



# What Are the Students' Attitudes Towards the Academic Plus Vocational Skill Level Certificates (1+X) System in Chinese Vocational Higher Education?

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## Abstract

The article examines Chinese Vocational Higher Education students' attitudes towards the "1+X" certificate system, which refers to the integration of one academic certificate (1) and several vocational skill level certificates (X). It comprehensively analyses the system's background, implementation, and perceived effectiveness. The research method includes qualitative analysis of interviews and focus groups, focusing on student experiences and perceptions. Specifically, the study involved final-year students participating in focus groups and follow-up online interviews using Tencent Meeting. Thematic analysis was employed to identify key themes in the data. Key findings relate to the curriculum, examination process, career plans, and suggestions for improvement. The study aims to inform policymakers about student attitudes towards the 1+X Certificate System and its impact on their vocational education and career prospects. The paper highlights the need to continually adapt and improve vocational education systems to meet evolving market demands and enhance student employability.

**Keywords:** Career Development, Chinese Vocational Education, Perceptions, Qualitative Analysis, Student Attitudes

## 1. Introduction

### 1.1. Introduction

According to Chen's exhaustive study (2023), the Chinese government has fiercely pushed the "1+X" certificate system as the trajectory for application-oriented undergraduate talent development. According to Huang (2021), the 1+X Certificate System provides a prospect to

advance the reform of training for computer specialists and foster a more significant number of exceptional multidisciplinary professionals for the computer and Internet sectors.

The 1+X Certification System is seen by Chen et al. (2023a) as a novel approach to responding to the dynamic market landscape and intense competition. Therefore, institutions must devise a strategy for enhancing their professional competencies through intelligent finance and taxation (1+X) (Li, Jun, 2019). Li (2019) emphasised that it is crucial to strengthen company competencies and gain the appropriate certifications to continue increasing in the financial industry. Wei and Zheng's (2023a) research on the talent training model of the "1+X certificate" system, which combines academic certificates and vocational skills certificates, complements the findings of Chen et al. (2023a). Traditional undergraduate institutions and vocational schools need to reflect this model comprehensively. The practical technical proficiency levels of undergraduates and post-graduates vary compared to those of conventional undergraduate establishments and vocational institutions. This distinction also represents the students' general character and ability to study at undergraduate schools with an emphasis on applications. Hence, Wei and Zheng (2023) put forth the "1+X+Y+Z" framework, which harmonises practical undergraduate vocational education with undergraduate research education and satisfies the latter's requirements.

Zhen (2022a) presents an alternative viewpoint, contending that by strategically harnessing students' passion for learning, instructors may effectively manage their time and improve the efficiency with which students acquire knowledge. Student motivation is ingeniously combined with the 1+X Certificate in Zhen (2022a).

Early in 2011, the "Opinions of the Ministry of Education on Giving Full Play to the Guiding Role of the Industry to Promote the Reform and Development of Vocational Education" stated unequivocally the support for the establishment and improvement of a dual certificate system as well as the realisation of the connection between academic and vocational qualification certificates. Notwithstanding the prevailing appreciation for dual-certificate education among vocational institutions, "evident indications of mechanical replication of foreign expertise" were evident (Liu, 2020). Academic education and vocational access must be acknowledged and communicated effectively to extend staff training in vocational education. Vocational education frequently gives the same significance as academic and vocational degrees when fostering talent. Liu (2020) and Qin (2020) contend that to optimise students' human capital and facilitate the integration of production and education, the teaching process must be incorporated entirely into industrial training. Although vocational education and courses with a substantial practical component comprise most of the "1+X certificate" system, undergraduate colleges emphasise certain relevant subjects comparatively less.

## **1.2. Research Purpose, Questions, Aims and Objectives**

### **1.2.1. Purpose of Research Activity**

The "Pilot Program on the Implementation of the 'Academic Certificate + Several Vocational Skill Level Certificates' System in Institutions" was jointly issued by the Ministry of Education, the National Development and Reform Commission, the Ministry of Finance, and the General Administration of Market Regulation in China at the start of 2019. It aims to introduce the "Academic Certificate + Several Vocational Skill Level Certificates" system, commonly called the 1+X Certificate.

The 1+X Certificate System is to be defined. Regarding the 1+X Certificate System, the State Council of the People's Republic of China (2020) has provided further clarification. The 1+X Certificate System is divided into two distinct elements. The academic certificate, denoted by

"1," indicates the standard of talent development in formal education. An assortment of occupational skill level certifications is represented by the letter "X." These certificates are proof of the vocational expertise that graduates and other members of society have acquired. These credentials prove the all-encompassing skills necessary for engaging in professional endeavours and advancing one's career.

Certificates of vocational skills level, represented by the letter "X," are granted in an estimated ten distinct occupational skill domains. Most pilot institutions are higher vocational institutions, secondary vocational institutions (excluding technical schools), pilot vocational education institutions at the undergraduate level, applied undergraduate universities, and the National Open University.

According to the research by Zhengxin and Fang (2023a), the CNKI database had 2,889 research articles about the "1+X" Certificate as of March 31, 2022. Among them, 2,139 were published in Chinese core journals. A considerable body of scholarly literature has been devoted to the "1+X" Certificate, encompassing its inception and definition, connotative qualities, developing concerns, and prospective avenues of inquiry (Wei & Zheng, 2023a)

The primary objectives of the pilot implementation of the 1+X Certificate System are to answer market demand, meet national requirements, and improve students' employability. Through an analysis of the pilot phase of the 1+X Certificate System, the following can be accomplished: further, enhance the value of academic certificates, fortify the groundwork for the sustainable development of students, optimise curriculum and teaching content, and efficiently utilise vocational skills level certificates to foster talent development in educational institutions; implement evaluation of vocational skills level; integrate certificate training content into professional training programmes; and optimise curriculum and teaching content.

### **1.2.2. Aims of Research Activity**

This study interrogates students' dispositions towards integrating academic and vocational skill certifications, specifically the 1+X Certificate System, within the context of Chinese Vocational Higher Education. Through a meticulous case study that probes students' perspectives, this inquiry aspires to amplify governmental bodies' awareness concerning students' educational needs and preferences, as delineated by the focal research question. The research intends to give policymakers data-driven insights into the scholarly discourse surrounding the 1+X Certificate System and its perceived impact on the student cohort. Furthermore, it assesses the ramifications of this state-sanctioned initiative on the attitudinal dimensions of the student body within the vocational higher education sphere. Policymakers' cognisance of student viewpoints is paramount for strategically recalibrating and auguring the vocational education paradigm in a specific Chinese province. Conclusively, evaluating student attitudes towards the 1+X Certificate System indicates the efficacy of related government policies, thereby informing the development of robust policy frameworks, the appraisal of policy outcomes, and the enhancement of the vocational educational infrastructure.

## **2. 1+X Certification System in Chinese Vocational Higher Education**

### **2.1. Background of the 1+X Certification System**

Higher education institutes in China are primarily concerned with fostering students' aptitude for particular occupations in the most effective way possible (Huang, Jun 28, 2021a). The principal objective behind implementing the 1+X Certificate System is to aid technical and vocational students in attaining distinct professional goals.

As stated explicitly in the "Decision of the State Council on Accelerating the Development of Modern Vocational Education," a group of general undergraduate colleges and universities must be guided in the development of modern vocational education by pilot promotion, demonstration, and other methods (Accelerating the Development of Modern Vocational Education, 2014). Undergraduate, vocational education will be the primary focus of transforming schools and universities specialising in applied technology. This will be reflected in policies and measurements skewed in their favour, such as financing and enrolment. The pilot phase of the diploma certificate and several occupational skill grade certificate systems that emphasise applied learning took place in undergraduate institutions and universities.

According to statistical data, the Institute of Vocational and Technical Education Centre of the Ministry of Education has selected and authorised pilot initiatives under sixteen "X" certificates. These initiatives include application-focused schools and vocational education pilot schools at the undergraduate level. The selection process adheres to the guidelines established by independent colleges and universities and provincial education administrative departments. As of May 6, 2019, figures from the Ministry of Education of the People's Republic of China indicate that between 200 and 600 institutions, including universities, specialised institutes, and colleges, had participated in each '1+X' certificate programme. A combined total of over 200,000 pupils are enrolled. Applied undergraduate colleges must actively acquire knowledge from many talent development methodologies and discern a contemporary educational framework that aligns with their specific circumstances. To cultivate proficient practical skills and eventually enhance the calibre of personnel education.

The objective of "accelerate the link between academic certifications and occupational skill level certificates" is stated in the 2019 "Government Work Report." By explicit declaration in Article 1 of Vocational Education, the four guiding principles for changing the "1+X certificate" system are outlined. As stated in Article 7 of the document "Vocational Education," vocational colleges are responsible for operationalising academic credentials while managing and regulating the middle ground, incorporating documented evidence, and operating schools in various ways—all while attempting to balance education and training. While the precise results remain uncertain, these elements could be marginally inadequate in the context of applied undergraduate education. Establishing guidelines on the acceptability of pilot work undertaken by independent colleges can be achieved by describing the state of the "1+X" certificate pilot programmes.

## **2.2. Academic Certificates Plus Vocational Skill Level Certificates (1+X) System, the Concept of 1+X Certificate System**

The Chinese government has implemented a pilot programme called the "Academic Certifications plus Vocational Skill Level Certificates (1+X) system to improve vocational education and training." Under this system, Students are incentivised to acquire practical skills and academic knowledge concurrently, culminating in acquiring two unique types of credentials.

The letter "X" denotes a certification encompassing many degrees of occupational expertise. It is a credential demonstrating a comprehensive set of skills necessary for professional endeavours and individual career advancement. On the contrary, the letter "1" represents a certificate of academic attainment. Sun(2019) states that the "1+X certificate" system facilitates school-business collaboration and promotes instructional integration as the institutional cornerstone. Moreover, it establishes the foundational structure that will direct forthcoming vocational education endeavours. According to Li, Lu, and Yin(2019), occupational skills

comprise the bulk of "X" certifications. These abilities serve as an indicator of students' learning outcomes and occupational competence.

The principal aim of this approach is to foster a comprehensive education that harmonises conceptual understanding with hands-on competencies. Students are motivated to develop an all-encompassing repertoire of abilities corresponding to the sector's demands and augment their employment prospects. Students who get occupational certifications and academic credentials are more adept at satisfying labour market requirements and delivering valuable contributions to the labour force (State Council Encourages Vocational Education Reform, 2019).

### **3. Method**

This section includes details on the research participants, the instrument used for the focus group and follow-up interviews, the procedure, the methods for collecting the data, and the approaches for data analysis.

#### **3.1. Participants**

Volunteers participated in focus groups and follow-up interviews.

All participants attended online. Participants were chosen among final-year students at a vocational university in China. This option examines how the 1+X Certificate System evolves during a student's educational experience and its possible influence on skill development and employment possibilities over time. Attempts were taken to guarantee gender and demographic diversity in the sample. This helped gather various viewpoints and experiences while accounting for potential variances in how the 1+X Certificate System may influence different student groups. Students previously participating in an online focus group were asked to volunteer for follow-up interviews.

#### **3.2. Sampling**

There were three participants in the focus group. The follow-up interviews included the same individuals. All participants attended the 1+X Certificate System.

Final-year students were chosen after completing the 1+X Certificate System and enrolling in an internship course. Participants can also determine whether the 1+X Certificate System affects their practical practice.

#### **3.3. Focus Group**

Focus groups were one strategy to learn how students felt about the 1 + X Certificate System. A focus group was deemed acceptable because it focused on group dynamics to highlight parallels and contrasts in the members' excellent or negative experiences.

Focus group talks allow for exploring various viewpoints and experiences connected to implementing the 1+X Certificate System. The researchers could organise open and dynamic discussions by gathering students in a group environment, encouraging them to express their opinions, ideas, and concerns. This technique allows for a more in-depth grasp of the complexity and subtleties of the 1+X Certificate System.

Furthermore, focus group conversations allow members to engage in communal sensemaking. Interaction and sharing ideas can reveal common themes, patterns, and issues. This technique

enables the researcher to find similar experiences, opinions, and issues, which can give helpful information about the 1+X Certificate System's efficacy and influence on vocational education.

Given the expense of organising focus groups in China, the researchers decided on an online focus group. The online technique is less expensive and allows for a more significant number of participants in the study (Gaiser, 2008). The focus group was carried out online, with one group scheduled. The purposely modest group size gives members enough time to answer questions and participate comfortably in the debate. The focus group questions addressed various topics (Gaiser, 2008), including students' course experiences and sentiments during the 1+X Certificate, their thoughts on teachers and teaching, the program's benefits and downsides, and the availability of further assistance.

Final-year students from a vocational university in China received email invitations to the focus groups. The focus group consists of three pupils.

The online approach is more cost-effective and makes it easier for many people to participate in the research (Gaiser, 2008). The focus group was conducted online, with three groups planned. The intentionally small group size is intended to allow participants the time to answer questions and contribute to the discussion comfortably. The focus group questions covered various aspects (Gaiser, 2008), including students' course experiences and feelings during the 1+X Certificate, their perspectives on teachers and teaching, the pros and cons of the program, and the availability of additional support.

Invitations to attend the focus groups were emailed to third-year students, final-year students, and graduates of the Guangzhou Vocational and Technical University of Science and Technology. Each group consists of 3 students.

The questions were presented in Mandarin Chinese. Because the students in the focus group speak Mandarin Chinese as their first language and have varying levels of English competence, doing the interviews in their original language helps them to express themselves more clearly.

### **3.4. Follow-up Interview**

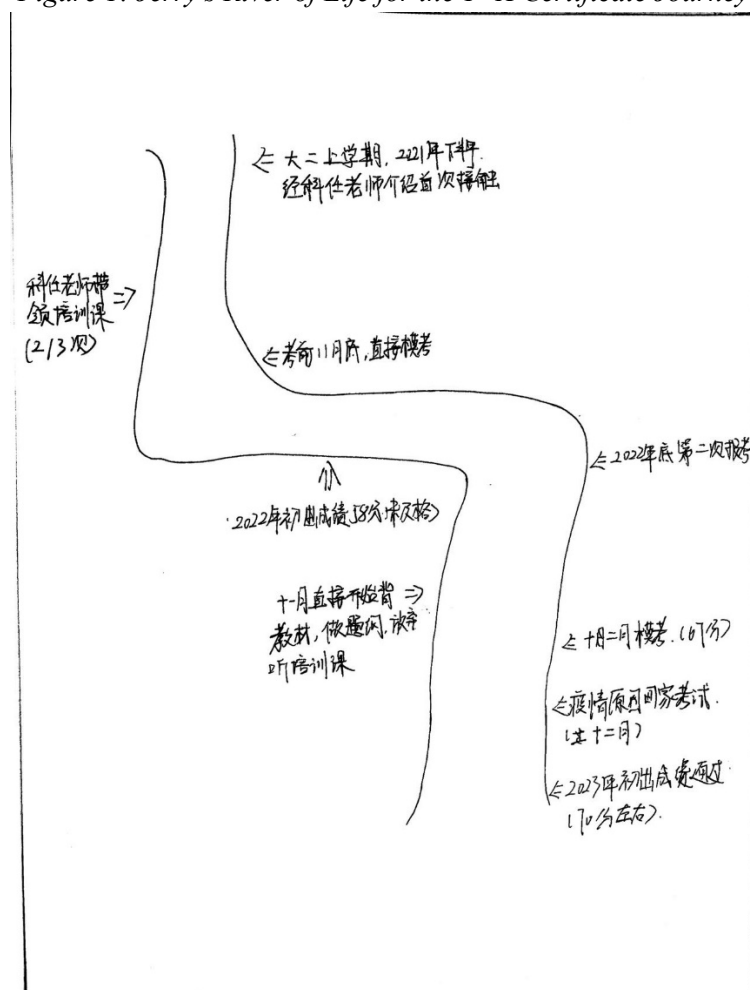
Follow-up interviews supplement focus group talks by allowing the researcher to explore specific themes more deeply, collect more comprehensive information, and acquire a more nuanced understanding of individuals' experiences and perspectives. These one-on-one interviews allow participants to express themselves more fully and reflect on their experiences with the 1+X Certificate System. Follow-up interviews allow me to collect valuable qualitative data that can be used to conduct a thorough review of the 1+X Certificate System implementation process.

The follow-up interview covered a wide range of topics, including participants' experiences with the 1+X Certificate System course, their perceptions of the 1+X test, their confidence in and enjoyment of the 1+X Certificate System for learning and practical application, and their support requirements.

The researchers used the River of Life technique to innovate based on Liu and Edwards' (2017) methodology. The participant was informed that the interview would be conducted using the River of Life approach. The participant was instructed to sketch a river to symbolise her journey with the 1+X Certificate System. The river originated when she first learned about the 1+X Certificate System. Along the river, the participant was invited to depict events, experiences, and emotions vital to her acquiring the 1+X Certificate System. Use various line forms, colours, or symbols to describe her experiences.

Figure 1 depicts participant Jerry's River of Life for the 1+X Certificate, created in response to my suggestions.

Figure 1: Jerry's River of Life for the 1+X Certificate Journey



The interview with the willing participant combines the semi-structured interview approach and the River of Life method. This method entails following an interview procedure to direct the interview and cover the same main subjects of conversation with each participant (Cohen et al., 2018). However, it also enables the participant to expound on her viewpoints and for both sides to ask follow-up questions. It gives flexibility (Cohen et al., 2018). Semi-structured interviews have a clear objective. Therefore, the researchers openly stated at the interview that we would discuss the 1+X Certificate System. Before the interview, the researchers prepared a list of essential questions to ask all participants while allowing flexibility for in-depth follow-up questions depending on their replies.

The focus group discussions and the follow-up interview emphasised the opinions and voices of students with first-hand experience with the 1+X Certificate System. By involving participants in various research approaches, the study ensured that the perspectives and experiences of those most affected by the system were prioritised. This participant-centred approach provides a more accurate and realistic picture of the 1+X Certificate System's issues, accomplishments, and prospective changes.

### **3.5. Data Collection**

The focus group was held in an online meeting room called Tencent Meeting. The follow-up interview was done separately in private online conference rooms via Tencent Meeting. Tencent Meeting is a Chinese online meeting software that allows clients and users to host and attend meetings anytime and anywhere (Wijaya et al., 2020). Tencent Meeting provides a connecting platform for individuals around mainland China (Wijaya et al., 2020). Following the COVID-19 pandemic, Chinese institutions switched from physical to virtual classrooms. Because my participants are Chinese students acquainted with Tencent Meeting, they found engaging in the focus group and follow-up interviews easier via this platform. Tencent Meeting taped the focus group and the follow-up interview to ensure high quality. The researchers only took notes throughout the recording to ensure that their whole attention was focused on the conversation with the participants. Recording continued until the interview and focus group were completed.

### **3.6. Data Analysis**

This study's data analysis technique includes a thematic analysis of the qualitative data gathered through focus group discussions and follow-up interviews.

Thematic analysis is a flexible and methodical way of detecting, analysing, and interpreting patterns and themes in qualitative data (Braun & Clarke, 2012). The researchers used a thematic analysis to keep the data viewpoint rich and complex while being adaptive (Braun & Clarke, 2006).

## **4. Findings and Discussion**

Following a rigorous categorisation process of the qualitative data obtained from focus group deliberations and follow-up interviews, the findings were distilled into three principal themes: Curriculum, Examination, Career and Future plans.

### **4.1. Curriculum**

#### **4.1.1. The Value of Professional Knowledge and Skills**

The results revealed that completing the 1+X Certificate System indicates that the student has made progress in their studies and gives some assistance with their skills. Skill refers to the capacity to apply one's knowledge in a real-world setting.

In the follow-up interview, the researchers received in-depth explanations of skill development. Participant Jerry stated that, first and foremost, there was a noticeable increase in the breadth of their cognitive understanding of the subject matter studied: "I would say it was through the grind of preparing for the skills test and studying that I began to get a solid grasp on the whole logistics thing."

This clarity required a thorough grasp of the logistics sector, including its components and operations. With a finely tuned knowledge of the subject matter, individuals may independently investigate areas of personal interest in greater depth.

#### **4.1.2. The Importance of Broadening Knowledge**

Although some of the material in the 1+x Certificate is relevant to students' speciality studies, it also contains content that needs to be added. The 1+X Certificate System has numerous



practical uses and increases students' knowledge beyond what is provided in their regular courses.

The researchers' curriculum studies highlight the necessity of teaching students diverse abilities (Sakellariou, 2006). This viewpoint is consistent with the study findings' outcomes. The variety of curricular content in the 1+X Certificate System benefits students.

#### **4.1.3. Enhances Passion for the Industry**

Third, the students emphasised the importance of loving the sector.

When asked, "After graduation, do you intend to continue additional education or work in the logistics industry?" Jerry said, "Currently, there is such a strategy. I am now thinking about it from a larger viewpoint. Even throughout this term of study, I may have a greater understanding and appreciation for this major. I am more of an arts and humanities type, so I was not excited when I first started studying logistics engineering. However, as I have worked through this exam, I have gained insight into the logistics sector. I have realised that logistics is not only about engineering; there is much more to learn. One element I am now interested in is determining how to promote the notion of logistics."

According to Jerry's response, the students have a good attitude about the 1+X Certificate System regarding passion for the industry. The 1+X Certificate System has sparked students' enthusiasm for the sector. In the literature analysis on the history of the 1+X Certificate System, it is claimed that the development of the 1+X Certificate System is focused mainly on supporting vocational and technical students in accomplishing specific career objectives and standing out in particular work positions (Huang, Jun 28, 2021a). An increase in students' enthusiasm for business is particularly advantageous in assisting vocational and technical students in achieving these specific career objectives.

#### **4.1.4. Fostering Personalised Learning Approach**

Students believe their attention to studying improves as they prepare for the 1+X Certificate. However, while discussing enhanced attention, the participants in the focus group did not go into detail on why attention is raised.

The 1+X course took about 6-7 hours due to its minimal material, which featured two reference books and online practice activities. As a result, students needed excellent self-directed learning skills to absorb the information and essential themes from the two volumes. After working on their self-learning skills, students saw increased focus and attention.

The curriculum-related findings addressed my study question. Regarding curriculum, pupils have a good attitude toward the 1+X Certificate System. The 1+X Certificate System curriculum offers students a comprehensive learning experience in various fields, giving them a great advantage from the substance of their academic studies. The 1+X Certificate System's diverse curriculum contributes to students' good attitudes toward it. The 1+X Certificate System courses provide information and skills in various professional sectors. Students find this comprehensive curriculum particularly enticing since it allows them to develop a more extensive range of talents within their academic endeavours, increasing their competitiveness in their chosen industries. It also helps students develop self-directed learning skills.

#### **4.1.5. Suggestions about the Curriculum Update**

Participants who took the test in 2021 remarked that the case studies utilised in the curriculum were from 2018 and 2019. They requested that the learning materials include case studies more relevant to the academic year they are presently enrolled.

According to the findings of student curriculum ideas, students urge connecting the curriculum with current demands. They desire the information they study to stay relevant to the requirements of their future professions, making it simpler for them to transition into the workforce after graduation.

## **4.2. Examination**

### **4.2.1. Suggestions about the Curriculum Update**

The focus group and follow-up interview participants stated that the 1+X Certificate System tests face various problems. The participants' views on the exam material indicate a lack of evaluation that fosters independent thinking and innovation among students.

Second, students had concerns about the rigour of the assessment procedure.

The participants took examinations in 2021, and due to the influence of COVID-19, they took them remotely from home on computers. During the tests, they had to turn on their cameras for surveillance. Because they did not detect the monitoring device, the students concluded that the exam's rigour was low. Participants stated that this perceived lack of stringency raised concerns about the certificates' trustworthiness.

Overall, the data reveal several obstacles and opportunities for development in the 1+X Certificate System test. This satisfies my research question: Students see the 1+X certificate tests as brutal and recommend increasing the breadth of exam topics and the certificate's legitimacy.

Enhancing the certificate's legitimacy suggests that students want to be recognised in the labour market after graduation, which will lead to improved career opportunities.

### **4.2.2. Suggestions for the 1+X Certificate System Examination**

Students propose broadening the test subject to keep it relevant to practical practice. They strive to simplify the integration of graduates into the workplace by ensuring that the test material fits professional needs.

## **4.3. Career and Further Plans**

The next part gives findings on Career and Future Plans based on the follow-up interview analysis.

### **4.3.1. Interest in Continuing Education**

The participant is presently a senior at a vocational undergraduate institution. In her junior year, she took two 1+X certificate tests. In the follow-up interview, the participant was asked, "How has the 1+X Certificate test affected your decision to pursue more degrees, internships, or future employment?" She responded: "It did not have a substantial influence. I believe that numerous things influence the decision to pursue additional education, and this is only one of them. Because this term of study helped me better comprehend and love my major."

However, in her response, she mentioned how the 1+X Certificate has motivated her to continue studying. Studying for the 1+X Certificate allowed her to find areas where she wanted to learn more. During the interview, she stated: "This exam study gave me a better grasp of logistics. I believe that logistics is not limited to engineering, and there is much more to discover. I am now interested in how to promote the notion of logistics." She stated that if she were to continue postgraduate courses in the future, she would prefer to focus on the

development of logistics as a profession. The comments demonstrate that the 1+X Certificate has a beneficial influence on students' decisions to pursue higher education in the future. The participants' university provides the 1+X Certificate System and course instruction, demonstrating institutional support. Because the 1+X Certificate System is not included in the primary vocational higher education curriculum, it is an optional component offered by the local university. The Chinese government's establishment of this policy, as well as its execution at the university level, indicates support for local government initiatives and universities. In this scenario, inspired by local government policies and university assistance, students have a good attitude toward the 1+X Certificate System in terms of their personal future development goals.

## 5. Conclusion

The focus group and follow-up interview results address the research question in three areas: curriculum, examination, and career and future planning. Regarding curriculum, students are generally favourable and satisfied with the 1+X Certificate System. They also made ideas for strengthening the 1+X Certificate System curriculum, indicating a wish for it to be updated regularly. Concerning examinations, students are disappointed with the 1+X Certificate System. They have made proposals to improve the 1+X Certificate System tests to make them more thorough. Regarding career and future planning, students feel the 1+X Certificate System has a good influence on their future decisions. They are pleased with the impact of the 1+X Certificate System on their professional routes and future goals.

## Acknowledgement

This paper is an outcome of the research project "A Study on Students' Attitudes Towards the '1+X' Certificate System in Chinese Vocational Higher Education." Gratitude is extended to all the students and educational workers who participated in this study; their active involvement and valuable feedback have supported the completion of this research. Appreciation is also due to all the interview and focus group discussion participants. Special thanks are given to my supervisor, Dr. Iain Jones, for his selfless guidance and assistance in my research work. Lastly, heartfelt thanks to my family and partner, Skyler Schenke, for their understanding and support of my research endeavours.

## References

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. 10.1191/1478088706qp063oa.
- Braun, V., & Clarke, V. (2012). *Thematic analysis*. American Psychological Association.
- Chen, S., Huang, G., Huang, T., & Xie, C. (2023a). The reform of the training mode of building intelligent engineering technology professionals based on the internet of things smart home 1 + X certificate. *SHS Web of Conferences*, 17110.1051/shsconf/202317103025.
- Chen, S., Huang, G., Huang, T., & Xie, C. (2023b). The reform of the training mode of building intelligent engineering technology professionals based on the internet of things smart home 1 + X certificate. *SHS Web of Conferences*, 17110.1051/shsconf/202317103025.
- Cohen, L., Manion, L., & Morrison, K. (. R. B. ). (2018). *Research methods in education*. Routledge.
- Gaiser, T. J. (2008). Online focus groups. *The SAGE Handbook of Online Research Methods*, 290-306.

- Huang, B. (Jun 28, 2021a). Research on the promotion and implementation of the +X certificate system. Paper presented at the 1608-1611. 10.1109/IWCMC51323.2021.9498763. <https://ieeexplore.ieee.org/document/9498763>
- Huang, B. (Jun 28, 2021b). Research on the promotion and implementation of the +X certificate system. Paper presented at the 1608-1611. 10.1109/IWCMC51323.2021.9498763. <https://ieeexplore.ieee.org/document/9498763>
- Li, J. (2022). Course certificate integration based on wireless communication ‘1+X’ intelligent finance and taxation. *Wireless Communications and Mobile Computing*, 2022, 1-13. 10.1155/2022/2174082.
- Li, J. (2019). *Research on the teaching reform of securities investment course based on the perspective of "1 plus x" certificate system*.
- Liu, G. (2020). *Research on the implementation strategy of "1 plus X certificate" system in higher vocational colleges*. Atlantis Press. 10.2991/aebmr.k.201111.051.
- Liu, & Edwards. (2017). Trilingual education in china: Perspectives from a university programme for minority students. *International Journal of Multilingualism*, 14(1), 38-52. 10.1080/14790718.2017.1258983.
- Qian Li, Wei Lu, & Xingjing Yin. (2019). 1+X certificate system: Progress, problems and countermeasures. *Journal of the National Academy of Education Administration*, 12, 18-25.
- Sakellariou, C. (2006). Benefits of general vs vocational technical education in singapore using quantile regressions. *International Journal of Manpower*, 27(4), 358-376. 10.1108/01437720610679214.
- Shanxue Sun. (2019). Some understandings of the 1+X certificate system . *China Vocational and Technical Education*, 7, 72-76.
- Wei, Z., & Zheng, F. (2023a). Innovation research of “1+X” certificate system in applied undergraduate education. *SHS Web of Conferences*, 153, 01019. 10.1051/shsconf/202315301019.
- Wei, Z., & Zheng, F. (2023b). Innovation research of “1+X” certificate system in applied undergraduate education. *SHS Web of Conferences*, 15310.1051/shsconf/202315301019.
- Wijaya, Ying, & Suan. (2020). *Gender and self regulated learning during COVID-19 pandemic in indonesia*. Universitas Pahlawan Tuanku Tambusai. 10.31004/basicedu.v4i3.422.
- Yang, Q. (2020). Promotion and implementation of “1 X” certificate system in higher vocational colleges. Paper presented at the *The Second International Symposium on Management and Social Sciences (ISMSS 2020)*, 270-275.
- Zheng, F. (2022a). Professional training and tutorial mode of social media SPOCS under the background of “1 x” certificate system. *Mathematical Problems in Engineering*, 2022.
- Zheng, F. (2022b). Professional training and tutorial mode of social media SPOCS under the background of “1+x” certificate system. *Mathematical Problems in Engineering*, 2022, 1-9. 10.1155/2022/9976880.