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# Combination between Competency Orientation and Outcome Standards in Teacher Education Programs in Vietnam

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***Abstract***

*This paper developes the teacher education programs (TEPs) based on the PDCA (Plan-Do-Check-Act) cycle. The development of TEPs is a complex process that requires a model with a clear philosophy, specific methods and approaches. In the context of Vietnam's comprehensive educational reform aimed at meeting national and international standards, the study designs a model for developing TEPs oriented toward competency development and outcome standards.Using methods of analysis, evaluation, stakeholder consultation, and benchmarking, this study clarifies the principles of model design, its components, advantages, limitations, and proposes solutions for further development. The findings indicate that the model addresses many gaps in TEPs development faced by Vietnamese universities. However, adjustments and improvements are needed in the future to achieve higher effectiveness. This study makes a significant contribution to the body of knowledge on curriculum development in higher education based on the PDCA cycle in the context of TEPs in Vietnam.*

***Keywords:*** *Training Program, Teacher Training, Orientation, Outcome Standards, Teachers*.

## Introduction

The development of university training programs is influenced by various factors, including the advancement of science and technology, the needs of the labor market, and the demands of society in the context of globalization (Darling-Hammond, 2006; Korthagen, 2004). As a result, diversity and flexibility, digital technology integration, vocational skills orientation, international integration, sustainable development, and social responsibility, as well as personalized learning, are trends in developing training programs in most universities worldwide (Cochran-Smith and Zeichner, 2005; Canadian Teachers' Federation, 2017). In accordance with these trends, training program development is carried out according to the PDCA cycle, which consists of four stages: planning (P), doing (D), checking (C), and acting (A) (Shewhart, 1939). This cycle is ongoing and iterative, with the new cycle replacing the old to create a new cycle (HMGS, 2022).

In Vietnam, the development of university training programs is regulated by various state documents, including the Law on Higher Education (NAV, 2012), the Law amending and supplementing a number of articles of the Law on Higher Education (NAV, 2018), Circular

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04/2016 (MOET, 2016), and Circular 17/2021 (MOET, 2021). These regulations aim to complete and guide higher education institutions in developing training programs (MOET, 2021a). Currently, the implementation of training program quality assessment according to domestic or international standards is a mandatory requirement for higher education institutions in Vietnam (MOET, 2021b).

After compiling the results of quality assessments for teacher education programs in accordance with Circular 04/2016 (MOET, 2016), we observed that as of February 2024, 1,172 undergraduate programs in Vietnam had been evaluated using the standards set out in this Circular. Among the 11 standards and 50 criteria defined in the Circular, 76% of the evaluated programs failed to meet the requirements of criterion 5.3 under Standard 5, which pertains to assessing learning outcomes based on the defined outcome standards (NAV, 2018; Nguyen, 2017). Similarly, 79% of the programs did not satisfy the requirements of criterion 3.2 under Standard 3, which focuses on the contributions of course modules to program outcome standards (Nguyen, 2017; Prime Minister of Vietnam, 2016). This result demonstrated that the training programs of higher education institutions had shortfalls in the following areas: the lack of alignment between course modules and program outcome standards, the lack of clear learning outcomes, and the lack of information on meeting the Program Learning Outcomes (PLO) (RISE Programme, 2023).

These shortfalls will lead to difficulties for higher education institutions in meeting Vietnam's regulations, including the requirement that assessment of learners' learning outcomes must be based on output standards and must clarify the level of achievement of learners according to the thinking levels specified in the output standards of each subject, each component, and training program (MOET, 2021; RISE Programme, 2023). Additionally, the lack of information on meeting the PLO may lead to difficulties in recognizing graduation and granting of graduation certificates, as well as the lack of information on the level of achievement of Course Learning Outcomes (CLO) for lecturers and learners to improve teaching and learning activities (Huong, 2020; Vinh University, 2023). Employers may also lack information about students' competency profiles when using students' graduation profiles for recruitment evaluation (Dang, 2019; Hoa, 2018).

Upon identifying these gaps, we developed a model for teacher education program development oriented toward competency and aligned with outcome standards (HMGS, 2022; Ssekakubo, 2020). This model aims to address the shortfalls in the current training programs and provide a framework for higher education institutions to develop training programs that meet the requirements of Vietnam's regulations and provide learners with the necessary skills and competencies to succeed in the workforce (Dang, 2019; Vinh University, 2023).

## Literature Review

The development of training programs based on student competency development is a global educational trend that has attracted the attention of many researchers and higher education institutions (Sahlberg, 2011; Shulman, 1986). Studies around the world have shown a fundamental change in the way training programs are designed and implemented, from focusing on purely academic content to developing specific student competencies to meet the needs of the labor market and society (Nguyen, 2014).

Competency development theory originated in the 1970s in developed countries such as the United States, Canada, and Australia (Biggs and Tang, 2011; González and Wagenaar, 2003). At this time, education was driven by the need to develop human resources capable of meeting the demands of the labor market (European Ministers of Education, 1999). Early studies, such as McClelland's (1973), emphasized that competence was a determinant of career success, and therefore, higher education needed to design training programs based on the competencies that students needed to succeed in their future jobs.

In the 1990s and early 2000s, European countries began to pay attention to the development of educational programs oriented towards the development of competencies. The implementation of the Bologna Process (European Ministers of Education, 1999) was a significant event, in which European universities committed to aligning their training programs to promote integration and recognition of degrees between countries (Huong, 2020, HMGS, 2022). Competences became one of the core elements for program evaluation and development, with the goal of ensuring that graduates are globally competitive (Anderson and Krathwohl, 2001; González and Wagenaar, 2003).

Recent research has highlighted significant developments in competency-based curriculum (CBC) for teacher education programs, focusing on bridging theoretical frameworks with practical applications. A notable study by the HMGS (2022) introduced a modular competency-based approach that emphasizes measurable learning outcomes and flexible pacing. This model integrates real-world scenarios, helping pre-service teachers acquire essential skills to address diverse classroom challenges effectively (Biggs and Tang, 2011). Cochran *et al*. (2005) study emphasized the importance of critical thinking practices in teacher education. Critical thinking allows future teachers to evaluate their teaching methods from multiple perspectives and adapt their practices to meet the diverse needs of their classrooms. Furthermore, Shulman (Shulman, 1986) introduced the concept of "pedagogical content knowledge", emphasizing that effective teaching depends not only on mastery of subject knowledge but also on the ability to effectively communicate that knowledge to students.

The Vietnamese education system has undergone significant reforms over the past few decades, especially in the area of teacher education. According to Hoa (2018), teacher education in Vietnam has gradually shifted to a learner-centered approach, in line with the MOET's goal of improving educational outcomes nationwide. However, challenges remain in bridging the gap between theory and practice, as many teacher education programs still rely heavily on traditional teaching methods (NAV, 2014; Nguyen, 2017).

In Vietnam, the ongoing "Fundamental and Comprehensive" education reform launched in 2020 has increasingly adopted CBC principles. A longitudinal qualitative study conducted across multiple provinces (2021-2023) revealed that teachers are gradually transitioning from traditional lecture methods to hybrid pedagogies. These include student-centered techniques that enhance engagement and align with competency-based objectives.

Currently, many teacher training universities in Vietnam have made significant efforts to modernize their education programs (Dang, 2019; Huong, 2020). Recent improvements in the curricula aim to enhance both the academic and professional competencies of teacher education students (MOET, 2021; NAV, 2018). Many institutions have adopted a competency-based approach, emphasizing the development of essential skills for future teachers, such as classroom management, lesson planning, effective student assessment, and, notably, innovations in

assessment methods to achieve the defined program learning outcomes (PLOs) (MOET, 2021; Vinh University, 2023).

Additionally, these universities have placed greater emphasis on practical training through internships and collaborations with local schools (RISE Programme, 2023; Huong, 2020). This aligns with global trends in teacher education, where experiential learning and the application of pedagogical knowledge in real-world contexts are essential for professional competency development (Korthagen, 2004). However, Dang (2019) argues that more opportunities for continuous professional development are needed for teacher education graduates to ensure they remain adaptable and responsive to the evolving educational demands in Vietnam.

Despite progress in program development, significant challenges persist, including limited resources, the need for more faculty with international teaching experience, and the difficulty of balancing theoretical knowledge with practical skills. Nevertheless, opportunities arise from increased government support for educational reforms and international collaborations with foreign universities.

## Methodology

Data for this study were collected from a variety of sources to ensure comprehensive and reliable content analysis. The main data sources include:

Requirements for assessing the quality of training programs according to the standards of international education quality accreditation organizations such as: FIBAA, AQAS, ASIIN, AUN-QA, ACQUIN, THE-ICE, ACBSP, ABET (Crawley et al., 2014; HMGS, 2022). These organizations operate in Vietnam under the approval of the MOET, helping universities in Vietnam ensure quality that meets international standards. These organizations play an important role in promoting educational innovation, developing training programs and enhancing the competitiveness of Vietnamese universities globally (Cochran-Smith and Zeichner, 2005; Korthagen, 2004).

The CDIO model (Conceiving - Designing - Implementing – Operating) of curriculum development: Initiated by the US and European countries, the CDIO model provides a framework for designing and developing engineering education programs that emphasize the integration of engineering, design, and innovation (Crawley et al., 2014).

Data on teacher competency frameworks: Southeast Asia (SEAMEO INNOTECH, 2010), Asia Pacific (UNESCO, 2016), California (California Commission on Teacher Credentialing, 2016), Canada (Canadian Teachers' Federation, 2017). These frameworks provide guidelines for teacher education programs and highlight the essential competencies required for teachers to be effective in the classroom.

Legal documents, regulations and guidelines on training program development: Stipulated in Circular 04/2016/TT-BGDDT (MOET, 2016), these documents provide the framework for developing and implementing training programs in Vietnam. They outline the requirements for quality assurance and accreditation of training programs.

Internal data sources published on the websites of seven Vietnamese teacher training universities, related to teacher education programs, such as regulations; Data on the evaluation of learning outcomes based on the teacher education PLOs; Research outputs from the university-level key research project titled Developing a Quality Assurance Framework for Teacher Education Programs, conducted in 2023.

**Data Collection**

To collect data for determining the teacher training model, we implemented a mixed-methods approach that included both quantitative and qualitative data collection methods.

*Quantitative data collection methods*: We designed and distributed a questionnaire to 250 faculty members involved in teaching teacher education programs in Vietnam and 500 schoolteachers from 13 provinces and cities across the country. The questionnaire aimed to gather their perspectives on the current education programs, the required competencies, and the learning outcomes of teacher education programs. A total of 750 completed responses with all necessary information were collected.

*Random sampling*: Faculty members, schoolteachers, and schools were randomly selected to ensure objectivity and fairness in the information received.

*In-depth interviews*: We conducted in-depth, face-to-face interviews with 20 reputable and experienced faculty members teaching in teacher education programs at seven Vietnamese teacher training universities and 20 other education experts nationwide. These interviews provided insights into the processes of designing, implementing, and revising teacher education programs.

*Document analysis*: We conducted an analysis of relevant documents on the output standards of teacher training programs and documents guiding the development of training programs oriented towards competency development (MOET, 2016; Crawley, et al., 2014).

The combination of these data collection methods provided a comprehensive understanding of the current teacher education programs in Vietnam and the required competencies for teacher education programs.

**Data Analysis**

To analyze the data collected for determining the teacher training model, we employed both quantitative and qualitative data analysis methods.

*Quantitative data analysis*:

Statistical analysis: We used specialized software, specifically SPSS, to process the survey results and create survey results tables as desired. This helped us to 1) identify general trends in the data, 2) examine relationships between factors in the training program and 3) summarize the data in a meaningful way.

Descriptive statistics: We used descriptive statistics to summarize the main characteristics of the data, such as means, medians, and frequencies.

**Qualitative Data Analysis**

Content analysis: We applied content analysis to analyze data from interviews and related documents to draw conclusions about the level of meeting output standards and professional capacity of teacher training students after graduation. This involved 1) identifying and coding relevant themes and patterns in the data, 2) analyzing the relationships between the themes and patterns and 3) drawing conclusions based on the analysis.

Thematic analysis: We used thematic analysis to identify, code, and analyze patterns and themes in the data, such as the challenges faced by teacher training students and the factors that influence

their professional capacity. By using a combination of quantitative and qualitative data analysis methods, we were able to gain a comprehensive understanding of the teacher training model and its effectiveness in preparing teachers for the profession.

**Research Process**

The process employed in this study involves four approach steps, combining both qualitative and quantitative data collection and analysis methods. The process consists of four main steps:

**Step 1**: Document analysis and literature review

Collect and synthesize documents: We collected and synthesized documents related to teacher training models and output standards from various sources, including academic journals, books, and government reports. We reviewed then the literature on teacher training models and output standards to gain a comprehensive understanding of the current state of the field.

**Step 2**: Data collection

Design and publish survey questionnaires: We designed and published survey questionnaires to collect data from a sample of teacher training institutions and education experts. In addition, we conducted in-depth interviews with education experts and teacher training program administrators to gather more detailed information on their perspectives and experiences.

**Step 3**: Data analysis

Analyze survey and interview data: We analyzed the survey and interview data using a combination of quantitative and qualitative data analysis methods. We also synthesized the findings from the data analysis to identify patterns, themes, and trends related to teacher training models and output standards.

**Step 4**: Model Development

Evaluate and build a model: We evaluated the findings from the data analysis and synthesized them into a model for developing teacher training programs towards capacity development and meeting output standards. The model is validated through a review of the literature and expert feedback to ensure its relevance and applicability to the context of teacher training in Vietnam.

**Reliability and Validity Test**

*Reliability*: To ensure the reliability and validity of the study, a pilot survey of the questionnaire was conducted prior to an official survey before. This preliminary survey allowed us to identify and address any issues with the questionnaire's clarity, relevance, and effectiveness in capturing the desired data. The results of the pilot test were used to refine the questionnaire, ensuring that it accurately measured the variables of interest. Additionally, a qualitative data coding method was employed to analyze the responses, allowing for a more in-depth understanding of the participants' perspectives and experiences.

*Research significance*: This study makes a significant contribution to the field of teacher education by providing a comprehensive framework for developing teacher education programs in Vietnam. The study's findings offer a foundation for building and enhancing teacher education programs, aligning with the country's education policy goals and objectives. The results of this study aim to improve teacher training quality, ensuring that teachers possess the necessary skills, knowledge, and competencies to meet outcome standards and professional requirements in the context of modern education.

## Results and Discussion

Results

*Model design process:* The model design process is studied and implemented by us through the following steps:

***Step 1****: Determine the design principle*

The training program was designed using a reverse design approach, which begins with the identification of social needs and gradually narrows down to the specific needs of stakeholders who have direct contact with the training program. This includes former learners, employers, agencies, and departments related to the training field, as well as internal stakeholders such as faculties and departments. A comprehensive analysis of these needs was conducted to link with the training orientation of the School and inform the development of the training program (Figure 1). The needs of these stakeholders were transformed into the mission of the School, which served as the foundation for setting the training objectives and learning outcomes at different levels within the program. Directional compatibility is reflected in the teaching program with compatibility between teaching - learning - testing and assessment activities, designing these activities based on learning outcomes to link the entire learning process through designing oriented learning activities to help learners gradually achieve the declared learning outcomes. This approach ensures that the training program is aligned with the broader social and institutional goals, while also meeting the specific needs of the target audience.

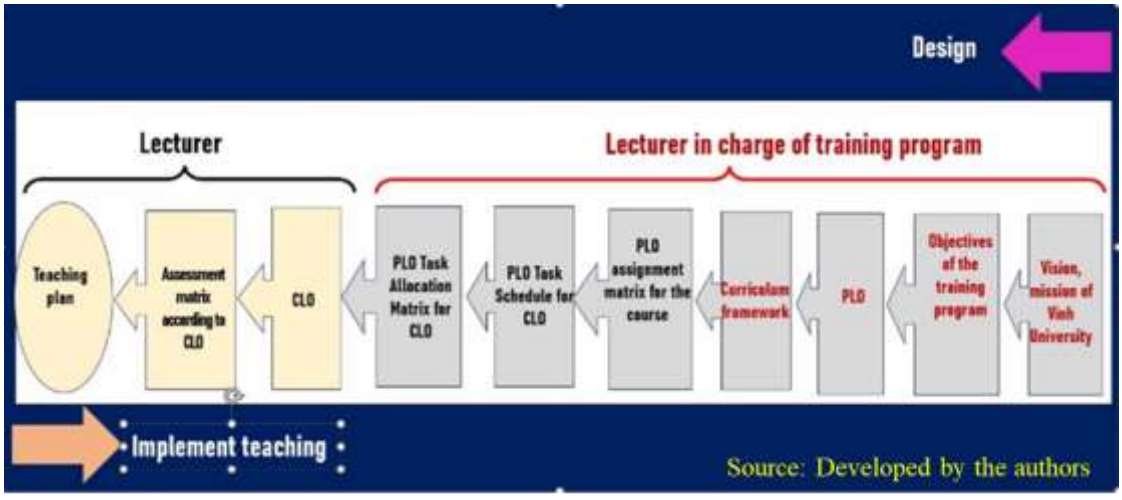


Figure 1. Process of designing training program development model towards capacity development and meeting output standards

***Step 2.*** *Competency framework design*

This competency framework includes knowledge (K), skills (S) and attitudes (A) domains to indicate each output standard area and follows the CDIO process (Conceive - Design - Implement - Operate). (Crawley, et al. 2014) (Figure 2).

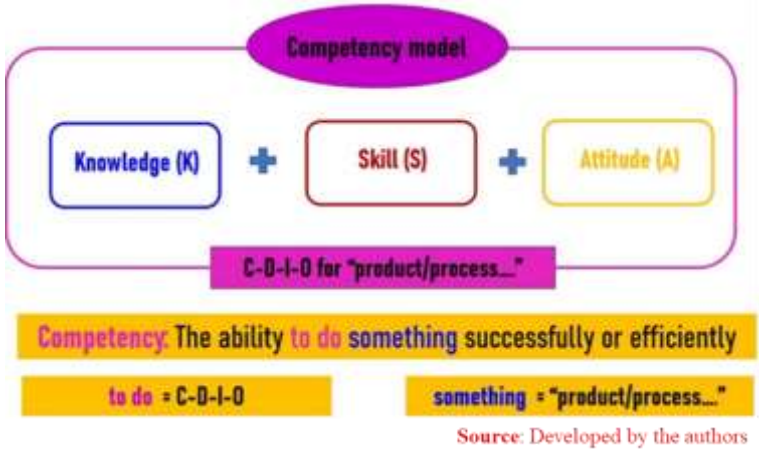


Figure 2. Competency framework of training program

***Step 3.*** *Building the competency framework of the teacher training program*

In this step, we identify the core competencies of teacher training students, which are expressed through competency components, from which we determine the output standards of the training program. Table 1 presents the competency framework and PLO.

| Competency | Competency Indicators |
|---|---|
| 1. Teaching and education | 1.1. Apply specialized knowledge and educational science into professional practice |
| | 1.2. Responsible, dedicated, fair in professional activities. |
| | 1.3. Demonstrates systematic thinking, critical thinking, problem solving skills and creativity. |
| | 1.4. Use teaching and education methods, test and evaluate to develop learners' qualities and abilities. |
| | 1.5. Analyze social and professional contexts and identify learners. |
| | 1.6. Design and organize teaching and educational activities to meet set goals. |
| | 1.7. Develop subject programs appropriate to learners and local realities. |
| 2. Cooperation and management | 2.1. Use communication and cooperation skills in learning and professional activities. |
| | 2.2. Organize and develop teams, manage and operate professional activities |
| | 2.3. Consulting and supporting learners in their career activities; building a learning environment and school culture. |
| | 2.4. Develop relationships with social organizations, teachers, learners, etc. to promote professional activities and scientific research. |
| 3. Professional and career development | 3.1. Demonstrate scientific style, civilized and polite communication attitude and behavior. |
| | 3.2. Self-study, self-improvement, research to improve professional qualifications and pedagogical skills. |
| | 3.3. Using technology, digital transformation in professional activities and scientific research. |

| | |
|---|---|
| | 3.4. Able to use foreign languages in communication, study and research. |
| | 3.5. Implement research topics related to training majors and professional practices. |
| | 3.6. Transmit, disseminate knowledge, disseminate research results |
| | 3.7. Coordinate, support and guide others in performing professional duties. |

Table 1. Competency framework of graduates of teacher training programs

From Table 1 we design the PLO in Table 2. At the same time, these output standards are set in the context of Conceiving - Designing - Implementing - Operating (CDIO) real-world systems and products (Crawley et al., 2014).

| | Output standards | | |
|---|---|---|---|
| 1. Fundamental knowledge and reasoning | 1.1.1. Apply basic knowledge of social sciences, politics and law | 4. Conceiving, designing, implementing, evaluating teaching, educational activities and scientific research | 4.1.1. Analyze the social and professional context in teaching, education and scientific research |
| | 1.1.2. Apply basic and specialized scientific knowledge of the training industry | | |
| | 1.1.3. Apply knowledge of educational science, theory and teaching methods of teacher training subjects | | |
| 2. Personal and professional skills and attributes | 2.1.1. Demonstrate critical thinking, systematic thinking, problem solving skills and creativity | | 4.2.1. Propose topics in teaching and education, scientific research |
| | 2.1.2. Use technology and digital transformation skills in teaching, education and scientific research | | |
| | 2.1.3. Use teaching and educational skills | | 4.2.2. Design teaching and education plans, scientific research |
| | 2.1.4. Use specialized scientific research skills and educational science | | |
| | 2.1.5. Demonstrate self-learning skills, self-control and adaptability to changes | | |
| | 2.1.6. Demonstrate ethics and teaching style | | 4.2.3. Implement teaching, education and scientific research activities. |
| 3. Skills: Teamwork and communication | 3.1.1. Demonstrate teamwork skills in learning, teaching and educational activities, and scientific research. | | |

| | | | |
|---|---|---|---|
| | 3.2.1. Use forms of communication in learning, teaching and educational activities, and scientific research. | | 4.2.4. Evaluate teaching and educational activities, scientific research |
| | 3.2.2. Able to use foreign languages (level 3/6) in communication, teaching and educational activities, and scientific research | | |

Table 2. Teacher Education Program Learning Outcomes

The CDIO framework offers a comprehensive set of tools for building PLOs, designing and implementing teaching programs, developing resources to ensure training program operations, and evaluating training program improvements in a closed cycle. This integrated approach enables educators to create a cohesive and effective learning experience that prepares students for the demands of the modern workforce. One of the key advantages of CDIO is its compatibility with the widely used PDCA quality improvement cycle, a widely recognized and effective methodology for continuous improvement. By integrating CDIO with the PDCA cycle, educators can ensure that their teaching programs are not only aligned with industry standards but also continually refined and improved to meet the needs of employers and the broader community.

The CDIO standards focus on developing the necessary competencies and skills in students to enable them to quickly adapt to the working environment and meet the needs of employers. By prioritizing the development of skills that are directly relevant to the industry, universities can help to narrow the gap between school training and social requirements, ensuring that graduates are work ready. The CDIO framework's emphasis on collaboration, creativity, and problem-solving skills also enables students to develop the ability to think critically and innovatively. By adopting the CDIO framework, universities can provide students with a comprehensive education that prepares them for the challenges of the modern workforce and sets them up for success in their future careers.

***Step 4.*** *Design a scale to measure the training program's output standards*

This scale is determined by the content of the output standards in three areas: cognitive, psychomotor/skills, and emotional/attitude (Figure 3). In this scale, we specify the level of competence from 1 to 5, where level 1 is the lowest and level 5 is the highest. Each level is represented by verbs according to Bloom (Anderson et al., 2001) and is quantified according to each range of competence scores (Table 4).

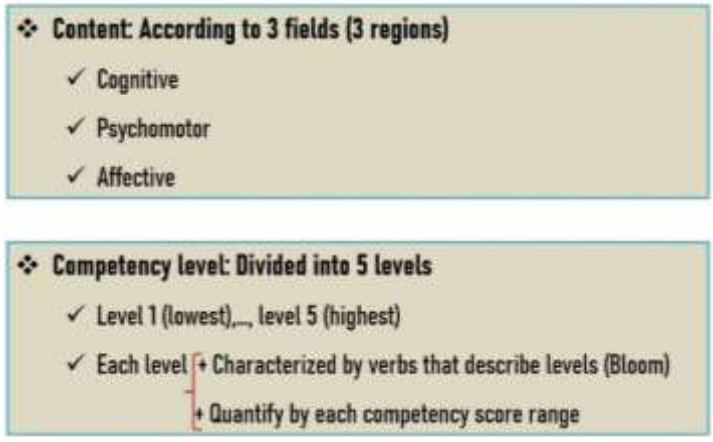


Figure 3. Standard output scale of training program

| Competency level | Competency level score | Description of output standard competency levels in 3 areas | | |
|---|---|---|---|---|
| | | **Knowledge (K)** | **Skill (S)** | **Attitude (A)** |
| **Level 5** | 4,5 – 5,0 | Creating | Origination | Characterization |
| **Level 4** | 3,5 – 4,4 | Analyzing, Evaluating | Adaptation | Organization |
| **Level 3** | 2,5 – 3,4 | Applying | Precision | Valuing |
| **Level 2** | 1,5 – 2,4 | Understanding | Manipulation | Responding |
| **Level 1** | 0,5 – 1,4 | Remembering | Perception | Receiving |

Table 4. Competency levels, competency scores and competency level descriptions of PLO

***Step 5***. *Design a teaching program compatible with output standards*

The curriculum is designed according to the Constructive Alignment Model (Biggs *et al*., 2011), the reverse design process and the CDIO-Flipped-Blended Learning model (Figure 4). The curriculum framework in teacher education programs is designed according to a constructively aligned model at an advanced level, corresponding to high-level learning outcomes (Levels 4 and 5). It incorporates active, independent learning methods and assessment activities focused on creative outputs. To ensure this alignment, teacher education programs emphasize implementing active learning approaches, particularly project-based learning (PBL), which constitutes at least 25% of the total credits within the curriculum framework.

The reverse design process is used to design the training program, starting from the training PLO and implementing the design in the following order: Training program framework; Assign training program output standards to modules; determine CLO; evaluate according to the CLO matrix and teaching plan according to the evaluation matrix.

The CFB model (CDIO-Flipped-Blended Learning) is an integrated model between the CDIO, Flipped Learning, and Blended Learning models. The CFB model incorporates the following elements:

- The CDIO model is integrated with the development of PLOs aligned with the four pillars of the CDIO syllabus: knowledge, professional skills, communication and teamwork, and CDIO competencies. It also adheres to the 12 CDIO standards for developing and implementing the curriculum.

- Flipped learning focuses on designing learning activities into two parts: self-study and classroom learning. The self-study part is implemented before class and is associated with theoretical learning corresponding to low-level competency requirements (Levels 1, 2, 3), while the classroom learning part is implemented after the self-study part and is used for activities to practice high-level skills and cognition (Levels 4, 5).

- Blended learning focuses on designing teaching activities into two parts: online and face-to-face.

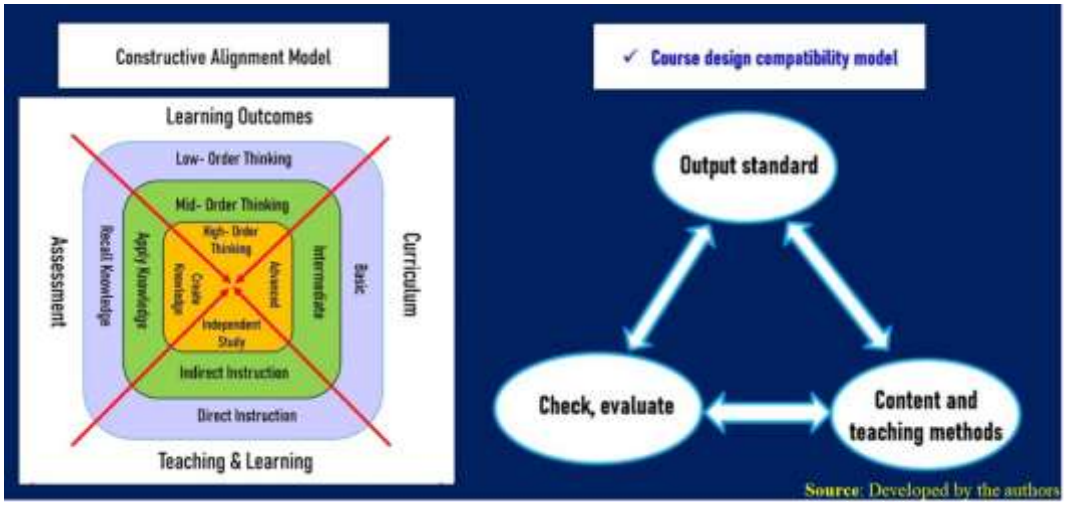


Figure 4. Curriculum design model

Under this model, the teaching and learning activities are designed so that the self-study part is implemented through electronic learning materials on the learning management system (LMS), while the direct learning part is implemented directly in the classroom, laboratory, or real-life experience. In some specific cases, the CFB model may be transformed into the CFO model, where the direct teaching part is implemented online through the Teams application, Zoom, or another simultaneous online teaching application.

***Step 6.*** *Design a matrix to assign training* program learning outcomes to course learning outcomes

- Each PLO is assigned to at least three subjects and is prioritized to be arranged in different, consecutive semesters.
- Each subject is assigned a maximum of five PLO, while project-based teaching subjects are assigned a minimum of six PLO, ensuring all types of output standards in all three areas of knowledge, skills, and attitudes. The number of PLO assigned to each subject serves as the basis for assigning credits to the subject.
- When a PLO is assigned to subjects, the competency level of that PLO in each subject may be different, depending on the competency score. However, the competency level value of each subject must be designed so that when taking the average (according to the subject weight) of

all assigned subjects, it will equal the competency value of the PLO. The weight of the course is calculated based on the ratio of the number of credits of the assigned course to the total number of credits of all courses assigned to that output standard and is calculated as a percentage after rounding to an integer.

- The minimum competency level of each PLO is level 3, corresponding to a minimum competency score of 2.5. The weight of the course assigned to the PLO must reach at least 30% of the competency level from level 4 or higher.
- For PLO in the skill or attitude domain, the competency level is designed to increase gradually over time (semesters) for the assigned courses in the teaching program framework (Figure 5).

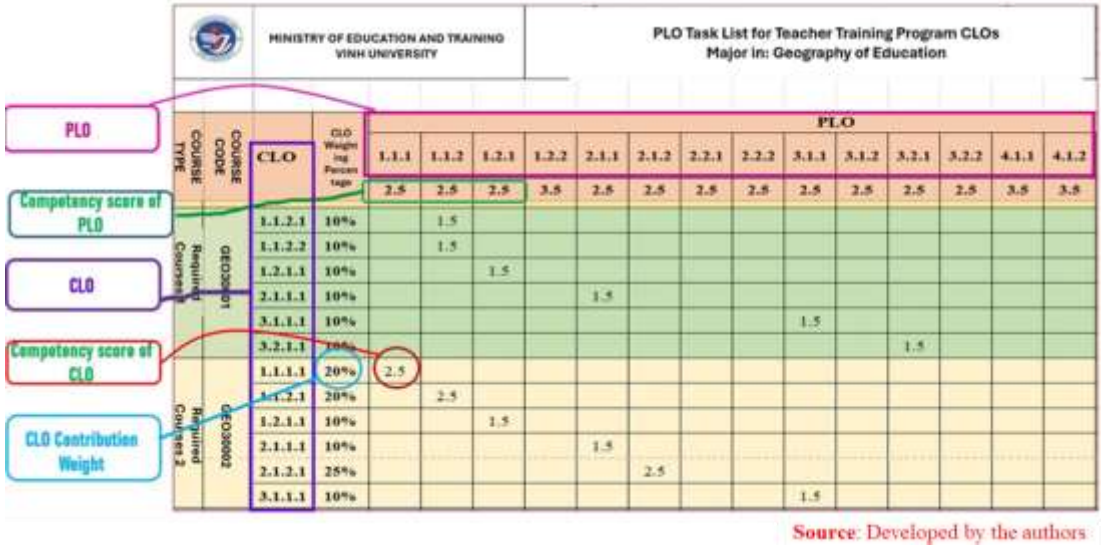


Figure 5. Assignment of program learning outcomes to course learning outcomes

***Step** 7. Design the assessment competency matrix (Figure 6)*

- Learner assessment methods are designed in accordance with the output standards.

The measurement and assessment of the level of achievement of output standards are carried out through the topics and competency levels of the output standards.

- Assessment methods and tools are selected appropriately for each type of output standard and the required competency level.
- The requirements for the competency level required for the CLO in the assessment tests and at the end of the course are specified in detail in the course outline. The competency level requirements for the PLO are assigned to the courses and are specified in the table of assignment of PLO for the courses.
- The assessment is designed to align with the level of competency required for the CLO. The assessment may include some content corresponding to a lower level of competency than the required competency, but the weight of the content corresponding to the required competency must account for at least 60%.
- Learners are recognized as achieving the CLO if they complete at least 50% of the assigned content to assess the required competency level.
- The competency score of an output standard is converted from the completion percentage of each competency level.

- When the required competency level does not meet the requirements (the completion percentage of the required level is below 50%), the competency score of the adjacent level below is determined to calculate the competency score of the actual achieved CLO (in a similar manner).
- The competency score of a CLO is calculated in the final assessment of that CLO.
- The competency score of the training program assigned to the courses is a combination of CLO that meet the PLO with the weights specified in the detailed outline.
- The competency score of a PLO is a combination of the competency scores of the PLO assigned to the subjects with the weights specified in the output standard assignment table.

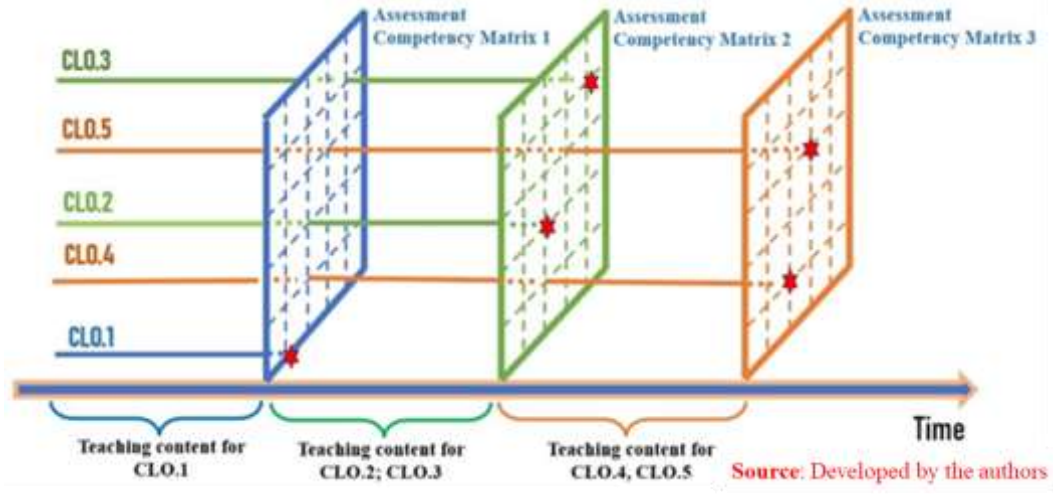


Figure 6. Assessment Competency Matrix

***Step 8.*** *Develop a teaching plan and implement teaching*

The development of teaching plans and teaching organization is a subsequent step that follows the construction of assessment capacity (Figure 7). This is crucial to ensure that the implementation of teaching and learning aligns with the established output standards and accurately measures the students' capacity. This approach is a deliberate design to ensure compatibility and address the gaps highlighted in the introduction.

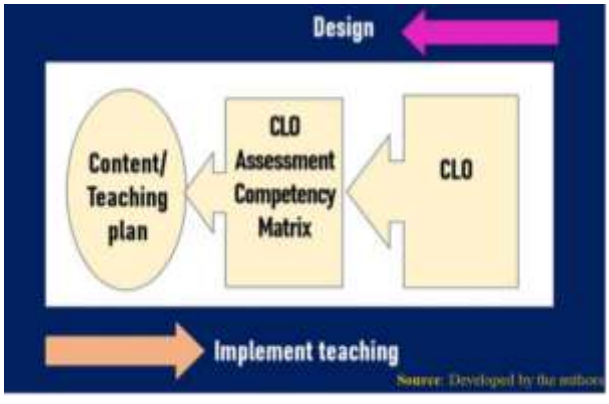

Figure 7. Teaching plan and implement teaching

## Discussion

The teacher training program development model of Vinh University has been built on the principle of competency orientation, combined with the requirement to meet output standards. This approach not only meets the requirements of modern education reform but also creates a solid foundation for training teachers who can adapt to the rapidly changing educational context. The competency-based model allows for the clear identification of core competencies that teachers need to achieve, from professional and pedagogical competencies to social and personal development competencies. This helps curriculum development to no longer focus on imparting theoretical knowledge but instead shift to developing learners' practical skills and creative thinking. Survey results show that students have significantly improved their ability to self-study, problem-solve, and apply technology in teaching - essential factors to become effective teachers in the context of modern education.

Moreover, this model also integrates specific output standards, closely following the requirements of the MOET , while reflecting the practical needs of employers and other stakeholders. The close connection between output standards and training activities not only creates transparency in the training process but also helps schools easily evaluate and adjust the program according to objective criteria.

However, this model also faces some notable challenges. The biggest challenge is to balance ensuring output standards and developing diverse student competencies. In addition, the application of new teaching and assessment methods requires changes in the awareness and skills of lecturers, which takes time and requires support in terms of management and infrastructure.

To address these challenges, we propose the following solutions:

1. *Building an Innovative University Ecosystem*: This is a collaborative model involving key stakeholders such as universities, schools, regulatory agencies, and the community. In this ecosystem, each university needs to be transformed into a center for innovation. This ecosystem facilitates the promotion of creative thinking, the application of technology, and modern teaching methods to meet societal needs. By continuously updating knowledge, skills, and learning outcomes based on current trends and real-world demands, this ecosystem contributes to improving the quality of the teaching workforce, meeting international standards, and ensuring sustainable development.

*2. Developing a teacher training program oriented towards innovation and entrepreneurship:* This includes developing a teaching model based on output standards on the basis of the CDIO model (Crawley et al., 2014); applying the Pillars of Flipped Learning and the Blended Learning method, both online and face-to-face; and designing a series of project-based teaching subjects in the teacher training program following the competency development path from the first to the fourth year of the course, in which project-based subjects will be assigned to meet 3 types of output standards in the fields of knowledge, skills, attitudes, linked to practice, linked to scientific and technological products, innovation and entrepreneurship.

*3. Developing teachers to become professional teachers:* It is necessary to train faculty members directly teaching teacher education programs to become individuals who have the ability to proactively adapt and develop training programs; have the ability to be flexible in choosing content, methods, and forms of assessment suitable for each student in order to help students

maximize their potential, while enhancing autonomy and responsibility in learning; have the capacity for digital transformation in curriculum development, lesson design, and teaching organization; have the ability to conduct scientific research, innovate, and start-up; build and develop research groups in which there is a close connection between research and training, innovation, and start-up.

*4. Creating an innovative infrastructure:* This includes building a quality management process for teacher training programs according to the International Organization for Standardization (ISO, 2018); developing an intelligent management platform on the University System for Management and Resource Tracking information technology system; and developing a digital-based LMS. Investing in building a digital learning materials production center: This center should be equipped with full functions such as building and developing teaching materials, textbooks, and lectures in digital form; providing platforms and tools for lecturers and students to conduct online teaching and learning; organizing training courses to help lecturers effectively use information technology in teaching; collaborating and sharing educational resources. Developing and perfecting research and development laboratories: These laboratories should be equipped with modern equipment and tools to support research, testing, and development of new products or technologies. R&D labs often play an important role in training pedagogical students to practice their profession and innovate to create valuable educational products, linking theory and practice.

In general, the model of developing teacher training programs of Vinh University in the direction of competency and meeting output standards not only creates innovation in educational approaches but also demonstrates a long-term vision in improving the quality of higher education. Initial results show the effectiveness of this model, but further research is still needed to assess the long-term impact and adjust it to changes in the international educational context.

## Conclusions

Developing teacher training programs that focus on capacity development and meeting output standards is a crucial factor in improving the quality of education. This approach ensures that students not only acquire theoretical knowledge but also develop practical skills, critical thinking, and professional capacity that meets the demands of society and the labor market.

To address this issue, Vietnamese universities offering teacher training programs need to invest in enhancing faculty capacity, improving infrastructure, and applying modern technology in teaching. A mechanism for continuous evaluation and improvement of the program is also essential. Furthermore, strengthening cooperation with international schools to learn and apply advanced teaching methods is crucial. By adopting this approach, Vietnamese teacher education programs can be improved, enabling students to become effective teachers who can meet the demands of the job market and their professional careers.

Vietnamese universities that offer teacher education programs have made efforts to reform their curricula towards competency development and meeting program learning outcomes. This model also helps to enhance students' adaptability to new teaching requirements, while creating a more dynamic and practical learning environment. Results from a survey involved in teaching teacher education programs indicate that both teachers and students have changed their approaches to teaching and learning. Teachers are empowered to design courses and lessons independently, while students take more initiative, enhancing their personal roles and recognizing their own value to adapt to the needs of the job market and their professional careers.

However, implementation still faces many difficulties, including lack of resources, non-innovative teaching methods, and limited ability of students to apply theory to practice. Synchronization in the process of evaluating and improving the program is also not complete.

**Competing Interests**: The authors declare that they have no competing interests.

### Ethical Consideration

The data reported in this study does not require human subjects' approval.

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