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Opportunities and Barriers of Integrating the 1+X Certificate System into Nursery Teacher Education in China

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ABSTRACT

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The development of high-quality vocational education is a critical factor in establishing a robust economy. Therefore, every nation places significant emphasis on the quality of teaching and learning within vocational education. This study investigates the use of the 1+X Certificate System to enhance teaching competence among nursery teacher students in China, with a particular focus on the experiences of Early Childhood Education (ECE) teacher educators who support their students during their teacher education. Employing a qualitative research design, the study conducted four in-depth case studies of ECE teacher educators who integrated the 1+X Certificate System into the nursery teacher education curriculum at a college in China. The findings of the study reveal the 1) Alignment with the Existing Curriculum; 2) Effectiveness in Teacher Education; and 3) Adequacy of Teaching Resources; and 4) Establishing Partnerships with Nursery Schools that ECE teacher educators encountered in utilizing the 1+X Certificate System to improve the teaching competence of nursery teacher students. This study contributes to the ongoing discourse on the integration of the 1+X Certificate System into nursery teacher education programs. The implications of this research may inform future efforts to enhance the quality of nursery student teacher education, leading to the development of a highly skilled workforce in the ECE sector.

1. Introduction

Nursery teacher education is a fundamental aspect of enhancing the quality of early childhood education (ECE), as it plays a crucial role in the psychological development and well-being of young children [1]. ECE serves as a vital milestone for young children's future learning and success by providing them with a supportive and nurturing learning environment [2,3]. Nursery teachers who have received professional training have the potential to positively influence the academic [4], social [5], emotional [6], and physical development of young children [7]. Effective nursery teacher education programs offered in vocational and technical colleges (VTCs) impart the necessary skills, knowledge, and competencies required to support young children's learning, cultivate creativity,

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promote healthy development, and establish meaningful relationships with children and their families [8]. Consequently, various countries, such as the United States [9], the United Kingdom [10], Australia [11], and Japan [12], are focused on enhancing the level of teaching competence among nursery teachers through educational reforms.

In 2019, China's Ministry of Education (MOE) implemented the 1+X Certificate System as part of the country's vocational education reform. This system allows students to earn both a vocational education certificate and an occupational skill certificate. A Vocational Certificate is granted upon completion of a VET course, while the Certificate of Occupational Skills is awarded based on standardized tests that assess a student's vocational proficiency. The 1+X Certificate System has been adopted in various industries, including early childhood education (ECE), to enhance the teaching skills of nursery student teachers. Different subjects of assessment place diverse demands on the teaching competences of pre-service nursery teachers. At the same time, the 1+X certificate system is currently in its pilot phase, resulting in a scarcity of research on the effective integration of this system into the curriculum for Early Childhood Education (ECE) teacher educators.

The purpose of this study is to explore the challenges and barriers faced by ECE teacher educators in their efforts to enhance the teaching competence of nursery student teachers through the utilization of the 1+X Certificate System in China. Specifically, this study aims to provide a comprehensive and in-depth understanding of the teaching experiences of ECE teacher educators who support their students during their teacher education, with a particular emphasis on the Early Childhood Education (ECE) context. The study is guided by two research questions that aim to identify the problems encountered by ECE teacher educators and to identify effective strategies to enhance the teaching competencies of nursery student teachers.

- i. Research Question 1: What are the main challenges faced by ECE teacher educators when integrating the 1+X Certificate System into the nursery student teacher curriculum?
- ii. Research Question 2: What are the potential solutions for addressing the challenges faced by ECE teacher educators when integrating the 1+X Certificate System into the nursery student teacher curriculum?

2. Literature Review

2.1 Nursery Teacher Education

Nursery teacher education is a critical area of study that provides comprehensive preparation for individuals working in the care of young children from infancy to four years of age [13]. The curriculum includes training in young child development [14], early education [15], classroom management [16], intercultural communication skills [17], and information and communication technology (ICT) [18].

Nursery teachers are widely acknowledged as playing a crucial role in the learning experiences of young children in nursery school, with their teaching abilities greatly impacting how children learn [19]. Consequently, scholars have increasingly focused on the quality of nursery teacher education. In an empirical study investigating the professional profiles of early childhood education teachers in Western Europe, Melnyk *et al.*, suggested that future research should concentrate on enhancing the quality of teacher education through educational policies and qualification requirements for professional training of early childhood education teachers. Similar studies have been conducted in Japan, aiming to improve the teaching competencies of nursery student teachers through teacher education institutions [21]. As social, cultural, and economic situations evolve, Japan has reformed

teacher certification and improved the quality of teacher training programs to enhance the quality of teacher education.

Comprehensive and ongoing professional development is crucial for nursery teachers, and developing a reflective practice is equally important, as highlighted in the literature [22]. Effective nursery teacher education should encompass both theoretical and practical knowledge, with emphasis placed on developing positive relationships with young children, families, and communities [21]. However, research on improving the competence of nursery student teachers in vocational education is limited. Understanding the unique challenges and opportunities in this context can inform efforts to enhance the quality of nursery teacher education and ultimately improve the learning experiences of young children. Prioritizing research in this area is crucial to ensuring that nursery student teachers receive the necessary training and support to provide high-quality education to young children.

2.2 Nursery Teacher Education in China

The origins of Chinese nursery teacher education can be traced back to the early 19th century when Suzhou, China offered its first course for training nursery teachers. Initially, the primary focus of nursery teacher education was on providing care and basic education for young children [23]. However, after the implementation of the Kindergarten Teacher Qualification, the nursery teacher education curriculum expanded to include a more comprehensive approach to young child development. The 14th Five-Year Plan for the Development of Health Talents [25] highlights the significance of early childhood education in promoting children's development, as well as the need for high-quality nursery teacher education. As a result, the awareness of the importance of high-quality nursery teacher education has been increasing in China.

Numerous studies have examined the current state of nursery teacher education in China. For instance, Chen and Yuan investigated the professional identity of nursery teachers in China and found that many teacher education programs lack research on the development of professional standards and the teaching competencies necessary for nursery teachers in child care institutions. Similarly, Suo and Wang conducted a study on the professional development needs of nursery teachers in China and found that there is a lack of professional standards for teacher education, and ECE teacher educators rely on their own experiences to cultivate teaching competencies. Thus, it is urgent to establish professional standards for nursery teacher education programs in China to ensure that they have the necessary skills and knowledge to foster the development of young children.

Although there have been efforts to enhance nursery teacher education in China, several challenges still require attention. These challenges involve a deficiency of resources and support for teacher training programs, as well as an insufficiency of qualified nursery teacher educators [27]. Further research is necessary to develop effective teaching strategies and address these challenges, so as to improve the teaching competencies of nursery student teachers in teacher education programs in China. It is essential for China to overcome these challenges to ensure that its nursery teacher education programs can provide high-quality education and care for young children, which is crucial for their development and well-being.

2.3 Overview of the 1+X Certificate System

The Chinese government's initiative to reform the vocational education system introduced the 1+X Certificate System in 2019 [31]. The framework is designed to offer vocational education and occupational skills training, providing students with flexible and diversified educational and

employment opportunities. As a major component of the Chinese government's strategy to create a skilled workforce and support the country's economic growth, this educational framework is of great significance.

Although still in its pilot stage, the effectiveness of the 1+X Certificate System has been explored through several empirical studies. Zhong's findings suggest that the system positively impacts the construction and development of courses. According to Xiang, the system offers students the opportunity to customize their education and training to align with their interests and career objectives, while also providing them with a wider range of knowledge and skills through general education courses. Similarly, Liu's research revealed that the 1+X Certificate System improved the quality of vocational education by integrating general education courses into the curriculum. These studies underscore the potential benefits of the 1+X Certificate System for vocational education and training in China

Despite its potential advantages, the implementation and integration of the 1+X certification system into vocational and technical education (VTE) curricula by teacher educators face challenges. One key challenge is the difference in orientation between the existing talent training objectives and the skill certificate objectives. The former is based on the training objectives of the Ministry of Education for diplomas, while the latter follows the requirements of the employment standards of enterprises. This has resulted in deviations between the talent training target positions and vocational certificate positions in higher education institutions [32]. Empirical studies have suggested that the overall planning of the 1+X certification system is not yet perfect, and practical cases are needed as reference. Additionally, all majors need to figure out and summarize their teaching experience from their own practice process [33].

However, there is also evidence to suggest that the 1+X certification system could be applied in other countries and contribute to the global discourse on improving vocational education and training. The system provides skills training for international students from ASEAN countries, and with the implementation of the Belt and Road policy, it has been adopted as a potential model for vocational education in other countries such as Thailand [34], Myanmar [35], and Benin [36]. These findings highlight the potential for the 1+X certification system to contribute to the global discourse on improving vocational education and training and to address the challenges associated with integrating it into VTE curricula.

3. Methodology

This study aims to thoroughly investigate opportunities and barriers of integrating the 1+X Certificate System into the curriculum within the context of teacher education in the vocational and technical colleges in Shaanxi, China. To achieve this research aim, a case study approach will be utilized and conducted an in-depth analysis of a singular subject, providing valuable insights into various aspects of a research problem [37].

3.1 Research Design

This study employs a qualitative research design to investigate the teaching experiences of early childhood education (ECE) teacher educators who integrate the 1+X Certificate System into nursery teacher education in China, with the goal of developing teaching competence among pre-service nursery teachers. The research was conducted in four vocational and technical colleges located in Shaanxi Province, China, which offer an early childhood education teacher training program. The objective of the study is to provide a comprehensive understanding of the opportunities and barriers

that ECE teacher educators encounter in integrating the 1+X Certificate System into the nursery teacher education curriculum. These colleges participated in the pilot teaching of the early childhood care certificate, one of the X Certificates, which enables nursery student teachers to earn a diploma qualification by completing the curriculum and an occupational certificate by passing a standardized exam.

3.2 Research Sample

The selection of participants for this study was based on purposive sampling, taking into consideration their teaching experience and expertise in teaching pre-service nursery teachers. The ECE faculties were informed about the study's nature and purpose, and ECE teacher educators who were willing to participate and integrated the 1+X certificate system into their curriculum were invited to contact the researchers. Four ECE teacher educators who met the inclusion criteria were recruited for the study. Further details of the sample are presented in Table 1.

Table 1

The Details of the Research Sample

Name	Sex	Teaching of Years	Teaching Curriculum	Teaching Experiences
A	F	13	Psychology	<ul style="list-style-type: none"> • Have been worked for local education department • Talkative and Friendly • Have a master degree in ECE
B	F	13	Teaching Design	<ul style="list-style-type: none"> • Have been worked for nursery school as a nursery teacher for over 10 years • Talkative and Friendly • Teaching Competition Winners • Have a master degree in ECE
C	F	20	Dance	<ul style="list-style-type: none"> • Have been worked for local education department • Teaching Competition Winners • Talkative and Friendly • Have a master degree in ECE
D	F	15	Piano	<ul style="list-style-type: none"> • Have been worked for nursery school as a nursery teacher for over 10 years • Talkative and Friendly • Have a master degree in ECE

3.3 Research Instrument

This study utilized multiple sources to collect data, which Hatch describes as converging sources that provide the same findings. The research questions and purpose guided the data collection process, which aimed to explore the experiences of ECE teacher educators in enhancing the teaching competence of nursery teacher students using the 1+X Certificate System. Qualitative research instruments were created to identify the opportunities and barriers of 1+X Certificate System into the curriculum used by ECE teacher educators with 20 years teaching experiences in teacher education. To ensure its validity, the interview protocol and classroom observation checklist went through a validity and reliability phase. To achieve this, four case studies were conducted, and the following data collection methods were employed:

3.3.1 Classroom observation

The researcher conducted classroom observations of the participants' teaching practices as they integrated the 1+X Certificate System into their curriculum. The observations were conducted at four different colleges located in Shaanxi, China, where the participants taught nursery teacher students. Detailed field notes were taken during the observation sessions, which were audio-recorded. The observations aimed to capture the participants' teaching practices, interactions with their students, and challenges faced while utilizing the 1+X Certificate System

3.3.2 Semi-structure interview

Four ECE teacher educators who integrated the 1+X Certificate System into the nursery teacher education curriculum were purposively selected as participants for this study. To gain an in-depth understanding of their teaching experiences in utilizing the 1+X Certificate System to develop teaching competence among nursery teacher students, semi-structured interviews were conducted with each participant. The interviews were conducted in Mandarin, the native language of the participants, and were audio-recorded with their consent. The interviews covered topics such as the participants' perceptions of the 1+X Certificate System, the challenges they faced in utilizing this educational framework, and their recommendations for improving the integration of the 1+X Certificate System into nursery teacher education.

3.3.3 Document analysis

Various sources, such as teaching plans used by the participants in their teaching practices, and relevant documents were utilized to collect data for the study. The researcher examined these documents to gain insight into the integration of the 1+X Certificate System into the nursery teacher education curriculum and its application in developing teaching competence among nursery teacher students.

3.4 Research Instrument

To analyse the vast amount of data collected from the observations and interviews, the researcher transcribed and translated the data into English and coded it using a thematic analysis approach [39]. This approach involved examining and interpreting the data to identify recurring themes related to the use of the 1+X Certificate System to develop teaching competence among nursery teacher students, as well as to present meaning, acquire understanding, and develop relationships through various variables and sense-making processes. The identified themes refined and organized into meaningful categories that will enable the researcher to answer the research questions and achieve the objectives of the study.

3.5 Ethical Considerations

The study was conducted under the supervision of the Ethics Office at Universiti Pendidikan Sultan Idris, where ethical clearance was obtained. All participants provided informed consent, and their anonymity was safeguarded during the entire data collection and analysis process. The researcher upheld the confidentiality of the participants' responses and stored the data securely.

4. Results

4.1 The Barriers in the Integration

This study employed classroom observations, semi-structured interviews, and related documents to address the research question. The analysis revealed several themes, which shed light on the challenges associated with the integration of the 1+X Certificate System into nursery teacher education, as well as potential solutions. These themes offer a comprehensive understanding of the findings in relation to the research topic in Figure 1.

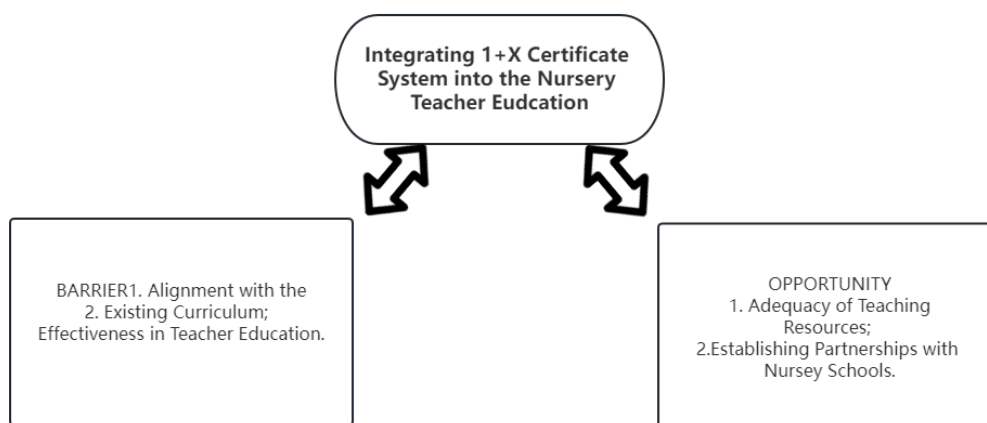


Fig. 1. The Theme of Opportunity and Barrier in Nursery Teacher Education

The curriculums are designed to cultivate student teachers' teaching competencies aligned with the Ministry of Education's standards in China, with the '1' vocational certificate assessed by the Ministry. Conversely, the 'x' occupational certificate is awarded based on student teachers' teaching competencies in line with the job requirements of the respective nursery school. The challenges encountered during the integration of the 1+X system into teacher education can be summarized as follows:

4.1.1 Aligning with the existing curriculum

The implementation of the 1+X Certificate System in nursery teacher education in China faces various challenges, with one of the most significant obstacles being aligning the system with the existing curriculum. In this system, the '1' signifies the academic degree assessed by the Ministry of Education (MOE) in China, while the 'X' represents the vocational certificate assessed by the nursery industry.

- *ECE teacher educators 2: With limited class time, we need to carefully consider how to organize the content in an orderly manner. Ensure that students master the knowledge points.*

Based on the analysis of the lesson plan and interviews with ECE teacher educators, this study found that the current vocational education curriculum is not adequately designed to incorporate the 1+X certificate system. As a result, there may be a lack of coherence and integration between the two systems.

- *ECE teacher educators 3: Previously, the curriculum was designed around the kindergarten teacher certification, but now it is important to consider both the kindergarten teacher certification and the competencies required of teachers in nursery schools.*

To overcome this challenge, policymakers and education experts must collaborate to revise the current vocational education curriculum and integrate it with the demands of the 1+X certificate system. Such alignment will guarantee that vocational education and training will equip students with the essential skills and competencies required for employment in various industries.

4.1.2 The effectiveness in teacher education

The effectiveness of incorporating the 1+X Certificate system into teacher education programmes has been affected by the disparity between the quality of teacher education teachers in different vocational and technical colleges and the lack of teacher resources in the pilot institutions. Differences in the level of teacher education faculty in some colleges led to inconsistent application of the system.

- *ECE teacher educators 4: Upon graduation, we often proceed directly to pursuing our chosen careers without any prior corporate experience.*

In addition, the lack of adequate teacher resources in the pilot colleges has limited the promotion and implementation of the system in teacher education.

- *ECE teacher educators 1: We are currently facing a shortage of teachers, particularly those with significant experience. As a result, we have resorted to hiring part-time teachers to meet the demand. However, one challenge we encounter with part-time teachers is the difficulty in effectively monitoring the quality of their teaching.*

Therefore, to ensure the effective operation of the system, there is a need to strengthen the training and upgrading of teacher education teachers and to provide more teacher support to the pilot institutions. It is only through these efforts that the full application and effective promotion of the 1+X Certificate System in teacher education can be achieved

4.2 The Opportunities in the Integration

The integration of the 1+X Certificate System into teacher education aims to enhance the development of student teachers' teaching competence. This is attributed to the belief that an alternative educational assessment system can contribute to the overall improvement of teacher educators' teaching strategies in fostering student teacher growth.

4.2.1 Adequate teaching resources

The successful integration of the 1+X Certificate System into nursery teacher education is heavily reliant on the provision of sufficient teaching resources and effective teaching strategies for Early Childhood Education (ECE) teacher educators. It is essential to equip ECE teacher educators with the necessary pedagogical knowledge and practical skills to ensure the smooth implementation of this

new curriculum. One way to achieve this goal is to collaborate with nursery schools and offer regular training and professional development opportunities to ECE teacher educators

- *ECE teacher educators 3: The content of handouts is provided by front-line teachers with simulation, and ECE teacher educators prepare them according to the teaching theme, and finally cooperation determines the teaching content with front-line teachers.*

In addition, the availability of teaching resources, including updated textbooks, technology, and classroom materials, can significantly aid in the transition to the new system. It is essential for policymakers to acknowledge the significance of investing in ECE teacher educators, as they are pivotal in determining the future of the ECE sector.

4.2.2 Establishing partnerships with nursery schools

The integration of the 1+X certificate into the teacher education curriculum fosters a collaborative partnership between schools and companies, aimed at enhancing students' competencies. To facilitate this collaboration, schools invite companies to actively engage in various aspects of teacher education teaching. This transformative approach turns the traditional learning classroom into a dynamic workshop, providing students with the necessary conditions for practical training and experiential learning. Through this immersive environment, students have the valuable opportunity to collaborate with industry professionals, benefiting from their practical expertise and real-world experiences.

- *ECE teacher educators 1: student teachers receive instruction from school teachers, while the examinations are conducted by teachers employed by the collaborating companies.*
- *ECE teacher educators 2: The lectures are based on examples from companies.*

This combines the expertise of both school teachers and industry professionals, ensuring a comprehensive evaluation of students' knowledge and skills. By involving company teachers in the assessment process, students are exposed to different perspectives and standards, which can enhance the relevance and applicability of their learning outcomes to real-world contexts

5. Discussion

This study used the classroom observation and semi-structure interview that involved 4 ECE teacher educators with more than 20 years teaching experiences in Shaanxi, China.

5.1 Overview of the Findings

The aim of this study was to investigate the challenges faced by ECE teacher educators when integrating the 1+X Certificate System into the nursery student teacher curriculum and to explore potential solutions for addressing these challenges. To achieve this goal, two research questions were formulated. Research Question 1 focused on identifying the main challenges that ECE teacher educators encounter when integrating the 1+X Certificate System into the nursery student teacher curriculum. The findings revealed that ECE teacher educators face several challenges, including difficulties in aligning the 1+X Certificate System with the existing curriculum and concerns over the

effectiveness of cultivating nursery student teachers' teaching competencies. Research Question 2 aimed to identify potential solutions for addressing these challenges according to the data analysis. The findings suggested that several strategies could be employed to address these challenges, including providing ECE teacher educators with access to up-to-date teaching resources and training, and establishing partnerships with nursery schools. These findings highlighted the importance of providing ECE teacher educators with the necessary support and resources to effectively integrate the 1+X Certificate System into the nursery student teacher curriculum. It was hoped that these findings will inform future efforts to improve the quality of nursery teacher education and enhance the professional competencies of ECE teacher educators.

The integration of the 1+X certification system into the nursery teacher education curriculum is a promising approach to enhance the effectiveness of teacher education, especially for student teachers who specialize in nursery education. By providing flexible and diverse educational and employment pathways, this system enables more individuals to become certified kindergarten teachers while acquiring recognized teaching competencies, thus improving the quality of teacher education and equipping future educators with the necessary skills for a rapidly evolving profession. However, Gibson *et al.*, found that nursery teachers develop professional teaching competencies, particularly in content and conceptualization, with varying degrees of success, even when student teachers receive the same teacher education and focus on the same qualifications. The quality of childcare teacher education may also vary among different colleges and universities. Therefore, policymakers and educators need to ensure consistent and high-quality teacher education to maximize the potential benefits of the 1+X certification system in improving the effectiveness of teacher education.

Ahmad *et al.*, emphasized the importance of Competency-Based Teacher Education (CBTE) in developing teaching competence among nursery student teachers in teacher education. Thus, any course of study must ensure that student teachers can apply what they learn to develop competencies. Despite the potential benefits of integrating the 1+X certificate system into teacher education, this research identifies several challenges, particularly in aligning it with existing curricula. To ensure that the knowledge and skills acquired through the 1+X certificate system complement existing curricula and meet the requirements of the teaching profession, a system must be established that effectively bridges the gap between traditional education and vocational training. This challenge is crucial to ensure that students acquire the knowledge and skills needed to succeed in their chosen field.

Empirical research conducted by Love *et al.*, revealed that the adoption and implementation of new tools could be instrumental in developing and enhancing the knowledge and skills of teacher educators. Therefore, teacher educators require comprehensive support and training to successfully adopt and implement new tools. Donitsa-Schmidt and Ramot have highlighted that the Ministry of Education (MOE) in Israel is continually seeking professional development programs to assist ECE teacher educators in mastering teaching material competencies. This study found that ongoing professional development and training are necessary for ECE teacher educators to effectively implement the 1+X Certificate System in their classrooms. This includes providing access to current teaching resources, such as online courses, instructional materials, and multimedia resources, and training on new teaching strategies, assessment methods, and pedagogical approaches. Additionally, ECE teacher educators require support in integrating these resources and strategies into their teaching practice, and must be given opportunities for collaboration and professional networking.

The second research question was focused on identifying potential solutions for the challenges faced by ECE teacher educators when integrating the 1+X Certificate System into the nursery student teacher curriculum. Redman and Wiek argue that the future success of ECE teacher educators will

depend on their ability to demonstrate strong interpersonal skills, and emphasize the importance of developing and assessing the teaching competencies of ECE teacher educators. Such competencies are essential to ensure that teachers are equipped to meet the evolving needs of their students and the broader educational landscape. This study found that establishing partnerships with industry and first-line nursery teachers can provide more authentic and practical teaching and learning experiences for ECE teacher educators, as teaching in nursery schools is crucial for equipping nursery student teachers with the necessary knowledge, skills, and experiences to succeed in the nursery education field.

Moreover, these partnerships also offer advantages to the industry and first-line nursery teachers by granting them access to the most recent research, technology, and teaching strategies. These collaborations allowed our students to obtain a comprehensive comprehension of the industry’s requirements and expectations, as well as the obstacles and prospects that first-line nursery teachers confront. Additionally, they could apply their theoretical knowledge and abilities to real-world circumstances, thus minimizing the disparity between theory and practice.

5.2 The Framework of Nursery Teacher Education

This study explored the opportunities and barriers of integrating the 1+X Certificate System into Nursery Teacher Education in China. It includes an examination of the current state of nursery teacher education in China, considering the existing curriculum, teaching methods, and assessment practices. This provides a foundation for understanding the context in which the integration of the 1+X Certificate System takes place. Figure 2 displayed the educational framework of nursery teacher education, which has undergone a peer-review process by three experts in ECE and vocational education. This framework can be effectively utilized throughout the process of nurturing nursery student teachers in their teacher education.

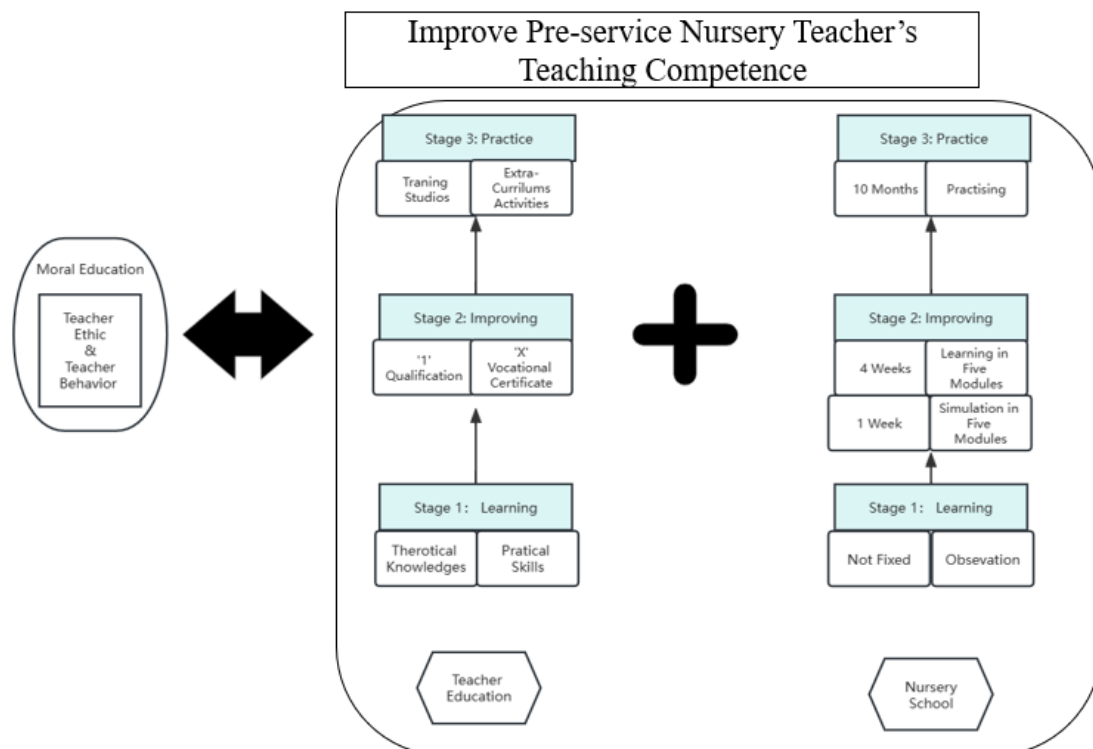


Fig. 2. T The Stage of Nursery Teacher Education

To prepare ECE teacher educators for delivering a predetermined curriculum, it is crucial to consider the moral, emotional, and relational dimensions of their professional development, along with their research orientation [45]. In order to achieve this goal, it is necessary for ECE teacher educators to incorporate the policy requirements of teacher ethics and teaching behaviour into the teaching and learning experience of nursery student teachers. By utilizing these strategies, humanistic values can be promoted, allowing nursery student teachers to continue growing and meeting the social needs of the nursery teacher profession. Additionally, extracurricular activities, such as volunteer work, can be an effective strategy to cultivate the moral character of dedication and hard work among PSNTs.

Collaboration between nursery student teacher education programs and local nursery schools can be a productive approach to enhance the teaching competencies of PSNTs. This collaboration can involve training sessions at the Vocational Training Centre (VTC) and practicing sessions in the nursery school. The VTC and the nursery school can work together to develop the curriculum and delivery standards. The training of PSNTs' teaching competencies can be divided into three phases, providing opportunities for observation, reflection, and practice to help PSNTs develop their practical skills.

The preparation of effective nursery teachers requires ECE teacher educators to integrate the requirements of teacher ethics and teaching behaviour into the curricula of ECE talent training plans. Strategies that promote humanistic values, including extracurricular activities like volunteer work, can be implemented to achieve this goal. In addition, a progressive talent planning plan can be developed for PSNTs that involves the acquisition of theoretical knowledge, practical skills, and vocational certificates to continuously enhance their comprehensive vocational skills. By consistently developing PSNTs' teaching competencies, better quality nursery education for young children can be ensured. ECE teacher educators must also pay attention to their own professional development, including the moral, emotional, and relational dimensions, as well as their research orientation. Kostianen *et al.*, assert that teacher educators should model ethical and caring behaviour in their interactions with student teachers to cultivate these qualities in their students, ultimately contributing to the development of a more ethical and empathetic early childhood education system.

In conclusion, the training of PSNTs should incorporate both practical skills and moral education to ensure their effectiveness as nursery teachers. Collaborating with local nursery schools and incorporating extracurricular activities can be effective strategies to promote these qualities. Furthermore, ECE teacher educators must model ethical and caring behaviour in their interactions with student teachers to cultivate these qualities in their students. By adopting a comprehensive and integrated approach to talent planning, PSNTs can develop the necessary teaching competencies, practical skills, and vocational certificates to become effective nursery teachers, thereby contributing to the improvement of nursery education quality for young children.

5.3 Conclusion

An effective educational framework is crucial for the success of ECE teacher educators and their students in fostering the development of teaching competencies among nursery student teachers, especially considering the evolving professional responsibilities of educators [46]. In this regard, this study investigated the opportunities and barriers in integrating of 1+X Certificate System to cultivate PSNT's teaching competence. Its role in ensuring the currency of teaching and learning practices with the latest strategies is of utmost importance for the success of ECE teacher educators and their students. However, several challenges impede the effectiveness and sustainability of this educational framework, necessitating further research and collaborative efforts.

Addressing the challenges of enhancing recognition and acceptance of the 1+X certificate, providing additional resources and support for implementation, and improving the quality of vocational education and training is crucial for the long-term success of the 1+X Certificate System. These efforts are necessary to ensure that Pre-Service Nursery Teachers (PSNTs) are well-prepared for the demands of the 21st-century workforce and to guarantee the provision of high-quality nursery education for future generations. By engaging in collaborative efforts and conducting ongoing research, the 1+X Certificate System can play a pivotal role in nurturing highly competent PSNTs and promoting the delivery of quality nursery education in the years ahead.

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