

The Development of a Dual Vocational Education Training Model to Enhance Functional Competencies in the Workplace for Vocational Teachers under the Office of the Vocational Education Commission

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Abstract

This research aimed to 1) investigate the problems and needs related to the dual system training model, 2) develop and evaluate the dual system training model, 3) trial the implementation of the model, and 4) monitor and evaluate the outcomes of the model. A research and development (R&D) methodology was employed, comprising four phases. In phase 1, the problems and needs associated with the dual system training model were studied. In phase 2, the dual system training model was developed and evaluated based on findings from phase 1. In phase 3, the developed model was trialed through implementation in a real-world context. In phase 4, the outcomes of the trial implementation were monitored and evaluated. Data were analyzed using content analysis, mean, percentage, and standard deviation. The research results found that the development of vocational teachers' workplace competencies achieved a high average score. The demand for a dual training system was also high among department heads, instructors, and administrators, all of whom emphasized the importance of hands-on training before, during, and after the training period. Notably, the highest emphasis was placed on experiential learning during and after training. The overall suitability of the proposed training model was rated at the highest level ($\bar{x} = 4.66$, S.D. = 0.47), and its overall accuracy was also at the highest level ($\bar{x} = 4.57$, S.D. = 0.49). The trial implementation and evaluation of the dual training system revealed that the overall usefulness of the model was rated as high ($\bar{x} = 4.28$, S.D. = 0.42), while its feasibility was rated at the highest level ($\bar{x} = 4.57$, S.D. = 0.40). The efficiency of the model was recorded at 89.22/81.83, surpassing the predetermined criterion of 80/80. Overall, the trainees expressed a high level of satisfaction with the program ($\bar{x} = 4.49$, S.D. = 0.44). Additionally, the follow-up assessment by academic affairs deputy directors, industrial engineering department heads, and workplace training supervisors indicated that the trainees demonstrated the highest level of competency in practical applications ($\bar{x} = 4.82$, S.D. = 0.26). These findings underscore the quality and effectiveness of the well-designed and appropriately structured training program.

Introduction

Vocational education management in Thailand faces several major challenges that can affect the quality of education and students' skill development. One critical issue is the shortage of teachers with practical skills, which hampers the effectiveness of real-world skill training (Independent Committee for Education Reform, 2019). Furthermore, there is a lack of concurrent development in technology and human resource training for teachers. This gap has resulted in a disconnect between the education provided in many vocational colleges and the actual requirements of the business sector (Thailand Development Research Institute, 2016).

Businesses, on the other hand, struggle with a shortage of skilled labor tailored to their needs, often necessitating in-house training that increases operational costs (Thailand Development Research Institute, 2016). Additionally, the varying capacities of educational institutions result in disparities in quality. Institutions lacking skilled personnel and high-quality equipment tend to produce graduates with lower competencies (Vocational Education Evaluation and Monitoring Division, 2021).

According to the standards for teacher development in the Dual Vocational Education system, teachers are required to undergo at least 80 hours of professional development annually through industry placements. However, the lack of professional experience among new teachers continues to be a major obstacle to improving the quality of education (Vocational Education Evaluation and Monitoring Division, 2019).

In response to these challenges, the researcher proposes enhancing the capacity of vocational education teachers who undergo training in workplaces. These teachers should develop the ability to create competency-based training plans and effectively use relevant documents and guidelines during training. Providing teachers with opportunities to gain practical experience in real-world workplaces will enable them to learn

actual work processes and apply this knowledge to their teaching.

This approach will equip teachers to design lessons that align with changes in the economy, society, and technology, ensuring that students acquire the skills needed for today's workforce. Such efforts will contribute to sustainable development in vocational education.

To address these needs, this research aimed to develop a Dual Vocational Education model designed to improve the workplace performance competencies of vocational education teachers. This model will enhance the ability of vocational education programs to produce students who are well-prepared for real-world work environments at both the Vocational Certificate and Higher Vocational Certificate levels. By bridging the gap between academic learning and practical application, the proposed model seeks to raise the standard of vocational education and support long - term workforce development in Thailand.

Research Objectives

1. To investigate the problems and needs related to the dual vocational training model for enhancing the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission.

2. To develop and evaluate the dual vocational training model aimed at improving the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission.

3. To trial the implementation of the dual vocational training model designed to enhance the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission.

4. To monitor and evaluate the outcomes of implementing the dual vocational training model for developing the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission.

Literature Reviews

This study aims to investigate the development and application of a dual vocational training model to enhance the operational competencies of vocational teachers. To establish a theoretical foundation, the researcher reviewed concepts and related literature, focusing on five main areas:

1. Dual Vocational Education Management

The dual vocational education system (DVE) in Thailand has been strategically developed to promote collaboration between educational institutions and industries. Under the Vocational Education Act B.E. 2551, DVE is recognized as a form of education where students learn both in vocational institutions and through hands-on practice in workplaces. This approach aligns with national policies such as the 20-Year National Strategy (2018–2037), which prioritizes human capital development to meet labor market demands and enhance national competitiveness (Office of the Vocational Education Commission [OVEC], 2024).

The system also benefits various stakeholders. Learners gain real-world skills and employment opportunities, institutions reduce the resource burden for technical training, and enterprises can recruit job-ready graduates while enjoying tax incentives and reputational benefits.

2. Concepts and Theories of Competency

The concept of competency was first formalized by McClelland (1973), who argued that attributes such as skills, motivation, and traits are better predictors of performance than IQ tests. Later, Boyatzis (1982) emphasized that competencies encompass internal characteristics that lead to effective job performance. In vocational education, competencies are broadly classified into general core competencies, like analytical thinking, communication, and ethics, and technical/professional competencies specific to job functions (OVEC, 2019).

3. Model Development Approaches

Developing a training model involves systematic steps including needs assessment,

model design, validation, implementation, and evaluation. The process incorporates the principles of instructional systems design (ISD), design thinking, and participatory collaboration with stakeholders. The present study developed its model through four phases: situation analysis, model construction, model trial, and follow-up evaluation, ensuring alignment with both theoretical constructs and real-world contexts.

4. Training Principles

Training is essential for building job-related competencies. Effective training programs incorporate experiential learning, workplace simulations, and coaching, especially in a dual education system where both school and industry settings play roles. Trainers must be well-prepared with content knowledge and the ability to transfer skills. Training success depends on the clarity of learning objectives, the appropriateness of training methods, and the continuous feedback provided to learners (Noe, 2017).

Scope of the Research

This research encompasses the following areas:

1. Content Scope

The dual vocational training model aimed to develop the workplace performance competencies of vocational education teachers specializing in industrial engineering under the Office of the Vocational Education Commission. The competencies gained through this training can be applied to create lesson plans and deliver effective teaching to students.

2. Population and Sample

The population and sample groups for this study were determined based on the following stages:

Stage 1: Problem Analysis and Needs Assessment

The population comprised 5,334 administrators and teachers across all levels of education, including those teaching vocational certificate and higher vocational certificate courses in industrial engineering under the Office of the Vocational Education Commission.

The sample consisted of administrators and instructors in the industrial trades under the Office of the Vocational Education Commission. The appropriate sample size was determined using Taro Yamane's formula, based on a population of 5,334 individuals, with a margin of error of 0.05. The obtained sample size was subjected to stratified random sampling to divide the sample into five regions. Subsequently, purposive sampling was used to select participants based on specified criteria, totaling 372 individuals, including 35 administrators, 104 department heads, and 233 industrial trade instructors under the Office of the Vocational Education Commission.

Stage 2: Development of the Training Model

The evaluation process of the dual vocational training model for enhancing the workplace competencies of vocational teachers under the Office of the Vocational Education Commission involved a target group consisting of six vocational education administrators, two workplace administrators, and three academic experts, totaling 11 participants. The study employed a Focus Group Discussion (FGD) method, engaging experts in curriculum development, instructional management, and training program design, each with no less than five years of experience in their respective fields.

Stage 3: Implementation of the Training Model

- The target group for the tryout phase of the dual vocational training model, aimed at enhancing the workplace competencies of vocational teachers, was selected based on specified criteria. The group comprised 7 participants, including 2 workplace trainers and 5 industrial trade department heads.

- The target group for the implementation phase of the dual vocational training model, aimed at enhancing the workplace competencies of vocational teachers, was selected based on specified criteria. This group comprised 13 participants, including 5 workplace trainers and 8 industrial trade department heads from Prachinburi Technical College.

Stage 4: Monitoring and Evaluation of the Training Model

- The target group includes industrial trade teachers from Prachinburi Technical College who have undergone training from 2 workplace trainers with workplace experience of no less than 2 years.

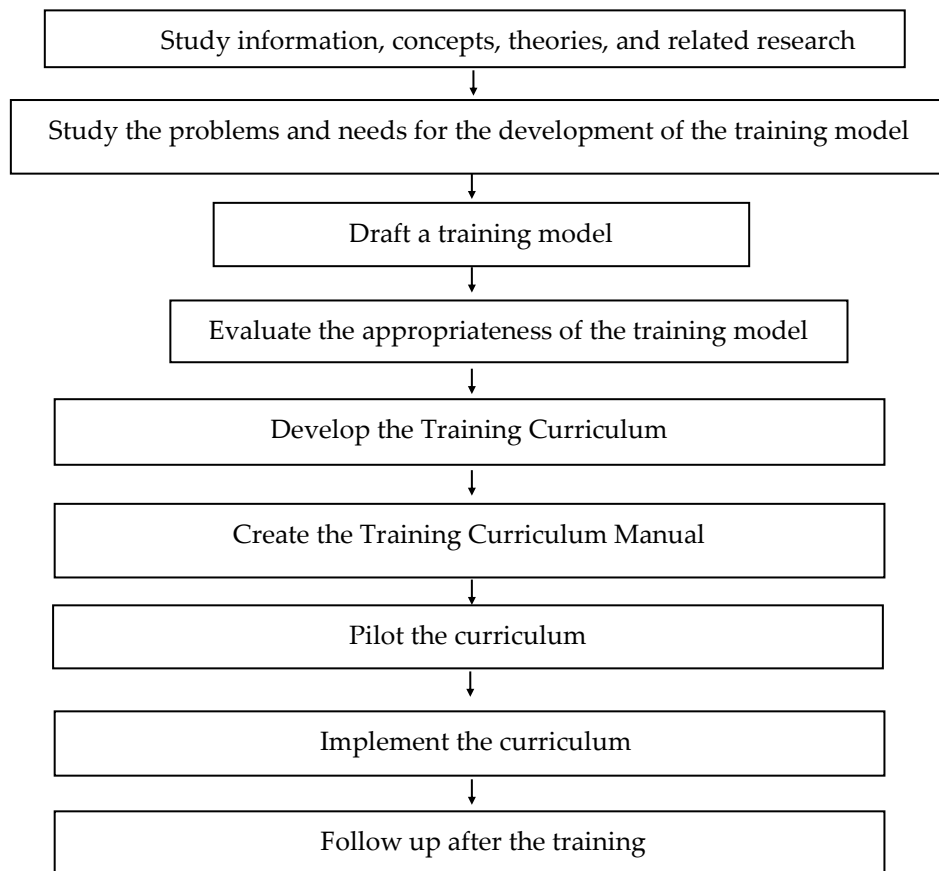
- The target group for post-training monitoring included 2 industrial trade department heads from Prachinburi Technical College, 2 head supervisors of workplace trainers, and 1 deputy director of academic affairs.

3. Time

The research was conducted from the academic years 2023 to 2024.

Research Methodology

The research on the development of a dual vocational training model to enhance the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission followed the process outlined in Figure 1.

Figure 1*Research process steps*

Research Results

The results of developing a dual vocational training model to enhance the operational competencies of vocational education teachers under the Office of the Vocational Education Commission are as follows:

1. The results of investigating the problems and needs for a dual system training model to enhance workplace competencies among vocational teachers under the Office of the Vocational Education Commission revealed that the overall operational challenges in workplaces encompassed three key aspects, including pre-training needs, during-training needs, and post-training needs. These challenges were perceived at a high level by the respondents. Additionally, the need to develop workplace competencies was reported at the highest level across all three respondent groups.

1.1 The respondent group consisting of department heads identified key challenges in

workplace operations. The highest-rated issue was the integration of workplace competency development training into instructional planning, with a mean score of $\bar{X} = 4.92$ (S.D. = 0.93). This was followed by the availability of a clear competency development manual for workplace training ($\bar{X} = 4.82$, S.D. = 1.01) and the existence of a structured competency development training plan ($\bar{X} = 4.80$, S.D. = 0.98). Regarding the assessment of the need for workplace competency development, the highest-rated requirement was the provision of a trainer's manual for competency development, with a mean score of $\bar{X} = 4.91$ (S.D. = 0.63). This was followed by the need for enterprises to establish structured competency training plans ($\bar{X} = 4.86$, S.D. = 0.70) and the need for training programs on lesson planning for vocational teachers in the dual system model ($\bar{X} = 4.83$, S.D. = 0.65).

1.2 The respondent group consisting of teachers identified key challenges in workplace operations. The highest-rated issue was the availability of a clear competency development manual for workplace training, with a mean score of $\bar{X} = 4.90$ (S.D. = 0.99). This was followed by the existence of a structured model for developing the competencies of workplace trainers ($\bar{X} = 4.88$, S.D. = 0.93) and the integration of workplace competency development training into instructional planning ($\bar{X} = 4.87$, S.D. = 0.77). Regarding the assessment of the need for workplace competency development, the highest-rated requirement was the enhancement of competency training models to improve efficiency, with a mean score of $\bar{X} = 4.86$ (S.D. = 0.66). This was followed by the need for enterprises to establish structured competency training plans ($\bar{X} = 4.84$, S.D. = 0.71) and the necessity of a trainer's manual for workplace competency development ($\bar{X} = 4.83$, S.D. = 0.68).

1.3 The respondent group of administrators identified challenges in workplace operations as follows: The highest-rated issue was the provision of an orientation session prior to workplace competency development training, with a mean score of

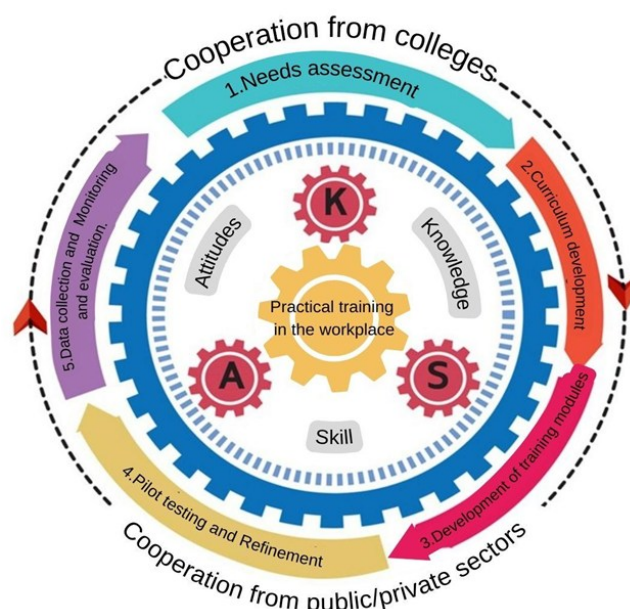
$\bar{X} = 4.54$ (S.D. = 0.79). This was followed by the clear establishment of understanding regarding workplace competency development training ($\bar{X} = 4.39$, S.D. = 0.69), the integration of workplace competency development training into instructional planning ($\bar{X} = 4.29$, S.D. = 0.69), and the formulation of plans for developing the knowledge, skills, and competencies to be applied in instructional planning ($\bar{X} = 4.29$, S.D. = 0.71). Regarding the assessment of the need for workplace competency development, the highest-rated requirement was the provision of in-house mentor support during training and the monitoring of the implementation of the dual system training model, with a mean score of $\bar{X} = 4.86$ (S.D. = 0.36). This was followed by the need to enhance the effectiveness of the workplace competency training model ($\bar{X} = 4.82$, S.D. = 0.39).

2. The results of the development of the dual vocational training model to enhance the operational competencies of vocational education teachers in the workplace under the Office of the Vocational Education Commission are as follows:

The results of the study from Phase 1 were used to draft the model, as shown in Figure 2.

Figure 2

(Draft) The Dual Vocational Training Model to Develop Competency in Workplace Performance for Vocational Education Teachers under the Office of the Vocational Education Commission



The (Draft) Dual Vocational Training Model to Develop Competency in Workplace Performance for Vocational Education Teachers under the Office of the Vocational Education Commission consists of 7 steps. Both the workplace and educational institution are involved in every step, including 1) Needs assessment, 2) Curriculum development, 3) Development of training modules, 4) Pilot testing, 5) Refinement, 6) Data collection, and 7) Monitoring and evaluation.

Following the Focus Group consultation with experts, suggestions were made to revise the draft of the Dual Vocational Training Model for Developing Competency in Workplace Performance for Vocational Education Teachers under the Office of the Vocational Education Commission. The revision should emphasize a model that presents its components in a complete and well-structured format, along with the expected outcomes of implementing the model.

The model must reflect the development of three core dimensions of competency:

Knowledge refers to the understanding required to perform duties effectively and safely within a given profession or responsibility. Skills represent the ability to apply knowledge and experience to complete tasks and perform duties with efficiency.

Attitude involves professional ethics, personal traits aligned with occupational standards, and a sense of responsibility. It includes values such as honesty, fairness, and integrity, all of which enable individuals to work collaboratively and constructively with others.

Based on expert recommendations, the training model was refined and simplified into the following five key steps, as shown in Figure 2:

1. Needs assessment
2. Curriculum development
3. Development of training modules
4. Pilot testing and refinement
5. Data collection, monitoring and evaluation

There will be checks to use feedback for making periodic improvements at every step of the curriculum development process.

Table 1

Evaluation results for the appropriateness and accuracy of the draft model for dual system training aimed at enhancing the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission, as assessed by experts (n = 19)

Evaluation Items	$\bar{X}$	S.D.	Suitability level	$\bar{X}$	S.D.	Accuracy level
1. Identifying the needs of dual system training to enhance the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission (NEEDS)	4.73	.43	The highest	4.66	.46	The highest
2. Developing a dual system training curriculum to enhance the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission	4.82	.40	The highest	4.55	.52	The highest
3. Developing a dual system training package to enhance the workplace performance competencies of vocational education teachers	4.64	.50	The highest	4.64	.50	The highest
4. Piloting the dual system training package	4.45	.52	The highest	4.64	.50	The highest
5. Revising the dual system training package	4.64	.50	The highest	4.64	.50	The highest
6. Collecting data to improve the dual system training package	4.70	.41	The highest	4.59	.45	high
7. Monitoring and evaluating the implementation of the dual system training package	4.64	.50	The highest	4.27	.47	The highest
Overall average	4.66	.47	The highest	4.57	.49	The highest

Table 1 reveals that the overall appropriateness is rated at the highest level ($\bar{X}$ = 4.66, S.D. = 0.47), and the accuracy is also rated at the highest level ($\bar{X}$ = 4.57, S.D. = 0.49). When considering the top three aspects of the model's appropriateness, 1) Developing a dual system training curriculum is rated at the highest level ($\bar{X}$ = 4.82, S.D. = 0.40), 2) Identifying the needs of dual system training to enhance the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission (NEEDS) is rated at the highest level ($\bar{X}$ = 4.73, S.D. = 0.43), and 3) Collecting data to improve the dual system training package is rated at the highest level ($\bar{X}$ = 4.70, S.D. = 0.41). When considering the

top three aspects of the model's accuracy, 1) Identifying the needs for dual system training to enhance the workplace performance competencies of vocational education teachers (NEEDS) is rated at the highest level ($\bar{X}$ = 4.66, S.D. = 0.46), and 2) Developing a dual system training package, piloting the dual system training package, and revising the dual system training package all have the same average score and are rated at the highest level ($\bar{X}$ = 4.64, S.D. = 0.50).

3. The results of piloting the training model, specifically the dual system training package designed to enhance the workplace performance competencies of vocational education teachers, are shown in Table 2.

Table 2

Evaluation results of the usefulness and feasibility of the dual system training package for enhancing the workplace performance competencies of vocational education teachers, as assessed by experts (n=7)

Evaluation Items	$\bar{X}$	S.D.	Usefulness level	$\bar{X}$	S.D.	Feasibility level
1. Identifying the needs for dual system training to enhance the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission (NEEDS)	4.54	.39	The highest	4.57	.39	The highest
2. Developing a dual system training curriculum to enhance the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission	4.43	.53	high	4.43	.53	high
3. Developing a dual system training package to enhance the workplace performance competencies of vocational education teachers	4.43	.53	high	4.57	.53	The highest
4. Piloting the dual system training package	5.00	.00	The highest	5.00	.00	The highest
5. Revising the dual system training package	4.29	.49	high	4.29	.49	high
6. Collecting data to improve the dual system training package	4.71	.49	The highest	4.29	.49	high
7. Monitoring and evaluating the implementation of the dual system training package	4.57	.53	The highest	4.86	.38	The highest
Overall average	4.28	.42	high	4.57	.40	The highest

As seen in Table 2, it was found that the overall usefulness was rated at a high level ($\bar{X}$ = 4.28, S.D. = 0.42), while the feasibility was rated at the highest level ($\bar{X}$ = 4.57, S.D. = 0.40). Regarding the usefulness of the dual system training package, the top three items with the highest average scores were 1) Piloting the dual system training package, rated at the highest level ($\bar{X}$ = 5.00, S.D. = 0.00), 2) Collecting data to improve the dual system training package, rated at the highest level ($\bar{X}$ = 4.71, S.D. = 0.49), and 3) Monitoring and evaluating the implementation of the dual system training package, rated at the highest level ($\bar{X}$ = 4.57, S.D. =

0.53). Concerning the feasibility of the dual system training package, the top three items with the highest average scores were 1) Piloting the dual system training package, rated at the highest level ($\bar{X}$ = 5.00, S.D. = 0.00), 2) Monitoring and evaluating the implementation of the dual system training package, rated at the highest level ($\bar{X}$ = 4.86, S.D. = 0.38), and 3) Identifying the needs for dual system training to enhance workplace performance competencies (NEEDS) and developing the dual system training package, both with equal average scores, rated at the highest level ($\bar{X}$ = 4.57, S.D. = 0.53).

Table 3

Efficiency Evaluation of the Dual System Training Program for Enhancing Workplace Competencies among Vocational Education Teachers

Score	Full Score (N)	Total Score ΣX	Average Score $\bar{X}$	Percentage
Efficiency of Exercise Completion (E1)	30	348	26.77	89.22
Efficiency of Test Completion (E2)	30	319	24.55	81.83

Table 3 shows that the effectiveness of the dual system training model, which aimed to enhance the operational performance of vocational education teachers under the Office of the Vocational Education Commission through practical

implementation, resulted in an exercise completion rate (E1) of 89.22% and a test completion rate (E2) of 81.83%. Both values exceed the predetermined standard of 80/80.

Table 4

Practical Scores for the Dual System Training Model to Enhance the On-the-Job Performance Competencies of Vocational Education Teachers under the Office of the Vocational Education Commission

Score	Full Score (N)	Total Score ΣX	Average Score $\bar{X}$	Percentage
Average Practical Scores for the Training Model	30	297	22.85	76.31

Table 4 shows that the practical scores of the dual system training model accounted for

76.31%, which exceeds the predetermined standard of 75%.

Table 5*Average satisfaction assessment scores of the training participants (n = 13)*

Item (s)	$\bar{X}$	S.D.	Satisfaction level
1. Clarity of the training content	4.38	.51	high
2. Relevance of the content to writing vocational training plans	4.77	.44	The highest
3. Variety of techniques and methods used in the training	4.69	.48	The highest
4. Trainer's knowledge and ability to deliver the content	4.38	.51	high
5. Response to questions and provision of advice by the trainer	4.31	.48	high
6. Trainer's communication skills and ease of understanding	4.46	.52	high
7. Convenience in registration and training management	4.69	.48	The highest
8. Comfort and facilities at the training location	4.46	.52	high
9. Time management and duration of the training	4.31	.48	high
Total	4.49	.44	high

As shown in Table 5, the trainees' overall satisfaction was rated at a high level ($\bar{X}$ = 4.49, S.D. = 0.44). The item with the highest satisfaction was the relevance of the content related to writing vocational training plans ($\bar{X}$ = 4.77, S.D. = 0.44), followed by the diversity of techniques and methods used in the training, as well as the convenience of registration and training management, both of

which had the same average score ($\bar{X}$ = 4.69, S.D. = 0.48).

4. The results of monitoring the implementation of the dual system training model to enhance the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission are shown.

Table 6*Average performance abilities of the trainees, as evaluated by the Deputy Director of Academic Affairs and the Head of the Industrial Vocational Program*

Assessment Criteria for the Workplace Performance of Training Participants	$\bar{X}$	S.D.	Ability level
Knowledge	4.77	0.41	The highest
Knowledge and Communication	4.80	0.45	The highest
Organizational Efficiency and Management Quality	4.80	0.45	The highest
Analytical Thinking, Decision Making, Planning, and Problem Solving	4.60	0.55	The highest
Coordination in Professional Work	4.60	0.55	The highest
Safety Management	4.80	0.45	The highest
Relevant Legal Requirements for the Profession	5.00	0.00	The highest
Skills	4.85	0.34	The highest
Health and Safety Skills regarding Regulations and Standards	4.80	0.45	The highest
Skills in Occupational Safety, Health, and Environmental Practices	4.80	0.45	The highest
Skills in Using Tools, Equipment, and Materials in the Profession	5.00	0.00	The highest
Skills in Specialized Occupational Tasks	4.80	0.45	The highest

Assessment Criteria for the Workplace Performance of Training Participants	$\bar{X}$	S.D.	Ability level
Attitude	4.65	0.52	The highest
Morality and Ethics	4.60	0.55	The highest
Professional Ethics	4.60	0.55	The highest
Characteristics According to Social Norms	4.60	0.55	The highest
Professional Traits	4.80	0.45	The highest
Total	4.76	0.42	The highest

As shown in Table 6, the follow-up results of the dual system training model for enhancing the operational performance competencies of vocational education teachers under the Office of the Vocational Education Commission revealed that the trainees' overall performance abilities were at the highest level. When considering each aspect, it was found that the skills aspect had the highest average performance ability score, followed by the knowledge aspect and the attitude aspect.

The follow-up discussions with participants who underwent the dual system training and post-training follow-ups revealed several insights, which can be categorized into three main aspects: knowledge, skills, and attitude.

Participant 1 (December 2024)

In terms of **knowledge**, the trainer reported gaining essential knowledge on professional development to enhance organizational performance, including critical thinking, decision-making, planning, problem-solving, career coordination, safety management, and related legal requirements.

For **skills**, the trainer showed strong understanding and strict compliance with occupational health and safety protocols. This encouraged students to learn naturally through observation and modeling. Moreover, the trainer could assess potential hazards and promptly recommend safe practices, reducing accidents during internships and reinforcing a disciplined and responsible work ethic.

Regarding **attitude**, the trainer served as a role model in both action and mindset, emphasizing honesty, fairness, and sincerity. These ethical qualities fostered credibility among students and promoted transparent, fair, and value-driven training.

Participant 2 (December 2024)

In the **knowledge** aspect, the trainer had deep expertise in the field and could provide accurate, suitable guidance. Knowledge was transferred in a clear and engaging manner, thus enhancing learning efficiency. Good communication helped reduce misunderstandings and strengthened teamwork.

Concerning **skills**, the trainer demonstrated specialized expertise and trained students in realistic work environments, which allowed students to gain in-depth comprehension, including industry-specific techniques and standards.

On **attitude**, the trainer had a personality that fit the role, showing patience, communication skills, technical knowledge, and the ability to motivate and inspire. These traits supported effective teaching and encouraged students to develop themselves further.

Participant 3 (December 2024)

Regarding **knowledge**, the trainer understood quality management and was able to instill awareness of standards, continuous improvement, and performance factors contributing to organizational competitiveness. The trainer could also analyze problems, plan, and make sound decisions while handling real situations effectively.

In terms of **skills**, the trainer exhibited strong coordination across departments and adhered strictly to safety standards, enabling students to learn naturally by observing and imitating. The trainer could assess dangers and promptly suggest safe practices, minimizing accidents and promoting structured, responsible behavior.

For **attitude**, the trainer consistently modeled honesty, fairness, and commitment to professional ethics.

Participant 4 (December 2024)

In the **knowledge** dimension, the trainer could efficiently analyze problems, plan, and make decisions based on real-life situations. Collaboration across departments was effective while ensuring legal compliance.

In terms of **skills**, the trainer, with technical expertise, was able to explain work processes, specific techniques, and professional standards. Risks could be assessed so immediate safety measures could be suggested, thus reducing training accidents and enhancing workplace discipline.

For **attitude**, the trainer demonstrated politeness, punctuality, responsibility, respectfulness, and a professional demeanor.

Participant 5 (December 2024)

In the area of **knowledge**, the trainer's understanding of quality management enabled the introduction of concepts of standards, work improvement, and performance, crucial to enhancing organizational competitiveness. Legal compliance was also emphasized.

Regarding **skills**, the trainer showed expertise in using tools and equipment correctly, performing basic maintenance, and ensuring readiness before operation. The trainer possessed domain-specific technical knowledge.

For **attitude**, the trainer served as a role model for professional conduct.

Summary and Discussion

The research on the development of the dual system training model to enhance the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission aimed to 1) investigate the problems and needs of the dual system training model to enhance the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission, 2) develop and evaluate the dual system training model, 3) test the dual system training model, and 4) monitor the results of using the dual system training model. The research results revealed the following:

1. The results of the study on the problems and needs of the dual system training model to enhance the workplace performance competencies of vocational education teachers revealed that vocational education teachers highly desire dual system training, especially during the internship period. The main concern is the long duration of the training and the lack of additional income. Regarding dual system training, teachers require support such as accommodation welfare, mentoring, and technology transfer. It is recommended that training programs be developed with appropriate support and welfare to enhance work efficiency. Supported training will help reduce the burden on vocational teachers during the internship period, both financially and in their daily lives, allowing them to work effectively without worrying about accommodation. Having a mentor will guide the vocational teachers and provide advice for real work in the workplace. Additionally, transferring new technologies will help teachers update their skills and knowledge, enabling them to apply it effectively in teaching and work. Such support will result in quality training and positive outcomes for both teachers and students in the future.

This aligns with the research by Sutiwandhanawat (2021), which found that the development approach for vocational teachers in the dual system training model includes the development of competencies in four areas, including professional skills, attitude, vocational education management, and learning management. The priorities, from the highest to lowest, are professional competencies and attitude, with the development of teachers during work time being the most important, followed by the development of teachers outside of work hours, and the least priority being the combined development of teachers during work time and outside of work time. As for the development methods, teachers should improve their ability to apply knowledge, professional skills, learning resources, learning organization, and assessment, as well as the use of information technology in training and writing vocational training plans suitable for the workplace.

2. The results of the development of the dual system training model to enhance the workplace performance competencies of vocational education teachers revealed that the training model consists of 7 steps, with both the workplace and educational institution involved in every step. These steps include 1) Needs assessment, 2) Curriculum development, 3) Development of training materials, 4) Pilot testing, 5) Improvement, 6) Data collection, and 7) Monitoring and evaluation. Throughout each step of the curriculum development process, there is a continuous review, allowing for periodic adjustments based on feedback.

Overall, appropriateness was rated at the highest level ($\bar{x} = 4.66$, S.D. = 0.47), while accuracy was also rated at the highest level ($\bar{x} = 4.57$, S.D. = 0.49). The training model was carefully designed and implemented in every step, with full participation from both the workplace and educational institutions, from needs assessment to follow-up and evaluation. Additionally, the curriculum was reviewed at each step and improved continuously, which allowed it to effectively address the actual

needs of vocational education teachers. Furthermore, the collection of data and feedback for curriculum improvement contributed to enhancing both the accuracy and appropriateness of the training process, ensuring its sustainability.

This finding was consistent with the research by Bua-in (2021), which found that the main challenges faced by on-the-job trainers in workplaces were related to creating vocational training plans with trainers, providing guidance, and solving problems at the workplace, as well as following up on learners' progress and reporting the results of the supervision to the management. The results of developing the on-the-job trainer's manual include an introduction, management of the vocational education dual system, educational supervision, and guidelines for supervision, with a consistency index of 1.00 for all items. The evaluation of the manual's appropriateness found that, overall, it was rated at the highest level, with the highest scores in language use, content design, and presentation.

3. The results of the pilot implementation of the dual system training model to enhance the workplace performance competencies of vocational education teachers revealed that the overall usefulness was rated at a high level ($\bar{x} = 4.28$, S.D. = .42), while the feasibility was rated at the highest level ($\bar{x} = 4.57$, S.D. = .40). The effectiveness ratio of the training model was 89.22/81.82, which meets the required 80/80 criteria. Overall, the satisfaction of the trainees was rated as high ($\bar{x} = 4.49$, S.D. = .44). This is because the training design appropriately addresses the needs of vocational education teachers, focusing on competency development that can be directly applied in the workplace. Additionally, the training can feasibly be implemented in real-world situations, leading to high satisfaction among trainees, who can effectively apply the knowledge they gain. This aligns with the research by Boonsri (2019), which found that the vocational training curriculum for preparing students for internships in dual-system enterprises

consisted of three main areas: knowledge, skills, and attributes. Enterprises expect students to have basic knowledge in maintenance and automotive repair, as well as desirable attributes. The trial implementation of the curriculum revealed that students showed significant improvement in knowledge and skills, and their attributes were at a high level. Moreover, student satisfaction with the curriculum was high, with stakeholders agreeing that the curriculum was appropriate, beneficial, and applicable in all areas.

4. The results of the follow-up on the use of the dual system training model to develop workplace performance competencies in vocational education teachers under the Office of the Vocational Education Commission revealed that, overall, the trainees' ability to perform, as assessed by the Deputy Director of Academic Affairs and the Head of the Industrial Arts Department, was at the highest level ($\bar{X} = 4.69$, $S.D = .56$). This was due to the development of a curriculum that is suitable and aligned with the actual working conditions in the enterprise, which enables the trainees to effectively apply their knowledge and skills in the workplace, thus meeting the needs of the enterprise. This is consistent with the research by Sutiwandhanawat (2021), which studied the development of vocational education teachers in the dual system. The study found that the development of teachers should focus on four competencies comprising professional skills, attitudes, management of dual system vocational education, and management of learning. The emphasis was on developing the ability to apply professional knowledge and skills, as well as developing learning tools and assessment methods. Furthermore, the study suggested three types of teacher development, comprising in-service development, development outside working hours, and a blended approach. The choice of training methods should be suitable for the work environment of the enterprise.

Recommendations and suggestions

Regarding the development of the dual system training model to enhance the workplace performance competencies of vocational education teachers under the Office of the Vocational Education Commission, the researcher offers the following recommendations:

1. Suggestions for the application of research findings:

1.1 The research findings can be used to develop a dual system training curriculum by involving both enterprises and educational institutions in every step of curriculum development, from the needs assessment for training to the follow-up and evaluation process. This approach will help enhance the competencies and work performance of vocational education teachers in enterprises.

1.2 Efforts should be made to foster networks between vocational education institutions and enterprises to facilitate knowledge and experience exchange. This will ensure that the training is aligned with the actual needs of the labor market.

1.3 Regular monitoring and evaluation of the training program should be conducted to ensure that the curriculum is continuously improved and better meets the needs of both vocational education teachers and enterprises. Further, feedback from evaluations should be used as a tool for ongoing development.

2. Suggestions for future research:

2.1 Comparative study on the development of vocational education teachers' competencies: Future research should compare the development of competencies of vocational education teachers across different colleges or industries to examine the varying impacts of industry types and training models.

2.2 Expand the sample group: The sample group should be expanded to include vocational education teachers from all regions and enterprises

across various fields of study. This will provide comprehensive data that can be used to improve and develop training curricula more effectively.

2.3 Explore the use of information technology and online learning in dual system training: Future studies should investigate the integration of information technology and online learning in dual system training. This could be valuable in enhancing the knowledge and skills of vocational education teachers and enterprises in the digital age.

2.4 Long-term study on training outcomes: A long-term study should be conducted to assess the sustained impact of the training on the work performance of vocational education teachers and the satisfaction of enterprises. Additionally, the effects of the training on students' employability and competitiveness in the labor market should be explored.

Human Research Ethics

This research involved the collection of general information that did not affect the rights, privacy, or well-being of the participants. The researcher strictly followed research ethics throughout the study and obtained informed consent from all participants and relevant stakeholders prior to data collection.

Use of AI in Research

In conducting this research, the researcher applied Artificial Intelligence (AI) technology as a supporting tool to enhance the quality of academic content. ChatGPT was utilized to assist in content verification, information structuring, and language refinement for academic presentation. Nevertheless, the researcher was primarily responsible for analyzing, synthesizing, and composing the content, with the use of AI serving solely as an auxiliary tool to support the research process and improve work efficiency.

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