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Applying the CIPO model to ensure the quality of early childhood education programs for students in Vietnam

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Abstract In the context of increasingly urgent demands for improving educational quality, particularly at the preschool level, which serves as the foundational stage in the national education system, the development of a quality assurance framework for early childhood teacher education programs has become an essential requirement. This article proposes the development of a quality assurance framework based on UNESCO's CIPO model (Contexte-Input-Proces-Output), aiming to support a comprehensive and systematic evaluation of early childhood education programs in Vietnam. The proposed framework integrates input factors (such as student competencies, teaching staff, facilities, etc.), the training process (curriculum, teaching methods, assessment, etc.), outputs (graduates' professional competencies), and outcomes (their contributions to the community and responsiveness to societal needs). We expect that this proposed quality assurance framework will serve as a scientific tool for teacher training institutions to review, improve, and enhance training effectiveness. In doing so, it will contribute to building a high-quality workforce of early childhood educators capable of meeting the demands of educational reform and the sustainable development of society, both now and in the future.

Keywords: quality assurance, training program, early childhood education, CIPO model

1. Introduction

Early childhood education (ECE) represents the foundational stage of the national education system, directly influencing children's cognitive, social, and emotional development and laying the groundwork for lifelong learning and human resource quality. Training programs in this field are structured systems of educational and instructional activities designed and implemented to achieve specific objectives, aligned with the Vietnamese Qualifications Framework (Ministry of Education and Training [MOET], 2021). Such programs encompass objectives, curriculum content, teaching and assessment methods, and intended learning outcomes, reflecting a dialectical relationship between goals, methods, and content. They are expected to not only equip learners with professional knowledge and skills but also nurture adaptability, creativity, and professional ethics. Quality assurance of training programs is, therefore, essential, functioning as a continuous process to ensure, enhance, and improve educational quality and institutional reputation. It requires clear strategic objectives, mobilization of resources, measurable outcomes, and mechanisms for ongoing risk identification and improvement. Globally, quality assurance has become a cornerstone of educational reform (ENQA, 2015; AUN-QA, 2020), and Vietnam is no exception.

Despite notable achievements, Vietnam's ECE sector continues to face critical challenges. According to MOET (2023), over 30% of preschool institutions in rural and mountainous areas report shortages of qualified teachers, while nearly 40% lack adequate facilities meeting national standards. The application of modern pedagogical methods remains inconsistent, with digital tools integrated in less than 45% of surveyed institutions (UNICEF, 2022). Regional disparities are particularly striking: whereas enrollment in urban areas exceeds 95%, participation in some disadvantaged provinces remains below 70% (General Statistics Office of Vietnam, 2023). Such gaps not only threaten educational equity but also undermine the long-term objective of building a high-quality, future-ready workforce. Moreover, although the Government of Vietnam has prioritized ECE in national strategies, including Resolution 57-NQ/TW (2024) on breakthroughs in science, technology, innovation, and digital transformation, the absence of a discipline-specific quality assurance framework persists. Current MOET regulations (2016, 2020, 2025) provide general accreditation standards but apply them uniformly across disciplines, overlooking the unique pedagogical, developmental, and practical dimensions of preschool teacher education. This situation highlights a pressing research gap. While international quality assurance models such as AUN-QA emphasize stakeholder engagement and PDCA-based continuous improvement, these mechanisms remain underutilized in Vietnam's ECE sector. Without a systematic, context-sensitive approach, quality assurance risks being procedural rather than transformative.

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In response, this study proposes the application of the CIPO (Context–Input–Process–Output) model to design a discipline-specific quality assurance framework for ECE in Vietnam. By integrating contextual realities, measurable inputs, effective processes, and competency-based outputs, this framework aims to support comprehensive, cyclical evaluation and continuous improvement of ECE training programs, ensuring a high-quality workforce capable of meeting both current and future societal needs.

2. Literature Review

The quality assurance of academic programs has emerged as a central pillar of higher education reform worldwide, reflecting the recognition that program quality is the backbone of institutional reputation and educational effectiveness (Harvey & Green, 1993; Tam, 2001). Within higher education institutions, program-level quality assurance typically involves the systematic design and implementation of policies, procedures, and continuous improvement mechanisms to ensure that training programs achieve established quality standards (Nguyen, 2014a).

Globally, different regions have adopted robust frameworks. In the United States, since the 1950s, professional associations have created discipline-specific criteria and performance indicators to guide program quality management, shaping national and regional accreditation systems (Eaton, 2012). In Europe, the Bologna Process and subsequent initiatives fostered collaboration between universities and quality assurance agencies to build comparable standards across the European Higher Education Area (Cave et al., 1997; ENQA, 2015). In Southeast Asia, the ASEAN University Network-Quality Assurance (AUN-QA) has become a key harmonizing force. Its Version 4.0 framework, comprising 8 criteria and 53 sub-criteria, underscores continuous improvement based on the PDCA (Plan–Do–Check–Act) cycle and emphasizes stakeholder feedback to ensure responsiveness to societal and labor market needs (AUN-QA, 2020).

Scholars broadly agree that effective quality assurance requires measurable indicators tied to program learning outcomes and institutional missions (Biggs & Tang, 2011; Hou et al., 2015). Yet, as Brennan and Shah (2000) argue, global standards cannot simply be transplanted; they must be adapted to national cultural, political, and educational contexts. This adaptation is particularly critical in fields such as early childhood education (ECE), where pedagogical approaches and developmental psychology principles differ significantly from those in general higher education.

In Vietnam, the Ministry of Education and Training (MOET) has issued several regulatory frameworks for accreditation and quality assurance (MOET, 2016, 2020, 2025), drawing extensively on international models like AUN-QA. However, these frameworks are applied uniformly across all disciplines, which risks overlooking the distinctive requirements of ECE. Unlike higher education programs in general, ECE curricula must integrate age-appropriate pedagogy, structured practicum, and child development principles to ensure graduates meet the complex demands of preschool teaching.

Recent evidence reinforces the urgency of developing a specialized framework. MOET (2023) identifies ongoing shortages of qualified preschool teachers, particularly in rural and mountainous regions, alongside disparities in infrastructure and limited integration of digital tools. UNICEF (2022) further reports that while preschool enrollment has improved, significant gaps in quality, inclusivity, and equity persist. Compared with OECD countries, where mechanisms for continuous stakeholder feedback, substantial investment in early education infrastructure, and rigorous teacher professional development are institutionalized (OECD, 2021), Vietnam's ECE sector still struggles with systemic shortcomings. These comparisons highlight a critical gap: while Vietnam has adopted international quality assurance models in form, it has yet to adapt them substantively to the realities of ECE. As a result, existing frameworks risk becoming procedural rather than transformative. To bridge this gap, a discipline-specific framework rooted in the CIPO (Context–Input–Process–Output) model is needed. Such a framework would not only align with global best practices but also integrate Vietnam's unique contextual needs, ensuring both feasibility and sustainability in advancing early childhood education quality.

2.1. Conceptual Diagram: International QA Standards vs. Vietnam's ECE Challenges

International QA Standards (OECD, ENQA, AUN-QA):
- Strong stakeholder engagement
- Substantial investment in facilities and digital tools
- Discipline-specific quality benchmark
- Continuous PDCA-based improvement cycles

Vietnam's ECE Challenges (MOET 2023; UNICEF 2022):
- Shortage of qualified preschool teachers, especially in rural areas
- Unequal infrastructure distribution
- Limited digital transformation and training resources
- Uniform QA frameworks not adapted to ECE-specific needs

Implication: A CIPO-based, context-sensitive QA framework is urgently required to bridge the gap between international standards and Vietnam's early childhood education realities.

3. Methodology

The research team collected data and relevant information from policy guidelines and prior studies by both national and international scholars. Through logical reasoning and systematic analysis, the authors derived essential scientific conclusions relevant to the research objectives. Three principal research methods were employed:

3.1. Theoretical Analysis and Synthesis

An in-depth analysis of the CIPO model (Context–Input–Process–Output) was conducted, focusing on its theoretical foundation and practical relevance in the context of higher education. Based on this analysis, information was synthesized into a coherent framework tailored to the specific context of quality assurance in early childhood education (ECE) degree programs.

3.2. Modeling Method

Building on the CIPO framework, the authors proposed a conceptual model for quality assurance in early childhood teacher education programs. This model systematically illustrates the logical structure and interactions among components that influence training quality. It also serves as a foundation for implementing effective quality management and continuous improvement processes in curriculum design and delivery.

3.3. Expert Consultation Method

Expert validation was incorporated to ensure the feasibility and relevance of the proposed quality assurance framework. A purposive sampling strategy was used to select a diverse panel of senior faculty, program directors, policy advisors, and researchers. These experts were drawn from five different institutions: two pedagogical universities, two pedagogical colleges, and one MOET-affiliated research institute. The selection criteria emphasized professional experience in early childhood education, involvement in quality assurance activities, and recognized contributions to educational policy or research. The consultation process involved semi-structured interviews and structured feedback forms, allowing for triangulation of perspectives across different institutional and professional contexts. This methodological rigor enhanced the validity of the framework by ensuring that recommendations were not only theoretically sound but also practically feasible across diverse educational settings.

4. Results and Discussion

4.1. CIPO Model (Context – Input – Process – Output)

In 2000, recognizing that the quality of education is a continuous process, UNESCO introduced the CIPO model, which comprises four key components: Context, Input, Process, and Output/Outcome.

The CIPO model was developed by Jaap Scheerens. The Context - Input - Process - Output (CIPO) model serves as a basic systems framework for understanding how schools operate. It can be applied across various levels of the education system, namely, the system level, school level, and classroom level. Moreover, it functions as an analytical framework through which the quality of education can be examined.

According to the CIPO model, education is viewed as a production process in which inputs, through a set of processes, lead to outputs. Inputs, processes, and outputs are all influenced by the context. The context provides inputs, supplies resources for the process, and sets the expectations and requirements for the output. In this way, all components of the CIPO model are interconnected, as illustrated in Figure 1 (Scheerens, 2015).

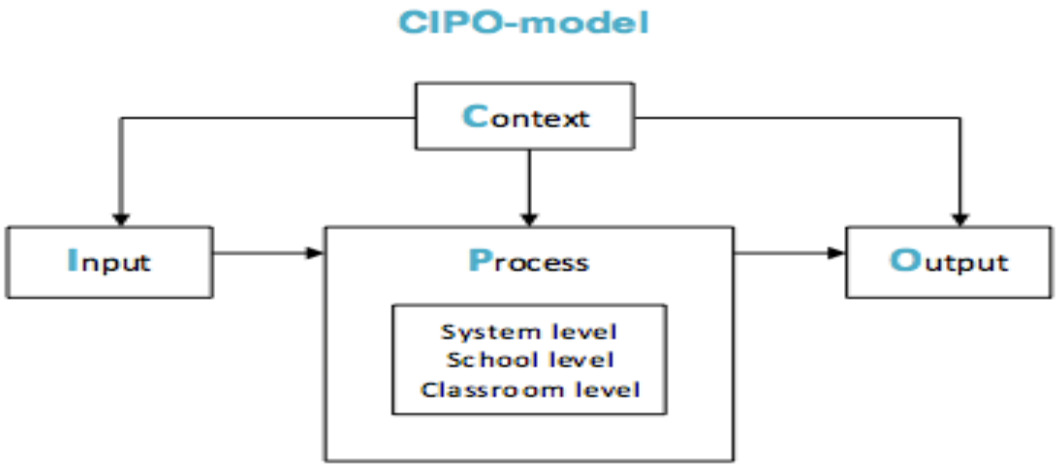

Figure 1 CIPO Model.
Source: Scheerens (2015).

The core idea of the CIPO model is process management, which enhances the effectiveness of the PDCA cycle (Plan, Do, Check, Act) throughout the management process, with a strong focus on the quality of output results. The CIPO model can be seen as a harmonious integration of the principles of management by objectives, management by results, and total quality management, creating a continuous and controlled management process that spans all elements from context, input, and process to output. When applied to the training process, the CIPO model is illustrated as shown in Figure 2.

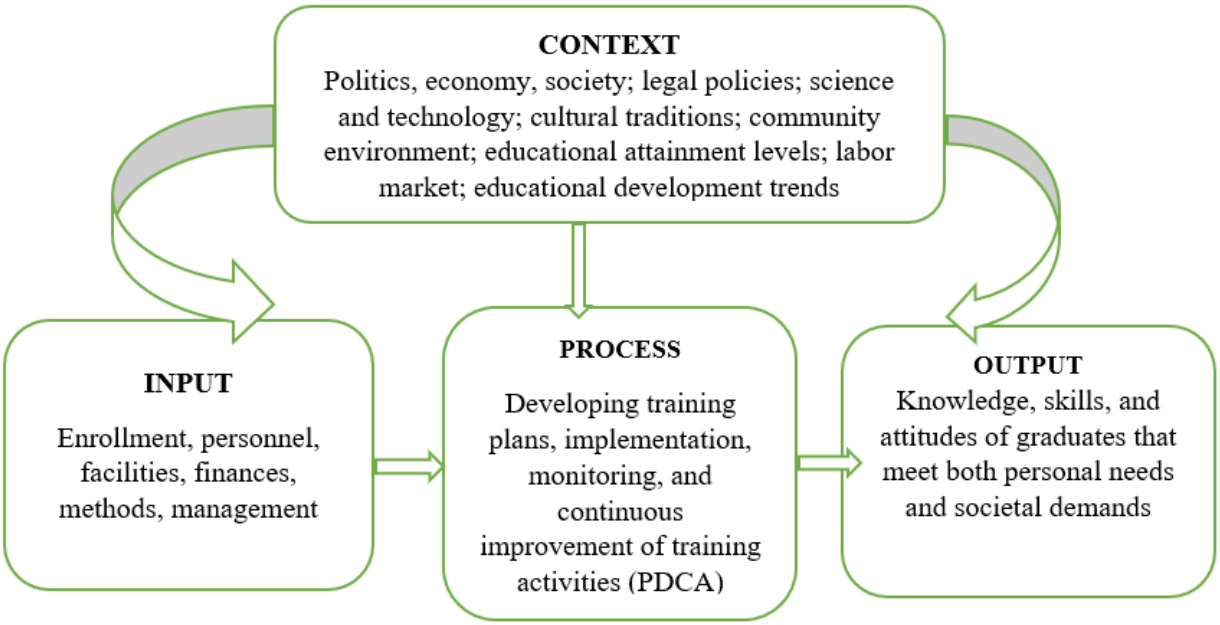

Figure 2 CIPO training process model.
Source: Scheerens (2015).

4.1.1. Context

The context in which education is currently taking place and will continue to evolve includes factors such as political, economic, and social circumstances; the development of science and technology; community environment and traditions; local culture; and the educational attainment level of the population. The broader context also encompasses regional and international environments, especially trends in educational development.

4.1.2. Input

Consists of five elements, abbreviated as the 5Ms: Man: The quality of management staff, teachers, and students; Material: Teaching equipment, classrooms, textbooks, and other educational resources; Money: Financial resources allocated for teaching and learning activities within schools; Method: Teachers' mastery of teaching methods, assessment techniques for evaluating students' learning outcomes, and the use of teaching equipment; Management: The organizational structure within the school, coordination mechanisms among different units, and the implementation of educational plans.

4.1.3. Process

Refers to the operation and development of education within individual schools and the broader education system. It includes four elements, abbreviated as PDCA: *Plan:* Based on the conditions and circumstances of the school, long-term and annual plans are developed across various activities; *Do*: According to the general plan, specific tasks are assigned to each organization and individual. Each unit and individual creates detailed implementation plans for their tasks; *Check:* Each self-manages and monitors their task execution to the final results. The school carries out regular or ad hoc monitoring to promptly identify new issues and provide timely support to address any shortcomings during implementation; *Act:* After completing an operational cycle, the school summarizes experiences, confirms strengths to maintain, identifies weaknesses to address, and adjusts plans if there have been changes in the school's context or inputs compared to the initial stage. Based on this, further improvements are proposed for the next management cycle.

4.1.4. Outcome

Focuses on qualitative changes in learners, specifically the transformation in their knowledge, skills, and attitudes from the beginning to the end of their educational or training period.

The CIPO model illustrates the components of the training process and their connection with the entities that employ human resources. To ensure the quality of training programs, it is essential to guarantee the quality of inputs, processes, and outputs based on favorable or challenging conditions arising from the context. This approach meets the demands of learners and society for human resources while improving the quality of training in educational institutions.

Thus, the operation of the relationships among inputs, processes, outputs, and context within the CIPO model essentially embodies the implementation of the PDCA cycle (Plan–Do–Check–Act), a continuous improvement cycle.

While the proposed framework offers a theoretically robust structure, its strength would be significantly enhanced by integrating the perspectives of key stakeholders. Employers (preschools and educational centers) can provide valuable feedback on graduates' professional readiness; parents can reflect expectations of early childhood learning outcomes; and students themselves offer insights into the effectiveness of training processes and support services.

To ensure practical feasibility, the framework should undergo pilot implementation in selected pedagogical institutions. Such pilots could include: testing the integration of digital tools in teaching practice, measuring graduate competencies against MOET and AUN-QA benchmarks, collecting systematic feedback from employers, students, and parents, and refining quality assurance mechanisms based on empirical data.

By incorporating stakeholder feedback and pilot validation, the framework can move beyond a conceptual proposal to become an evidence-based tool for improving ECE training quality in Vietnam. This approach would also ensure alignment with both national reform priorities and international quality assurance standards, strengthening trust among policymakers, institutions, and society. Thus, the operation of the relationship among the input, process, output, and context factors in the CIPO model essentially represents the implementation of the PDCA cycle (Plan–Do–Check–Act), a continuous improvement cycle, as illustrated in Figure 3.

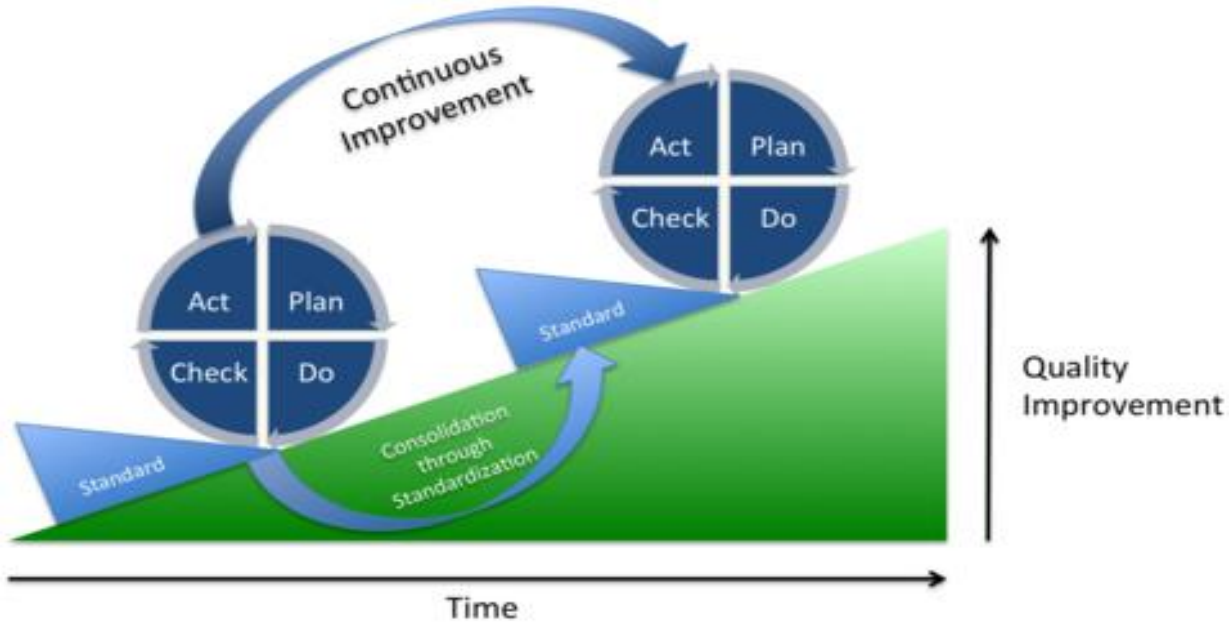

Figure 3 Continuous quality improvement with PDCA.

Therefore, in our opinion, applying the CIPO model is very suitable for implementing quality assurance training programs.

The CIPO model provides a structured lens for analyzing and improving early childhood education (ECE) training programs by systematically addressing *Context, Input, Process, and Output* dimensions.

Context: Vietnam's ECE sector is influenced by national policies such as Resolution 57-NQ/TW (2024), socio-economic conditions, digital transformation strategies, and global educational development trends. These factors set both opportunities and constraints for training programs.

Input: Key elements include standardized admission policies, lecturer qualifications, infrastructure, digital learning resources, and institutional support mechanisms. These inputs must align with MOET regulations while remaining responsive to evolving contextual demands.

Process: Training activities encompass curriculum design, teaching, practicum, internships, assessment, and ongoing quality monitoring. Effective application of the PDCA cycle (Plan–Do–Check–Act) ensures continuous improvement.

Output: Graduates must demonstrate professional knowledge, skills, and attitudes that meet both individual aspirations and societal needs. This includes employability, compliance with preschool teacher standards, and readiness for lifelong learning.

While the proposed framework offers a theoretically robust structure, its strength would be significantly enhanced by integrating the perspectives of key stakeholders. Employers (preschools and educational centers) can provide valuable feedback on graduates' professional readiness; parents can reflect expectations of early childhood learning outcomes; and students themselves offer insights into the effectiveness of training processes and support services.

4.2. Proposed Quality Assurance Framework for Early Childhood Education Training Programs

The quality assurance framework for training programs in early childhood education is defined by three core components: the quality assurance system for the training program, the set of quality assurance standards for the training program, and the quality assurance process for the training program.

4.2.1. Quality Assurance System for Early Childhood Education Training Programs Based on the CIPO Model

Based on the theoretical framework of the CIPO model and the AUN-QA version 4.0 program assessment standards, with the perspective that quality is a process and that monitoring and improvement are present in all stages and standards of evaluation, we propose a quality assurance system for the undergraduate program in Early Childhood Education, as illustrated in Figure 4.

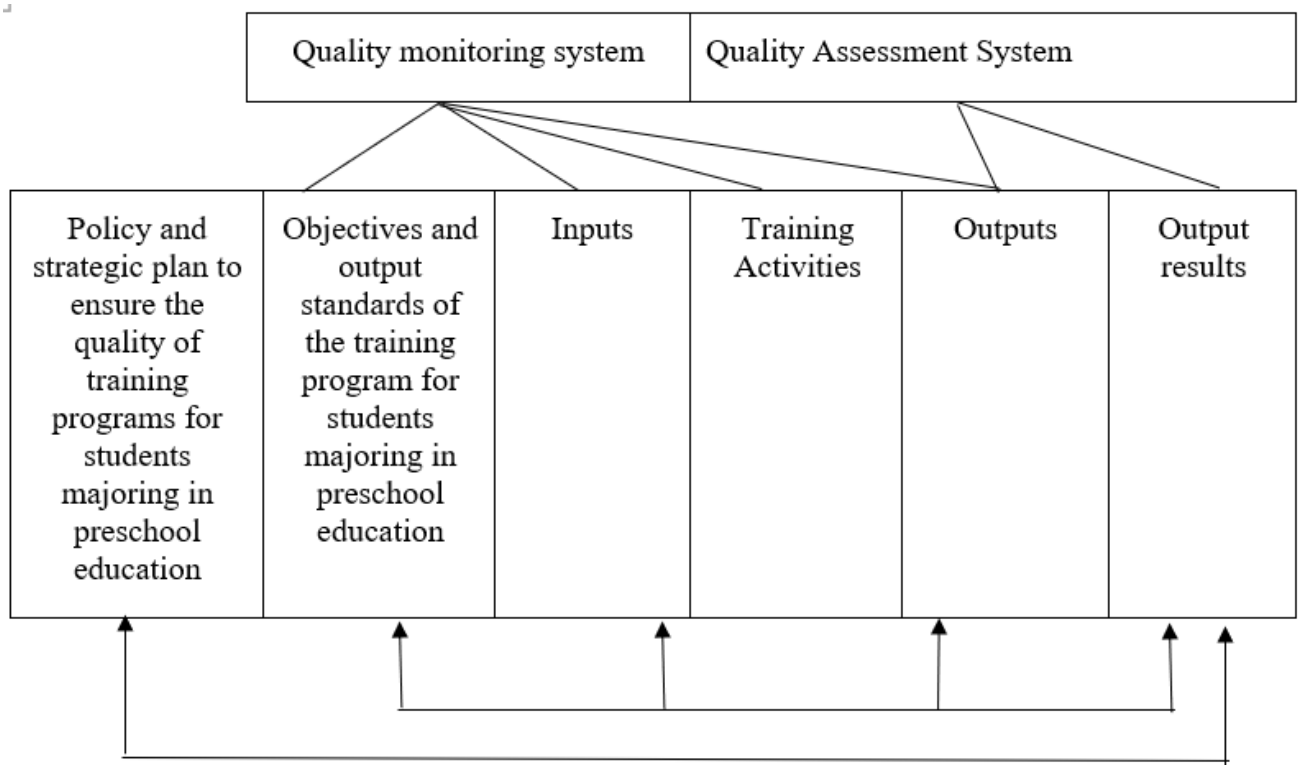

Figure 4 Quality assurance system for training programs for students in preschool education.

The quality assurance system for early childhood education (ECE) programs is underpinned by a comprehensive quality monitoring framework comprising three interrelated components: (1) a system of legal and regulatory documents, (2) an institutional organizational structure for quality assurance, and (3) mechanisms for implementing monitoring and evaluation processes.

First, the legal and Regulatory Framework. Teacher training institutions are required to establish a coherent set of strategic documents and development plans for quality assurance, aligned with institutional roadmaps and contextual conditions at different stages of development. These documents serve as the foundation for defining program objectives and graduate competency standards. The quality monitoring system covers all dimensions of the program, from curriculum and inputs to training activities and outcomes, using regulatory instruments such as procedural guidelines and the operational mandates of quality assurance units. Importantly, these documents must not only provide clear instructions and measurement tools but also be widely disseminated across the institution to ensure transparency, compliance, and accountability.

Second, organizational Structure. To operationalize quality assurance, institutions must establish a dedicated quality assurance center or office, supported by quality teams embedded within faculties and administrative units. Oversight is typically assigned to a vice rector who directly supervises quality assurance activities under the mandate of the institutional leadership. The functioning of this structure must be institutionalized through formal regulations, operational charters, and policies, thereby ensuring systematic coordination across departments and units.

Third, implementation of Monitoring and Evaluation. The quality assurance center or office plays a pivotal advisory role in assisting institutional leadership to develop legal frameworks, design annual monitoring and evaluation plans, and allocate responsibilities to specialized quality teams. Implementation relies on close collaboration between the quality assurance office, faculty, and administrative departments. Monitoring activities include the systematic collection, analysis, and evaluation of graduate outcomes, thereby generating feedback loops to inform continuous improvement in program delivery and quality assurance practices.

This tripartite system of legal and regulatory instruments, organizational structures, and coordinated monitoring and evaluation provides the institutional backbone for sustaining effective quality assurance in ECE programs. When contextualized through the CIPO model, it ensures that inputs, processes, and outputs are systematically aligned with both national standards and international benchmarks, while remaining responsive to institutional realities.

4.2.2. Quality Assurance Standards for the Early Childhood Education Training Program

Based on the established quality assurance system for the undergraduate program in Early Childhood Education, together with an examination of the set of standards for assessing the quality of undergraduate programs and the accreditation standards issued by the Ministry of Education and Training (Ministry of Education and Training, 2020, 2025), as well as the AUN-QA version 4.0 program assessment standards (AUN-QA, 2020), the research team developed a framework of requirements for the quality assessment standards of the Early Childhood Education undergraduate program, as presented in Table 1.

4.2.3. Quality Assurance Process for the Preschool Education Teacher Training Program

Applying the CIPO model to propose a quality assurance process for the preschool education teacher training program in Vietnam, we identify the *Context* factors to include: national policies on quality assurance, regulations concerning education quality assurance in general, and more specifically, policies and procedures for program-level quality assurance set by the government and the Ministry of Education and Training; socio-economic, cultural, and scientific-technological development conditions; societal demand for both the quantity and quality of preschool teaching human resources; and current practices and trends in early childhood education both domestically and globally. In practice, teacher training institutions cannot manage the context, as it comprises external and objective factors. However, they can exert influence to regulate their impact, such as leveraging scientific and technological trends and global educational reform movements by optimizing favorable conditions and minimizing adverse effects.

In the current Vietnamese context, some favorable policy factors are in place to promote the development of early childhood education, which teacher training institutions should capitalize on. These include: policies supporting monthly tuition subsidies for full-time students enrolled in preschool education programs; and retirement policies that allow preschool teachers to retire five years early with the highest level of allowance (Government of the Socialist Republic of Vietnam, 2020; National Assembly of the Socialist Republic of Vietnam, 2025). Furthermore, from December 2024, Resolution 57-NQ/TW on breakthrough development in science, technology, innovation, and national digital transformation has become a significant contextual factor that strongly influences program quality assurance, posing new and urgent requirements for this activity.

Regarding *Input* factors in quality assurance for preschool education teacher training programs, we identify the following elements: institutional quality assurance policies and strategies; admission policies that meet the minimum quality thresholds for teacher training; the curriculum for preschool education; the team of lecturers and academic staff; infrastructure, materials, and data systems that support program delivery; and the organizational structure and coordination mechanisms among institutional units. These inputs must align with the institution's mission and vision, be responsive to the context, and be implemented during the training process. Essentially, the inputs constitute the internal resources of teacher training institutions factors that are fully within their control and subject to improvement via the PDCA (Plan–Do–Check–Act) cycle to adapt to contextual opportunities and address challenges. For instance, the preschool education curriculum must be updated in line with domestic and international innovation trends, enhancing flexibility through digital transformation, incorporating updated learning outcomes aligned with professional standards for preschool teachers, and undergoing regular reviews following regulations (Ministry of Education and Training, 2018, 2021). Teacher training institutions must promptly develop digital transformation plans, upskill lecturers and staff in digital competencies, and ensure infrastructure and information resources meet stipulated requirements.

The *Process* of quality assurance in preschool teacher training involves organizing educational activities (teaching, research, teaching practicum, internships, assessment, etc.) and supporting activities. This process operates based on the aforementioned inputs and only functions when these inputs are present. Additionally, the training process in teacher training institutions partly depends on the policies, quality, and competencies of the preschool teachers at practicum sites and early childhood education institutions where students undertake fieldwork. In Vietnam, under the current Education Law, preschool teacher training is offered at two levels: the college level (for pedagogical colleges) and the university level (for pedagogical universities).

Table 1 Standards for assessing the quality of preschool education training programs.

No	Standards	Requirements
1	Training program objectives and output standards	Consistent with the national qualification framework, elements of the institutional context, policies, and professional standards for preschool teachers are included. Compatible with the mission and vision of the pedagogical school; Reflects the requirements of stakeholders and is disseminated to stakeholders. Assessed at the time of graduation.
2	Training program structure and content	Reasonable, integrated, and compatible logical structure with the training program's output standards, ensuring that learners achieve output standards and have a learning volume appropriate to regulations; Designed and developed based on feedback and the needs of stakeholders, especially preschool education institutions and preschool education management agencies. All modules have clear contributions to achieving the output standards of the preschool education training program. Demonstrate flexibility and adaptability; allow learners to choose according to their career orientation. Updated, reviewed, evaluated, and improved in quality according to regulations, meeting the requirements of the industry and preschool education institutions.
3	Teaching and learning activities	Designed to be compatible with the educational philosophy of the pedagogical school and the output standards of the training program; Promote active learning, form and develop learning methods, and lifelong learning abilities of learners; Promote learners to innovate and develop an entrepreneurial spirit; Be regularly improved to meet the requirements of the labor market in the preschool education sector and meet the output standards of the training program.
4	Assessment of learning outcomes	Regulations on assessment of learning outcomes, review processes, recognition of learning outcomes, and graduation are disseminated to learners and implemented consistently, ensuring validity, reliability, and fairness. Methods of assessing learning outcomes are diverse, compatible with the output standards of the training program, and ensure measurability. Assessment results are promptly responded to by learners so that learners can improve their learning, learning methods, and learning outcomes. Assessment of learning outcomes and regulations on assessment of learning outcomes are periodically reviewed and improved to meet the needs of stakeholders.
5	Lecturers and researchers	Have the quantity and quality to meet the requirements of implementing the training program according to regulations. Be assigned tasks appropriate to qualifications, capacity, and experience; Have a development plan to meet the requirements of training, scientific research, and community service connection of the pedagogical school; Be informed of regulations on responsibilities, powers, and obligations for understanding and implementation. Be measured, and evaluated on capacity, workload for improvement according to regulations, assigned tasks/appointments, rewards, and information to directly related parties; Be systematically trained, fostered, and professionally developed based on a survey of their needs.
6	Learner support services	Admission policies, criteria, and procedures are clearly defined according to the requirements of the training program; quality assurance thresholds of the pedagogical sector, specific to the preschool education sector, are publicly announced and updated. The capacity of the support service team is clearly defined in the standards of job positions, recruitment criteria, in the assignment of tasks, and is assessed to ensure that it is suitable for the needs of stakeholders. Short-term and long-term plans for learner support services are developed and implemented to ensure a full and quality response. There is a suitable training management system to monitor, record, and promptly respond to learners' progress and learning outcomes, as a basis for improvement. There are learning counseling activities, extracurricular activities, competitions, and other support services to help improve learners' learning and increase their employability. Learner support services are periodically evaluated, benchmarked, and improved.
7	Infrastructure, Facilities, and Equipment	There is a system of offices, classrooms, and functional rooms with suitable equipment to implement training programs, scientific research, and community service. Laboratories, practice rooms with full equipment, and a network of preschools practicing according to the requirements of the training program are effectively exploited to meet the requirements of training activities.

		Libraries, digital libraries, information technology systems, network infrastructure, computers, and learning resources are updated, easy to access, and use to meet the needs of training and scientific research. The psychological, social environment, and natural landscape ensure environmental, health, and safety standards and take into account the needs of specific and specialized groups of learners (if any); The quality of facilities serving the training program, the capacity of the support team regarding facilities and equipment are evaluated and improved to meet the needs of stakeholders.
8	Output and output results	graduation rates of learners and employment rates, including self-employment, entrepreneurship, and advanced study of graduates, are established, monitored, and benchmarked to improve quality; Scientific research activities and creative products, inventions of learners, lecturers, and researchers, are established, monitored, and benchmarked to improve quality. Data on the level of learners meeting the output standards of the training program and the level of satisfaction of stakeholders are established, monitored, and benchmarked to improve quality.

Concerning *Output* quality assurance, graduates of preschool education programs must possess knowledge, skills, and attitudes that meet both individual and societal needs. Societal needs include standards for preschool teachers, requirements from employers (i.e., early childhood education institutions), expectations of parents, and the learning outcomes of the program. Among these, the foundational factor is the regulatory standards for preschool teachers, as both employers and teacher training institutions rely on these standards when developing training programs. Additionally, output quality must address the personal aspirations of learners themselves, a critical aspect that, in our view, requires appropriate attention from training institutions. In reality, learners are the beneficiaries and are directly influenced by all context factors, inputs, and processes of the institution in achieving their outcomes. Learners are both active participants in the process and the ultimate purpose of quality assurance in training programs. Their satisfaction serves as a crucial indicator for evaluating program output quality.

Based on the above analysis, we propose a model for the quality assurance process in preschool education teacher training programs (Figure 5).

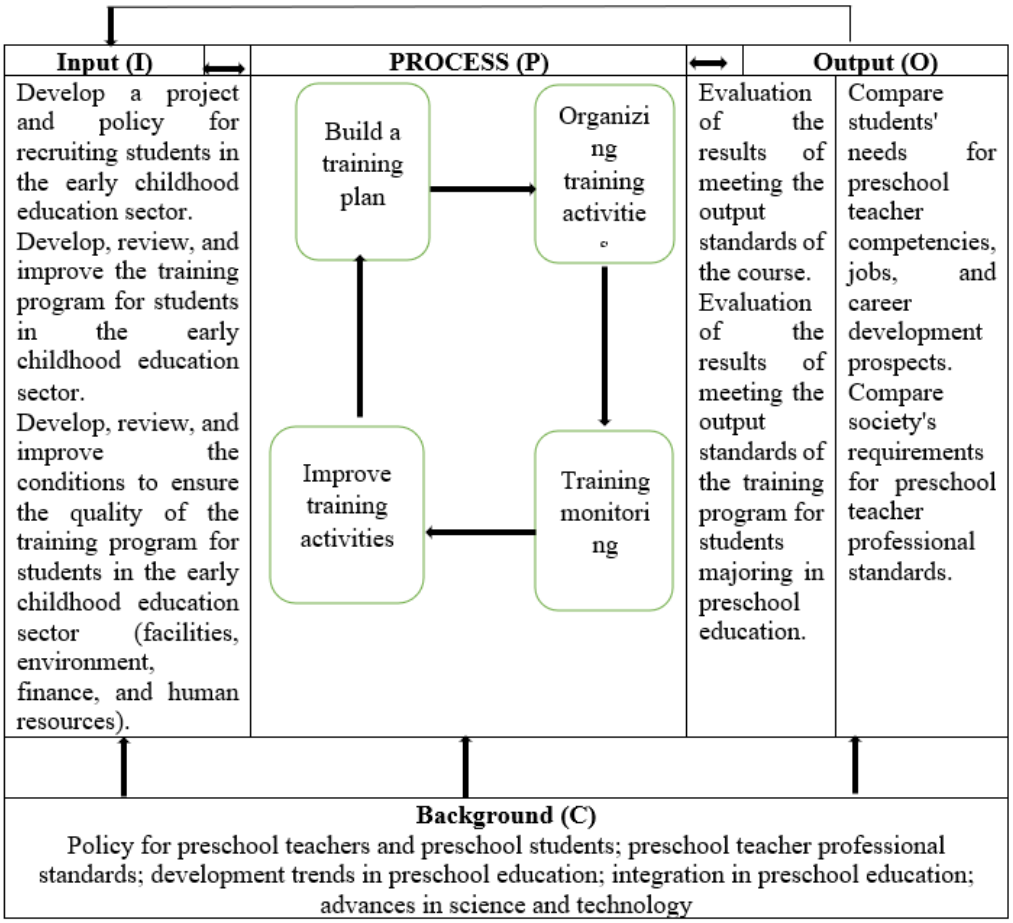

Figure 5 Process of ensuring the quality of preschool education training programs.

Looking at the above model, we can see that all elements of *input*, *process*, *output*, and *context* are closely interconnected in the implementation of the training program. Among them, *context* serves as the overarching factor; the elements of the context are objective conditions that influence and drive the dynamics of the input, process, and output components of the training program. The *input* factors are internal to teacher training institutions, but they are shaped by institutional and policy elements stemming from the context. At the same time, input factors only become operational and effective when engaged in the training process. Inputs do not directly lead to outputs; rather, they yield outcomes only when activated through the training process. Therefore, when changes occur in the *process* or *output*, they will in turn affect the *input*, requiring adjustments in the input factors accordingly.

This dynamic illustrates that, in the actual operation of training programs, the CIPO elements mutually influence, regulate, promote, and transform one another following Deming's PDCA (Plan–Do–Check–Act) cycle for continuous quality improvement.

5. Conclusions

The CIPO model exhibits a high degree of conceptual alignment with the PDCA cycle, making it particularly well-suited for implementing quality assurance activities in higher education programs in general and preschool teacher education in particular. Drawing on a comprehensive analysis of its components and interrelationships supplemented by accreditation guidelines from AUN-QA (2020), the Ministry of Education and Training (2020, 2025), and relevant scholarly research, this study advances a discipline-specific quality assurance framework for preschool teacher education. Beyond serving as a practical tool for teacher training institutions to design, implement, and enhance quality assurance processes, the proposed framework also addresses a critical gap in Vietnam's early childhood education sector by contextualizing international best practices to local needs. This contribution lays the foundation for future empirical validation and policy application, thereby strengthening both the effectiveness and sustainability of quality assurance in preschool teacher education.

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Ethical considerations

This study strictly adhered to the ethical policies required by the Ministry of Education and Training of Vietnam. Approval was obtained from the relevant authorities. Informed consent was obtained from all participants, who were fully briefed on the purpose, procedures, risks, and benefits of the study. Confidentiality and anonymity were strictly maintained, with personal data stored securely and used for research purposes only.

Conflict of Interest

The authors declare no conflicts of interest.

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