve the cultivation of composite talents.

Unlike traditional vocational teaching models, implementing the “1+X” certificate system can provide more opportunities and cooperation paths for vocational colleges to carry out school-enterprise cooperation education. The cooperation between vocational colleges and local related industries and enterprises can enhance the social influence and industry reputation of vocational colleges and provide professional talent support and reserves for developing related industries and enterprises. Under the “1+X” certificate system, relevant enterprises can select talents based on their business transformation direction and market development needs. In the context of school-enterprise cooperation, vocational colleges can improve the training plan for environmental engineering and technology professionals according to the needs of cooperative enterprises, ensuring that the teaching content can meet the development needs of relevant enterprises and industries. At the same time, close cooperative relationships can also help establish a bridge of cooperation and learning between vocational college teachers and cooperative enterprise mentors and achieve mutual assistance in work. The teaching level of vocational colleges and the industry competitiveness of related enterprises can be comprehensively improved.

Through the implementation of school-enterprise cooperation teaching, the Environmental Engineering Technology major can reflect the development needs of enterprises in the form of courses and introduce the environmental engineering projects currently carried out by relevant enterprises as practical teaching content in the vocational environmental engineering technology classroom. Relevant enterprises can appoint professional mentors and vocational teachers to carry out teaching work in the classroom jointly. Professional teachers provide students with solid theoretical knowledge guidance; enterprise mentors explain various problems that may be involved in practical work to students, strengthen their ability to combine theoretical knowledge with practical application and improve the level of their professional skills. This promotes the effectiveness of vocational colleges in cultivating composite talents under the concept of industry education integration. It also provides a large reserve of professional talents for related industries' sustainable and healthy development <sup>[12]</sup>.

### **6.4. Strengthen ability and quality, strengthen the training of “1+X” integrated teaching staff**

In order to improve the effectiveness of the curriculum system reform for environmental engineering technology majors and implement the requirements of the “1+X” certificate system for vocational education reform,

various vocational colleges need to continuously strengthen the construction of “1+X” integrated teacher teams.

As the foundation of teaching work, high-quality and excellent teacher teams are the basic guarantee for improving the quality of teaching work. Many professional teachers in vocational colleges are directly admitted or assigned to vocational colleges for teaching after graduating from other universities. These teachers have strong learning abilities and solid professional knowledge reserves but lack corresponding practical experience. This leads to deviations between the teaching content they choose and the actual needs of the current industry when carrying out practical teaching and the development effect of practical teaching is naturally not satisfactory. Therefore, by introducing professional and technical talents from relevant industries as reserves for the teaching staff of environmental engineering technology in vocational colleges, the professional teaching ability of professional teachers can be effectively improved, and the application effect of the “1+X” certificate system can be fully utilized. A unique “double teacher” team with unique characteristics can be created within vocational colleges, accelerating the reform of environmental engineering technology courses and bringing students a new professional curriculum learning system. In addition, vocational colleges should also encourage teachers majoring in environmental engineering technology to go to relevant local enterprises for learning and improvement. Only by immersing themselves in the frontline work environment can teachers have a deep understanding of the job requirements of relevant enterprises and comprehensively improve their personal and professional skills and teaching levels. Teachers should also actively participate in various trainings in their spare time, timely understand the development trends of relevant industries, and provide direction for innovation in teaching work. Vocational colleges can also invite outstanding professional teachers from other universities to hold academic exchange conferences at their universities or invite experts in the field of environmental engineering to give lectures on professional knowledge and skills on campus to improve the overall level of teacher team construction in the environmental engineering technology major of vocational colleges<sup>[13]</sup>.

### **6.5. Develop “1+X” practical training materials**

In addition to the teaching team, textbooks are also an essential element in developing educational work. Before teaching, teachers should deeply develop various “1+X” practical training materials applied in the teaching process. Under the “1+X” certificate system, teachers should actively promote the development of integrated teaching with certification and integration. Students should be equipped with course materials related to vocational skill level certificate exams at the end of lectures. The content of the textbooks should be combined with the current standards for vocational skill training and assessment, and the specific requirements in vocational skill certification should be reflected one by one, with detailed operating procedures indicated so that teachers and students can learn more smoothly and improve the pass rate of relevant level skill certificates<sup>[14]</sup>.

### **6.6. Improve assessment and evaluation design**

The teaching evaluation mechanism is an important means of evaluating the effectiveness of teaching work. To better implement the reform of the curriculum system for environmental engineering technology, teachers should improve the design of professional assessment and evaluation and attach importance to the value of process assessment in teaching activities. For this purpose, teachers can adopt situational task teaching, allowing students to carry out project-based learning according to the proposed learning tasks, guided by task goals and comprehensively improve students’ practical abilities. In teaching evaluation, teachers also abandon the traditional “score-based” theory and focus more on evaluating students’ learning process. The entire semester’s learning work is divided into multiple practical projects and students are assessed in stages according

to the requirements of different vocational skill level certificates. Students' assessment results in daily learning are considered an important part of the final teaching evaluation, increasing the proportion of daily training evaluation, enhancing students' enthusiasm for daily learning and training and promoting the comprehensive improvement of their abilities <sup>[15]</sup>.

## 7. Conclusion

Applying the “1+X” certificate system in the reform of the curriculum system of environmental engineering technology in vocational colleges can effectively improve the quality of professional courses and the training effect of specialized talents. In this article, the author briefly explains the policy support and guidance of the “1+X” certificate system and elaborates on the reform significance brought by the current “1+X” certificate system to vocational education. Combining with the shortcomings in the teaching of environmental engineering technology courses in current vocational colleges in China, the author analyzes in detail the reform measures of the curriculum system for integrating the “1+X” certificate into vocational education from six aspects: (1) Reforming the professional curriculum system, (2) Innovating teaching methods, (3) Strengthening practical training, (4) Building a teacher team, (5) Developing practical training materials, and (6) Improving assessment and evaluation. Hopefully, this can provide reference and help for subsequent teaching innovation and contribute to the development of vocational education in China.

## Funding

2023 Vocational Education Teaching Reform Research Project in Linyi City, “Research on the Talent Training Model of ‘Integration of Post-Course Competition and Certification’” (Project No.: SZJ2023009)

## Disclosure statement

The authors declare no conflict of interest.

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