

MANAGING TEACHING INNOVATIVE PROCESS FOR TEACHERS CORE COMPETENCIES IN VOCATIONAL UNIVERSITIES BASED ON CHINA REFORM NEW POLICY

Wenjing Ma^{1*}, Kuncharee Kakhai²

^{1*,2} College of innovation and management, Suan Sunandha Rajabhat University, Bangkok, Thailand

E-mail: Wenjing Ma: s62484945014@ssru.ac.th^{1*}; Kuncharee.ka@ssru.ac.th²

ABSTRACT

This study aims to address the current challenges in vocational education under the 1+X policy, providing practical response for amending existing policies and offering reliable evidence for further reforms. It emphasizes the importance of adapting university stakeholders to the reformed policies by supplying detailed information for effective management process adjustments. Furthermore, the study serves as a guide for educational and organizational managers to understand the direction needed to cultivate qualified and suitable workforce in line with industry demands. For vocational teachers, this research outlines a clear pathway for career development, enhancing their core competencies in a rapidly evolving educational landscape. Vocational university students will benefit by gaining insight into the learning approaches and objectives tailored to their specific needs and aspirations. Overall, this study contributes to bridging the gap between vocational education and industry requirements, facilitating sustainable development in the sector.

Keywords: Vocational Education; 1+X Policy; . Policy Reform; University Stakeholders.

INTRODUCTION

Management Process Adjustment

1.1 Introduction

The up-to-date teachers' core competencies play a key role in producing achievements of reformed education system (Mandal, 2018; Sulaiman & Ismail, 2020). Since February 2019, the Chinese higher vocational education system has met a new challenge due to a reformed policy promoted by the State Council of the People's Republic of China (Guofa (2019) No. 4). This innovated policy advocated a "1+X" certificate model for higher vocational education, which combines one academic credential certificate with multiple vocational certificates (Huang, 2021; Li, 2019). According to the definition of "1+X" certificate model, a co-growth between specialized knowledge and practical ability could be core conception. Based on the requirement of this model, the academic researchers have suggested a

useful teaching format that is “classroom theory learning + in-school training + out-of-school practice (X certificate)” model (Zhang & Zhang, 2019). Apparently, the improvement of teaching on practical ability could be a new component of teachers’ core competencies under “1+X” certificate model. However, the absence of practical opportunities for teachers has been recognized as a common problem in Chinese vocational education (Steward, 2015). Therefore, the innovative management of teachers’ core competencies could be studied for overcoming this issue leading to enhancement of the teachers’ practical ability.

1.2 Research Questions

The research questions of this study are listed as below:

- 1) What are key stakeholders’ perceptions of innovative managing teaching processes for teachers’ core competencies in vocational universities based on “1+X” certificate policy?
- 2) How do the key factors of teaching innovative process management related to the teachers’ core competencies based on “1+X” certificate policy?

1.3 Research Objectives

The research objectives of this study are listed as follows:

- 1) To investigate key stakeholder perceptions of managing innovative teaching processes for teachers’ core competencies in vocational universities based on “1+X” certificate policy.
- 2) To develop a model of a relationship between key factors of teaching innovative process management and teachers' core competencies.

1.4 Research hypotheses

There are significant relationships between teachers' core competencies and key factors of teaching innovative process management.

1.5 Expected benefits

The current study will contribute to literature in the innovative teaching management in vocational education in the area of policy implementation. Furthermore, the study also informs those who are policymakers, university stakeholders, educational or organizational managers, educators, vocational teachers, and vocational students in China.

In terms of policymakers, this study will transmit the practical response for correcting the exist policy and providing reliable evidence for reforming. In addition, the university stakeholders will acquire the detailed information to adjust their management process for successfully implementing the reformed policy. Meanwhile, educational or organizational managers will realize the current direction to cultivate the suitable and qualified working people. Consideration of vocational teachers, the current study will make a clear guideline for career development. For students studied in vocational universities, they will recognize the approach and purpose of learning.

1.6 Terminology

This proposal refers to theoretical definitions that are listed as below:

- 1) Teachers’ core competencies: skills and knowledge that enable a teacher to be successful in maximizing student learning.
- 2) China reform new policy: an action of updating the established policy based on the development of Chinese society.
- 3) Vocational university: a higher education organization specially cultivates students to work as a technician.
- 4) Key stakeholders: a group of members who have power and ability to prevent the project from achieving successful consequence.

- 5) “1+X” certificate model: a model for tight combination of academic education with professional training. “1” means the academic credential certificate and “X” represents several vocational certificates.
- 6) Double-Professionally-Titled Teachers: teachers with academic educational certificate and practical operation ability.

LITERATURE REVIEWS

Chinese higher vocational education has experienced four significant stages based on the development of international and domestic society. In the recent stage, “1+X” certificate model, a reformed policy, refers to a tight combination of academic education and skills training, has been implemented in majorities of higher vocational education institutions. The promotion of this model is originated from national requirement coupled with international background. Furthermore, the “Double-Professionally-Titled” Teachers in Higher Vocational Colleges (TCDTHVC) was suggested to be a updated teachers’ core competencies in line with the core conception of “1+X” certificate model.

2.2 Concept, theories, and research results

China reform new policy for vocational education

Following the global and national economic development, the capabilities of human resource also meet the reforms and the education plays a major responsibility for providing adequate workers on the nation’s human resource market (Kreysing, 2001). Since a global reform of education, Vocational Education and Training (VET) has been welcomed worldwide and also introduced to China as a suitable career pathway for youths (Steward, 2015). The vocational education was first introduced to China in the 1960s, which was completely separated from general education since its initial establishment. The educational structure in China is illustrated in Figure 1 (Steward, 2015).

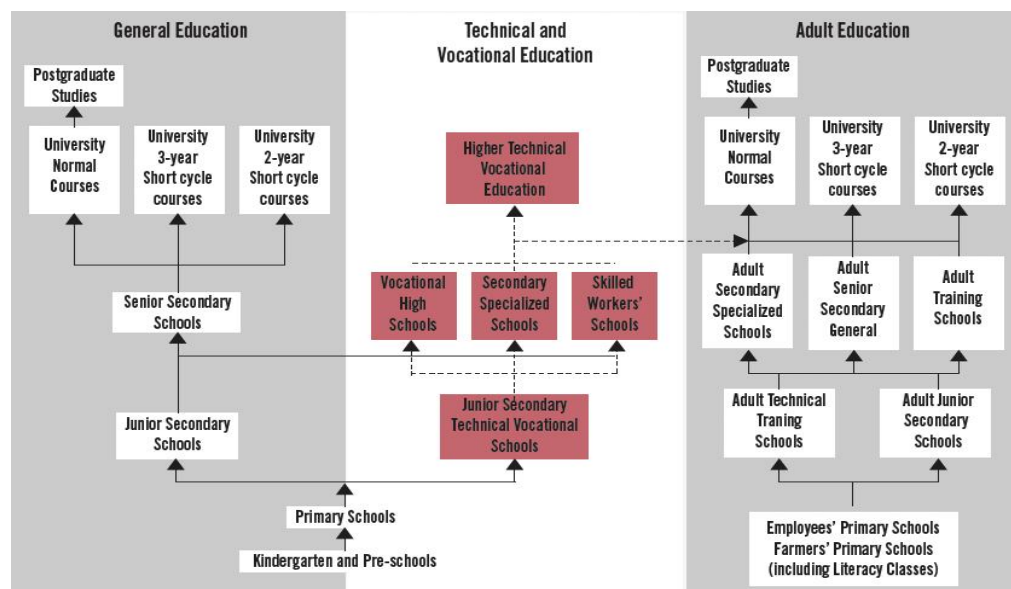


Figure 1 The contemporary educational structure in China. Source: Steward (2015, 15)

Subsequently, the higher vocational education earns the dominant development in China based on the international experiences and current development of Chinese society. The vocational universities, as an inseparable part of higher vocational education that plays a dominant role in preparation of students with profound expertise for future working ability coupled with degree. During the initial stage, the value of vocational universities had been underestimated by the society considered as a group of students with poor academic grades (Wang, 2021). According to the current global and Chinese society, the Chinese Ministry of Education's director of vocational and adult education mentioned that vocational and academic education share "the same important status" (I-Ming Wang, 2005; Li, 2019). Therefore, the innovative establishment of "Top Higher Vocational Colleges" is proposed by Chinese government led to transformation of "Non-top and New-born Undergraduate Universities" into "Application-oriented Undergraduate Universities" (Li, 2019).

Since year of 1999, the enrollment of vocational universities was expanded (Fan, 2020) because Chinese government dramatically alter its attention to this field and established 30 beneficial policies to enhance the its development (Fan, 2020). The reforms of vocational universities experienced four significant steps including Stage 1 (1999–2005), Stage 2 (2006–2010), Stage 3 (2011–2018), and Stage 4 (2019–present), respectively (Fan, 2020). The "1+X" certificate model was issued in Stage 4 (Fan, 2020) by The State Council of the People's Republic of China to enhance the quality of vocational universities. The background of "1+X" model is based on the international and domestic experiences.

In terms of the international experiences, the best achievement was dual apprenticeship training in German (Forster, Bol, & van de Werfhorst, 2016; Haasler, 2020; OECD, 2018) led to extremely lower rates of youth unemployment even during the financial crisis (Haasler, 2020). The dual apprenticeship training refers to a combination of academic leaning and occupational skill training to facilitate the transition from school to work (Haasler, 2020). Thus, the duration of on-the-job training is dramatically decreased for the workplace but the productivity is significantly increased (Forster & Bol, 2018). After that, a series of reforms related to vocational education has been performed in several developed countries, such as the United States and Australia (Clayton & Harris, 2018; Kreysing, 2001). Apart from the international experiences, the previous evaluation system of Chinese vocational education, namely double certificate scheme, showed the apparent disadvantages in the context of current Chinese society (Duan & Yelin, 2018; Sun, 2019). Firstly, the school-based education was not compatible with vocational training led to the extra time for skill training (Duan & Yelin, 2018; Yuan, 2020). Secondly, the shortage of financial and human resources delayed the process of double certificate scheme (Duan & Yelin, 2018). Finally, the absence of national standard for vocational certificate induced the chaos of evaluation by various stakeholders (Duan & Yelin, 2018).

Regarding the detailed contents of "1+X" model, "1" means the academic credential certificate. It is well known that the academic degree is crucial indicator for judging the ability of graduates. Moreover, "X" represents several vocational certificates, which is the target for vocational education. Additionally, "+" indicates the tight association between academic credential certificate and multiple vocational certificates. Furthermore, "1+X" requires school and public or private enterprise engage in the vocational education and all the involved institutions intergrade different effects on achieving the goal of higher vocational education. Additionally, the setting policies of vocational certificates are decided by the stakeholders and requirement of market (Sun, 2019; Yuan, 2020).

New policy for teaching model in vocational universities based on the “1+X” certificate model

It is widely accepted that a creative and supportive teaching system exerts a significant and necessary effect on successful education (Clayton & Harris, 2018). Since the “1+X” certificate model was launched in China, a wide range of collaborative study was performed by Zhang and co-researchers. They designed a applicable teaching model of “classroom theory learning + in-school training + out-of-school practice (X certificate) model” (Zhang & Zhang, 2019). This model was then carried out and acquired the positive results by some vocational universities (G. Liu & Wang, 2020). Furthermore, the curriculum was also been intensively considered by educators, a “combined and diversified 'multi-process' curriculum structure” was conducted suggesting that multi-dimension course content was selected coupled with learning based (W. Liu, 2019).

The construction of a national standard teaching model under the model of “1+X” certificate is still on the process. Even the stakeholders, educators, and managers have tried to search the optimal ways to encounter the establishing a teaching system, few studies were performed to explore this issue. Currently, Chinese educational researchers have investigated the dimension and core concept of “1+X” model discussed that the double ability of teachers might be a core problem (Fan, 2020; Ling & Chen, 2021; G. Liu & Wang, 2020). Thus, the model of “Double-Professionally-Titled” Teachers in Higher Vocational Colleges (TCDTHVC) was suggested and recognized as a crucial teachers’ core competencies (J. Liu & Zhou, 2019). The researchers reviewed that academic teaching ability and practical ability with qualified operating levels must be tightly connected to each vocational teacher. Unfortunately, several problems including the structure of double teachers in vocational colleges and universities; little practical experience; poor salary; and low social status are existed in the present stage, which inhibit the implementation of reformed teaching system (J. Liu & Zhou, 2019). Therefore, the necessary step for cultivating TCDTHVC could concentrate on the construction of applicable teaching system. Unfortunately, the applicable routines for cultivating qualified “Double-Professionally-Titled” teachers have not been elucidated based on the report of The Central People’s Government of the People’s Republic of China (Xinhua News Agency, 2020).

Innovation process management (IPM)

It has been widely accepted that innovation plays a key role for survival and growth of an organization (Eveleens, 2010), resulting in the occurrence of several types of innovation by mankind (Verloop, 2004), such as reformation of democracy by government (A. Dahl, Shapiro, & Antonio Cheibub, 2003). However, innovation does not represent successful consequences that were accompanied by risky and uncertainty endeavor. Additionally, the process of innovation might be complicated based on the comprehensible vision and strategy of reformers (Errida & Lotfi, 2021). Several researchers and practitioners pointed that a sequential step of management could be crucial for innovation, probably avoidance of negative results of innovation (Eveleens, 2010). Based on this reason, IPM draws numerous intensive attentions in recent decades (Eveleens, 2010; Kylliäinen, 2018).

IPM refers to a approach of nurturing the new ideas for innovation and transition of new ideas into practice (Kylliäinen, 2018). A cycle of innovation management was suggested in Figure 2. Based on this cycle, the initial step could point out influenced factors of innovation from previous researches on successful projects. According to previous empirical experiences, a suitable model could be developed for practicing the management process. During the practicing period, the effects of management should

be evaluated probably leading to the formation of new insights that could be coupled with established theories. Finally, the combination of new and old visions will be further applied for establishing an updated management model to push the positive outcome of innovation.

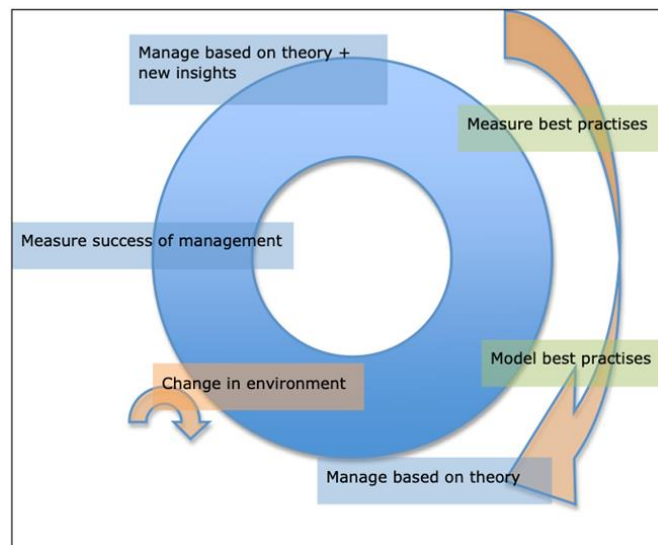


Figure 2. Cycle of research and practice.

Source: Eveleens (2010, 3)

Furthermore, innovation process model is established via intensively research to guide the approach of innovation. Obviously, a wide range of models have been developed based on various variables and purposes. Furthermore, the development of models experienced six generations becoming more and more complicated and cooperated to adapt for the current society (B Motilal, K. Sankat, & Fai Pun, 2015). So, it is interesting to investigate the features of existed models to gain adequate knowledges for developing new models. Almost all innovations are started from the intensive study to initially explore the factors involved in IPM (Eveleens, 2010). For instance, factors exert effects on teaching innovative process could be explored firstly for further procedures of innovative teaching process management

Factors of teaching innovative process

It has been revealed that the learning strategy was significantly enhanced via the innovative teaching approaches (Omur & Argon, 2016). However, innovating the teaching approaches is a challenging issue due to complicated factors involved in the teaching innovative process. The body of literatures were performed to investigate the various related factors. A systematic review paper summarized that successful teaching innovative process is strongly affected by teachers' innovative behavior (Zainal & Matore, 2019), which is affected by the demographic factor, the individual factor and the organization factor (Zainal & Matore, 2019). In addition, the innovation process is also influenced by social environment, such as underestimation of higher education (Savina, 2019).

In addition, several studies also studied this filed in detailed visions including enhancing ability of managing curriculum and knowledge; providing sufficient budget for learning source; providing

efficient program for staff development; and establishing efficient networking with other school teachers for sharing knowledge and self-development (Prasertcharoensuk, Somprach, & Ngang, 2015). Furthermore, the training aspects for enhancing the abilities of teachers are also concerned, referring to psychology of education, general pedagogy, teaching specialized discipline, sociology of education, classroom management, computer assisted instruction, teaching practice (Turturean, 2013).

Therefore, the consequence of innovation is affected by the demands of the society and the desirability of people that are absolutely dynamic elements, resulting in the hardships for innovating the teaching approaches and strategies.

Vocational Teachers' Competencies

Nataša Pantić (2011) studied the meaning of teacher competence in contexts of change by a sequential exploratory qualitative-quantitative mixed-method from five countries in the Balkans (Pantic, 2011). The researcher defined teachers' competencies in three broad streams; theory and practice, teachers' roles as change agentry, and teachers' beliefs in their career. The results showed that teachers competencies were self-evaluation, professional development, subject knowledge, pedagogy and curriculum, contribution to education system development, values, and child rearing. Generally, teacher competency refers to skills and knowledge that enable teachers to perform quality tasks and, most importantly, to expand learners' learning levels (Nessipbayeva, 2012). More specifically, competencies include the knowledge, skills, and values of teachers (Nessipbayeva, 2012). In the 21st century, teachers' competencies have been changed. Sulaiman & Ismail (2020) studied Teacher Competence and 21st Century Skills in Transformation Schools 2025 (TS25) in Malaysia, using a quantitative approach (Sulaiman & Ismail, 2020). The findings showed that there is a robust and positive relationship between professional competence and 21st century skills among teachers and also the significant contributors to 21st century skills are personal characteristics, pedagogy, professional, information and communication technology (ICT), as well as school management and development. In a nutshell, teachers competencies refer to the knowledge, skills, and attributes that enable teachers to perform their professional duties effectively.

However, all of the above meanings are for secondary school teachers only. The objective of this research is to study vocational university teachers' competencies. Therefore, it is necessary to search further about this topic. Begin with the work of Muhammad Aiman Bin Arifin (2017) who studied the competent vocational college teacher competencies in Malaysia with a quantitative research (Muhammad Aiman Bin Arifin, 2017). The proposed models of vocational college teacher's competence for the 21st century are teaching competency, professional competency, communication competency, and personal competency. Again in Malaysia, Muhammad Aiman Bin Arifin et al (2018) studied further competencies of vocational teachers: A personal measurement framework by an exploratory sequential mixed-method approach (Muhammad Aiman Arifin, Roziah Mohd Rasdi, Mohd Ashraff Mohd Anuar, & Muhd Khaizer Omar, 2018). The proposed measurement models were confirmed by teacher competencies model in the 2017 study. The first competency is a teaching competency which requires the teacher's ability to manage classroom activities and to design teaching and learning techniques. (2) Professional competency ensures vocational teachers need to master knowledge and skills related to the world of work. (3) Communication competency helps teacher to perform effective communication with students in learning and with key

stakeholders. (4) Personal competency might enhance teachers level of competency for effective job performance, especially to adapt themselves to a dynamic environment.

In Thailand, Kritsana Thongkam, Peerawat Suwanjan, & Phadungchai Pupat (2018) studied vocational college instructor teaching competency through a quantitative study using two sets of questionnaires as tools (Thongkam, Suwanjan, & Pupat, 2018). The study objective is to analyze factors of teaching competency. The findings indicated that there are three factors including knowledge, skill, and attributes. Firstly, knowledge factor; classroom management was found to have the greatest importance. Secondly, skill factor; measurement and evaluation skill were found to have the greatest importance. Finally, attributes factor; attitudes towards the teaching profession was found to have the greatest importance. After that Lolo & Sudira (2019) studied competency profiles of vocational high school teachers in Indonesia by a quantitative reserves research (Lolo & Sudira, 2019). Detectives to describe teacher competencies and the performance of teachers in vocational high schools by using a questionnaire to collect data. The results found that teacher competency profiles consisted of pedagogy, professional, personality, and social competence. The teacher performance is listed in the following order; social competence, personality competence, professional competence, and pedagogy competence. The same year in Indonesia but a different time focus, Wagiran et al (2019) studied the competencies of future vocational teachers (Wagiran et al., 2019). By the future, they mean the workforce era that will be moved as Industrial revolution 4.0 and Society 5.0. The research objective was to identify the core competencies for future vocational teachers through qualitative research by analyzing empirical data and setting Focus Group Discussions from nine different expertise fields. They found that there were two types of skills; hard skills and soft skills. The hard skills are content, student, technology, and cubiculum while the soft skills are living in the world, methods of working, ways of thinking, and tools of working.

2.2 Conclusion

Chinese vocational education has experienced four stages of innovation based on the global and national requirement. Meanwhile, the innovation of teaching system is also reformed simultaneously. Recently, “1+X” certificate model has been established since February 2019 requiring a co-growth of theoretical knowledge and practical skills. Furthermore, the professional techniques are certified follow the specific guideline. It is widely accepted that clear that lack of practical ability has been a significant problem to delay the implementation of “1+X” certificate model because traditional teaching is only concentrated on the academic field instead of practical ability. Previously, practical training is mainly performed by technicians who work in the enterprises to supplement the drawbacks of vocational education. However, the separation of two teaching system is absolutely opposite to the core idea of “1+X” certificate model. Subsequently, TCDTHVC was suggested to be a teachers’ core competencies connecting academic level and practical ability. Unfortunately, this advanced model is not successfully implemented in higher vocational education since the innovative process of updated teachers’ core competencies is still obscure probably due to the absence of practical study. Therefore, the current study will create a model to explore relationship between key factors of teaching innovative process management and teachers' core competencies.

2.3 Conceptual framework

Because of a mixed-method design, the researcher used the combination approach, descriptive and diagram to set up the conceptual framework, shown in Figure3below.below.

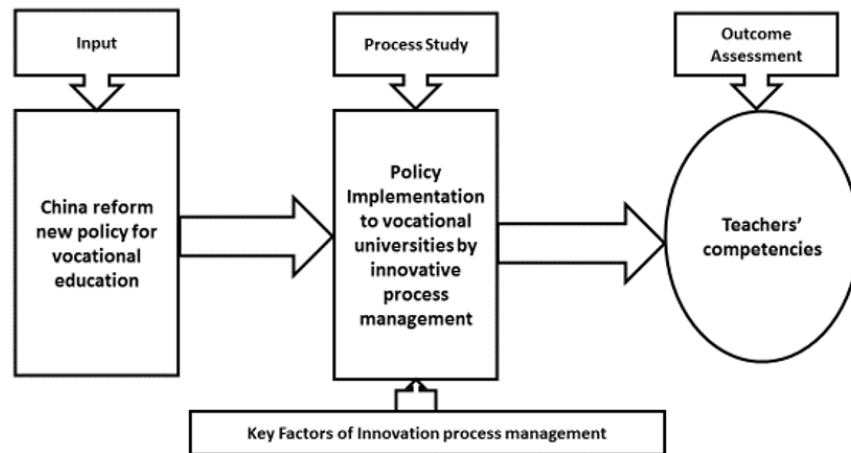


Figure 3. The Research Framework.

From Figure 3, the Chinese government has developed a policy to reform vocational education and led to implement in vocational universities. The university has brought the mentioned policies into practice by “1+X” certificate model with the concept of the innovation management process. The result is the enhancement of teachers' competencies. The project has key stakeholders, namely executives, teachers, and students. Therefore, this research begins with an exploration of the policy implementation process based on the practical experiences of key stakeholders. Next, it aims to assess the level of university teachers' competencies. Finally, it needs to find out the relation between the key factors of the innovative management process and teachers' competencies.

RESEARCH METHODOLOGY

Chapter three presented a research design, informant group, population and sample size, data collection techniques, and data analysis as detailed.

3.1 A sequential qualitative-quantitative research Design

According to the major purpose of this study referring to develop a model of a relationship between key factors of teaching innovative process management and teachers' core competencies, the basic assumptions of methodology should be suitable for constructing a principle for large population, resulting in consideration of sequential exploratory mixed method approach composed of qualitative study followed by quantitative research. The results originated from qualitative and quantitative study explain the research issues with profound depth and width. Firstly, the qualitative study, a beneficial way to investigate the problems in-depth, will be done to collect and analyze the data acquiring the qualitative findings probably generation of a survey. Subsequently, the qualitative findings will be implemented to the quantitative approach that tests the qualitative findings in large population to identify the effectiveness. Therefore, the combined conclusions will make researchers generalize the findings to a

population. Based on these reasons, a sequential exploratory mixed method approach will be performed in the current study.

Regarding to the current study, the first phase (Phase I) will be a qualitative approach with case study to investigate key stakeholder perceptions of managing innovative teaching processes for teachers' core competencies in vocational universities based on "1+X" certificate policy. During this step, face-to-face interview with stakeholders who have been implemented the "1+X" certificate model will be performed in small groups. The discussions will be an open-topic regarding the teachers' core competencies under the "1+X" certificate model or coupled with post-pandemic re-shaped education system using Chinese language. Subsequently, the results from the qualitative study will be collected and analyzed to generate a questionnaire. Progress to the second phase (Phase II), the questionnaire will be implemented to test the qualitative findings in a large population including academic administrators, teachers, and students. The participants will respond to the listed items to evaluate the relationship between key factors of teaching innovative process management and teachers' core competencies. The degree of association based on their judgement. The score will be ranged from 1-5 representing Extremely related, Related, Reasonably related, Less related, and Totally unrelated, respectively. Meanwhile, the participants will be allowed to give the remarks based on their individual experiences. Then, the results will be collected and analyzed based on questionnaire. Consequently, the integrated results from Phase I and Phase II will be used for generating the final outcome.

3.2 Research process

3.2.1 Case selection

The criteria of the current study will be 1). Chinese vocational university; 2). implementation of "1+X" certificate model; and 3). acceptance of TCDTHVC. The major researcher searched the eligible vocational universities from a national vocational education database coupled with limited geographical location including Beijing, Shanghai, Chongqing and Kunming which are political capital, financial capital, major source of technicians, and an open-gate facing Southeast Asia countries, respectively. A total of six vocational universities will be recruited in this study including Yunnan University Dianchi College, Yunnan Urban Construction Vocational College, Chongqing College of Humanities, Science & Technology, Chongqing Industry Polytechnic College, Beijing Polytechnic College, and Shanghai Institute of Technology. The latter two universities are located in Beijing and Shanghai, respectively, which could have representative value. However, our preliminary study suggested that several privileges for teachers' resource and government policies are possessed by these two cities. Additionally, the academic education of advanced scientific field acquires more concerns than vocational education by the local government since most qualified technicians graduated from other provinces pursue to work there. Therefore, these two universities were removed from this study due to less representative value. As a result, Chongqing College of Humanities, Science & Technology and Chongqing Industry Polytechnic College in Chongqing municipality as well as Yunnan University Dianchi College and Yunnan Urban Construction Vocational College in Kunming, Yunnan. Consideration about Chongqing, the development degree of vocational education is considered as the average level within the country and the large population of technician working in China is graduated from Chongqing. In addition, Kunming, a central city of Yunnan province that is a border between China with Lao, Cambodia, and Myanmar. Based on the benefit of geographical location, the vocational education is gained the support by Chinese government for exporting qualified technicians to domestic and international markets. Finally, research funding is another challenge issue for the study, the

economical requirement of Chongqing and Kunming is reasonable and affordable by this study. Based on these reasons, the vocational universities originated from these two cities could be better candidates for the current study.

3.2.2 A preliminary study

A preliminary study was conducted at the meeting room of the department of human resource, Yunnan Urban Construction Vocational College. The two stakeholders of Chinese vocational universities and one manager from a private company were invited to discuss the topic about the several aspects of vocational education in China including the advantages and disadvantages; the geographical distribution; the government policy; the benefits and hardships of implementing “1+X” certificate model; the possible solutions and management process for establishing “Double-Titled-Teachers” in vocational institutions; and the expectations of enterprise regarding to “1+X” certificate model.

3.2.3 The qualitative study phase

3.2.3.1 Data collection

The researcher chose to use two data sources, namely official reports and people. The paper is related to implementing all relevant teachers' competency reform policies. For the informants, the researcher elected representatives of the management and academic departments involved in implementing reforms in the universities, four people, a total of 4 universities, totaling 16 informants.

Table 1 The data collection for qualitative phase in each university

University	Tools, Data source, and Informants	Number of sources and informants
1	Official reports	Two
	A focus group interview in the same room	four
2	Official reports	Two
	A focus group interview in the same room	Four
3	Official reports	Two
	A focus group interview in the same room	Four
4	Official reports	Two
	A focus group interview in the same room	Four

3.2.3.2 Data analysis for qualitative study

The validity of the content will be checked by submitting the interview results back to the informant group representative for confirmation. The reliability of the content can be done by taking some content from interviews and analyzing it by two people, namely university research experts, and the researcher. If the consistency is 80% or higher, the data is reliable.

3.2.3.3 The steps of qualitative data analysis

Prepare the interview process. The interview process will be separated into two groups, which are two stakeholders with one manager in each group.

Introduce the topic. The topics will refer to the several aspects of “1+X” certificate model based on the teaching system and the format of discussion will be open-mind. The informants could share their opinions based on personnel working experiences.

Organize and prepare the data for analysis. The whole procedure will be recorded by the researcher, then summarize the related points and organized the structure to the final report.

Check up the data. The members of research group will read through the report and recheck it via the recording.

Start coding all of the data. All acquired data will be categorized and labelled by specific terms.

Sorting the data. The major researcher will shape all acquired data into different dimensions.

Checking up the validity. The member checking approach will be used for validity procedures. The major findings will be sent via email and reviewed by informants, results in the chance to comment the findings.

3.2.4 The quantitative study phase

3.2.4.1 Unit of analysis

The current study will include three units, which are administrators, teachers and students, respectively.

3.2.4.2 Population and sample

The numbers and distribution of population are shown in Table 2. The sampling design for this study is simple random sampling, the recruited sample size in each group will be calculated according to the Yamane formula (Israel, 1993)

Table 2 The numbers and distribution of participants

University	Types of Population	Number of Population	Sample size
Yunnan University Dianchi College	administrators	24	24
	teachers	100	51
	students	6,000	98
Yunnan Urban Construction Vocational College	administrators	19	19
	teachers	33	33
	students	3,457	98
Chongqing College of Humanities, Science & Technology	administrators	176	64
	teachers	1,152	91
	students	2,200	95
Chongqing Industry Polytechnic College	administrators	234	70
	teachers	790	79
	students	1,500	95
Total: 4		15,685	817
The sample size of the population in each group are calculated according to the Yamane formula (D. Israel, 1993) $n = \frac{N}{1+N(e)^2}$, N is the population size and e is the level of precision			

3.2.4.3 Instrumentation

The instrument uses to collect data was a 5-level assessment questionnaire divided into three parts. The first part was the basic information of the respondents, the second part was the questionnaire

on factors related to the success of the teacher competency development process, and the third part was It is a questionnaire estimating the five levels of teacher competency.

For the quality of the tool, The researcher will find the validity of the tool by content validity, giving seven qualified professionals in vocational universities to check the content. The Item Objective Congruence (IOC) Index is used to screen the item quality. Acceptable validity values are .60 or higher . For the tool's reliability, 30 vocational teachers from other vocational universities that are not a sample group will check the questionnaire to test the tool to determine the reliability. Acceptable reliable values are .60 or higher.

3.2.4.4 Data collection

3.2.4.5 Tools for collecting data

The questionnaire will be allocated via a Chinese App, named “Wen Juan Wang” (in Pinyin) (www.wenjuan.com). The questions will be designed via this App according to the informants’ suggestions and the abilities of vocational teachers supposed by The State Council of the People’s Republic of China and previous literature review. The quality of designed questionnaire will be evaluated by independent three stakeholders and three vocational teachers.

Process of collecting data

Since the quality of questionnaire is tested, the advance-notice letter will be sent to each participant via email. Then, the link of the survey generated by “Wen Juan Wang” automatically will be distributed about one week of the advance-notice letter. The third email will be sent around eight days after the questionnaire for follow-up. After three weeks, the final email will be sent to notice the nonrespondents.

Furthermore, the survey will be answered anonymously by the target population. In addition, this App will calculate the time spending for each respondent to evaluate whether the questions are answered carefully. Finally, the researcher will set up the reward in the App for each respondent.

3.2.4.5 Edit data

A table will be constructed to describe the number of respondents and nonrespondents. During the process, the response bias will be determined via wave analysis. Furthermore, a descriptive analysis will be done to identify the missing data. According to the percentage of missing data, the major researcher will consider whether a useful strategy will be carried out for replacing missing data.

3.2.4.6 Data analysis for quantitative study

The Statistical Package for the Social Sciences (SPSS) will be used for data analysis. For the quantitative study, the demographic data including age, gender, educational degree, academic position, and working experience will be analyzed by descriptive statistics. The Kolmogorov–Smirnov test was performed to test normal distribution of data. Furthermore, Correlation coefficients were determined using the Pearson product-moment correlation coefficient method for normal distributed data or using the Spearman's Rank correlation coefficient method for non-normal distribution data.

DISCUSSION

Impact of Policy Implementation: The study finds that the "1+X" policy significantly contributes to enhancing teachers' competencies, especially in improving teaching quality and

professional skills. Challenges such as uneven resource distribution and varied implementation outcomes are noted.

Role of Training Processes: Training processes play a crucial role in enhancing professional skills of teachers, though the practicality and adaptability of training content remain areas for attention.

Importance of Knowledge Transfer: Knowledge transfer is key in linking policy, training, and the enhancement of teachers' competencies, crucial for the application of innovative teaching methods.

Research Limitations and Future Directions: The study is limited by its sample scope and methodology, suggesting future research should consider a broader sample and diverse methods.

CONCLUSION

This study, exploring the enhancement of vocational education teachers' competencies under China's "1+X" policy, underscores the importance of innovative teaching process management. The findings indicate that policy implementation, training processes, and knowledge transfer are vital for enhancing teachers' abilities. These insights are significant for policy makers and educators in vocational education, providing valuable direction for similar future research.

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