

Evaluation of an Integrated Contextual Learning Model to Strengthen Professional and Reflective Competence of Future Vocational Education Teachers

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Abstract—This study evaluated an integrated contextual learning model for strengthening the professional and reflective competence of future vocational education teachers. The model integrated engineering-related instruction with foreign language learning to create interdisciplinary and professionally relevant learning experiences. A mixed-methods approach involving pedagogical modelling, experimental instruction, questionnaires, competence tests, observation, and statistical analysis was employed. Reflective competence was evaluated through motivational, cognitive, activity-based, and reflective components. The results showed that 54.1% of students in the experimental group achieved a high level of reflective competence, compared with 19.5% in the control group. The findings demonstrate that integrating technical, communicative, and reflective learning within contextual professional situations can support reflective thinking, professional self-regulation, and adaptive decision-making. The proposed model provides a practical framework for strengthening professional competence in vocational teacher education.

Keywords—contextual learning, interdisciplinary learning, professional competence, reflective competence, vocational education.

I. INTRODUCTION

Vocational education has an important role in preparing graduates for professional environments characterized by technological development, changing workplace requirements, and increasingly complex occupational tasks. Consequently, vocational education teachers require competencies extending beyond mastery of disciplinary and pedagogical knowledge. They must also be capable of connecting technical knowledge with practical situations, communicating professional information, adapting to changing conditions, solving problems, and evaluating their own professional practices. These competencies are increasingly important because employability and professional readiness depend on the ability to transfer

knowledge into authentic workplace situations (Behle, 2020).

Employability in vocational education involves a combination of technical and transferable competencies. Contemporary workplaces increasingly value critical thinking, creativity, communication, adaptability, problem-solving, and the ability to manage professional development. These competencies allow individuals to respond effectively to unfamiliar situations and changing occupational requirements rather than relying exclusively on predetermined technical procedures (Tushar & Sooraksa, 2023; McGrath & Yamada, 2023). The importance of such transferable competencies provides a basis for designing vocational learning environments that connect disciplinary knowledge with professional situations.

Contextual learning is one way to make this connection. Contextual learning does not consist of the presentation of knowledge as academic content, but of putting concepts in situations that learners can relate to professional activities and practical problems. This orientation is especially relevant when considering vocational education, where students are expected to apply knowledge, rather than simply reproduce it. Contextual learning therefore offers students the chance to interpret professional problems, select relevant knowledge, propose solutions and evaluate the consequences of their decisions.

Higher-order thinking can also be facilitated by problem-oriented and contextual learning. Real problem-based learning activities encourage students to analyze the situation, relate different sources of knowledge, evaluate alternatives, and formulate appropriate responses. Previous studies in vocational and science education have shown the significance of contextual and problem-oriented instructional environments for improving higher-order thinking and transferable competencies (Agussuryani et al., 2020; Sumarni & Kadarwati, 2020).

But professional competence is more than just solving a particular problem successfully. Furthermore, future

vocational education teachers should be able to evaluate their decision-making, identify deficiencies in their professional actions, and determine how to improve their performance. This ability is closely related to reflective competency. Reflection turns professional experience into a learning tool by making people rethink their knowledge, actions, decisions, and results. Reflective judgment can therefore contribute to more responsible and adaptive professional decision-making (Zeidler et al., 2009; Ashwin et al., 2015).

Reflective competence is especially significant for future vocational education teachers, as their professional tasks are a combination of technical and pedagogical aspects. They must understand engineering-related knowledge while simultaneously determining how that knowledge should be interpreted, communicated, and applied within instructional situations. Reflective learning provides a mechanism for examining this relationship between technical understanding and professional action. In engineering education, reflection can support students in connecting disciplinary knowledge with professional judgment and learning from practical experience (Kember et al., 2008; Winberg et al., 2020).

In the present study, reflective competence is conceptualized through four interconnected components: motivational, cognitive, activity-based, and reflective. The motivational component concerns students' willingness to engage in professional development and self-improvement. The cognitive component represents the knowledge required to understand and evaluate professional situations. The activity-based component concerns the application of knowledge in professional and pedagogical activities, while the reflective component involves self-analysis, self-evaluation, professional self-regulation, and consideration of alternative actions. These components provide the conceptual basis for evaluating reflective competence among future vocational education teachers.

Interdisciplinary learning provides an additional mechanism for developing these competencies. Professional situations rarely require knowledge from only one academic discipline. Future vocational teachers may simultaneously need technical understanding, pedagogical reasoning, communication skills, and professional judgment. Interdisciplinary education can help students integrate knowledge originating from different disciplinary domains and apply it to complex problems (Knight et al., 2013; Lattuca et al., 2013). In this study, interdisciplinary learning was operationalized through the integration of engineering-related instruction and foreign language learning. Engineering subjects, including vehicle technical operation and service, provided professionally relevant technical contexts, whereas foreign language learning provided opportunities to interpret and communicate professional information. The combination was designed to move students beyond discipline-separated learning toward situations requiring technical understanding, communication, application, and reflection.

This approach is also consistent with competence-oriented vocational education. Professional readiness is strengthened when learning activities are aligned with the

competencies required in professional practice rather than organized exclusively around content acquisition. Previous vocational education studies have emphasized the importance of integrative approaches and competence development in preparing learners and instructors for contemporary professional requirements (Shahroni et al., 2022; Khamdamovna, 2025).

Despite increasing attention to contextual learning, interdisciplinary education, employability skills, and professional competence, an important gap remains in understanding how these orientations can be systematically combined to develop the reflective competence of future vocational education teachers. Existing approaches frequently emphasize technical competence, employability, or disciplinary learning, whereas reflective competence requires a more explicit connection among professional context, technical knowledge, communication, professional action, self-evaluation, and reflection. We therefore need a structured model that combines these elements.

The present study was conducted to determine the effectiveness of an integrated contextual learning model to improve the professional and reflective competence of prospective teachers of vocational education. The model integrates engineering-related instruction and foreign language learning and assesses reflective competence through motivational, cognitive, activity-based, and reflective components. The effectiveness of the intervention was evaluated by comparing students who received the integrated interdisciplinary intervention with students who received the traditional discipline-separated instruction. The study thus aims to provide an instructional framework in which contextual professional experience and interdisciplinary learning are systematically connected with reflection and professional competence development.

II. LITERATURE REVIEW

A. Professional Competence in Vocational Education

Vocational education must prepare learners for professional environments that require technical knowledge and transferable competencies. Professional readiness thus consists not only of mastery of the discipline but also of communication, adaptability, problem-solving, critical thinking, self-management and the capacity to apply knowledge in realistic occupational situations. Employability should, therefore, be interpreted as a multidimensional competence connecting knowledge, skills, professional attitudes as well as adaptability to changing requirements of the workplace (see Behle, 2020).

The changing nature of employment has further increased the importance of transferable skills in vocational education. Contemporary workplaces require individuals who can respond to unfamiliar problems, communicate effectively, manage their professional development, and adjust to technological and organizational change. Vocational education should therefore provide learning experiences that connect academic content with professional tasks rather than concentrating exclusively on theoretical knowledge (Tushar & Sooraksa, 2023; McGrath & Yamada, 2023).

Professional competence is particularly important for future vocational education teachers because they are responsible for transferring both technical and pedagogical knowledge to learners. Their professional role requires them to understand technical content, make instructional decisions, communicate professional information, and evaluate whether their teaching practices correspond to learner needs and occupational requirements. Competence development in vocational teacher education should therefore integrate technical, pedagogical, communicative, and reflective dimensions.

B. Contextual and Problem-Oriented Learning

Contextual learning provides a framework for connecting academic knowledge with situations that learners may encounter in professional and social environments. In vocational education, this connection is essential because knowledge is expected to be applied to practical tasks and workplace-related problems. Learning activities that involve authentic or professionally meaningful contexts can encourage students to interpret information, identify relevant knowledge, and formulate appropriate responses.

Problem-oriented learning strengthens this process by requiring students to engage actively with problems rather than passively receive information. Problem-based and contextual instructional environments can promote higher-order thinking because learners must analyze situations, compare alternatives, communicate reasoning, and evaluate possible solutions. Similar approaches have been used in vocational and science education to strengthen higher-order thinking and contextual understanding (Agussuryani et al., 2020; Sumarni & Kadarwati, 2020).

Contextual learning is also relevant to professional competence because it allows learners to understand why disciplinary knowledge is important and how it can be applied. For future vocational teachers, professionally relevant situations can simultaneously activate technical understanding, pedagogical reasoning, communication, and decision-making. Therefore, contextual learning provides an appropriate basis for connecting theoretical knowledge with professional practice.

C. Reflective Competence

Reflective competence refers to the ability to examine professional experiences, evaluate actions and decisions, recognize limitations, and identify appropriate improvements. Reflection allows professional experience to become a source of learning rather than a sequence of repeated activities. It is therefore closely connected with professional judgment, self-regulation, and continuous development.

Structured reflective learning has been linked to better professional judgment and greater engagement with learning experiences. Reflection can vary from merely describing an activity to analyzing it by evaluating, rethinking assumptions, and proposing alternative actions (Ashwin et al., 2015; Kember et al., 2008).

Reflective learning is particularly important in engineering education because technical decisions are often made within the framework of practical consequences and professional responsibilities. Structured reflection enables engineering learners to improve the links between disciplinary knowledge and professional action and to assess the effectiveness of applying knowledge in complex situations (Winberg et al., 2020).

Reflective competence in this study is structured into four interconnected components: motivational, cognitive, activity, and reflective. These components provide the basis for understanding how professional competence develops through the interaction of knowledge, motivation, professional activity, and self-evaluation. The principal characteristics of these components are summarized in Table 1.

The interaction among these components is represented in the structural-functional model shown in Figure 1. The model conceptualizes reflective competence as a progressive system involving professional and pedagogical cooperation, professional responsibility, practical reflection, and different levels of competence formation. Reflective competence does not develop as an isolated psychological characteristic. It is connected with professional activity, professional-personal development, professional-educational responsibility, and practical reflection. The model also distinguishes adaptive, pragmatic, and integrative levels, indicating a progression toward more independent and comprehensive professional reflection.

TABLE I
COMPONENTS OF REFLECTIVE COMPETENCE IN THE INTEGRATED
CONTEXTUAL LEARNING MODEL.

Component	Main Focus	Competence Developed	Relevance to Vocational Teacher Education
Motivational	Willingness to learn and improve professionally	Professional motivation and readiness for self-development	Encourages continuous professional growth
Cognitive	Understanding professional, technical, and pedagogical knowledge	Analytical and professional knowledge	Supports interpretation of vocational and engineering situations
Activity-based	Application of knowledge in professional situations	Practical competence and problem-solving	Enables the application of technical knowledge in pedagogical practice
Reflective	Evaluation of actions and professional decisions	Self-analysis, self-regulation, and reflective judgment	Supports improvement and adaptive professional decision-making

D. Interdisciplinary Learning in Vocational Teacher Education

Professional problems generally require knowledge from more than one disciplinary area. Interdisciplinary education therefore provides opportunities for learners to integrate knowledge, methods, and perspectives when responding to complex situations. Effective interdisciplinary learning requires more than simply teaching different subjects within the same curriculum; students should be encouraged to connect these disciplines during analysis and professional action (Knight et al., 2013; Lattuca et al., 2013).

For future vocational education teachers, interdisciplinary competence is particularly important because teaching involves technical knowledge, pedagogy,

communication, and professional judgment. In the present study, interdisciplinary instruction connects engineering-related subjects with foreign language learning. Engineering subjects provide technical and professional contexts, while language-based activities support communication and interpretation of professional knowledge.

Such integration can create learning conditions in which students are required to understand technical information, communicate professional reasoning, apply knowledge, and evaluate their actions. This process supports reflective competence because learners must move repeatedly between understanding, action, communication, and self-evaluation.

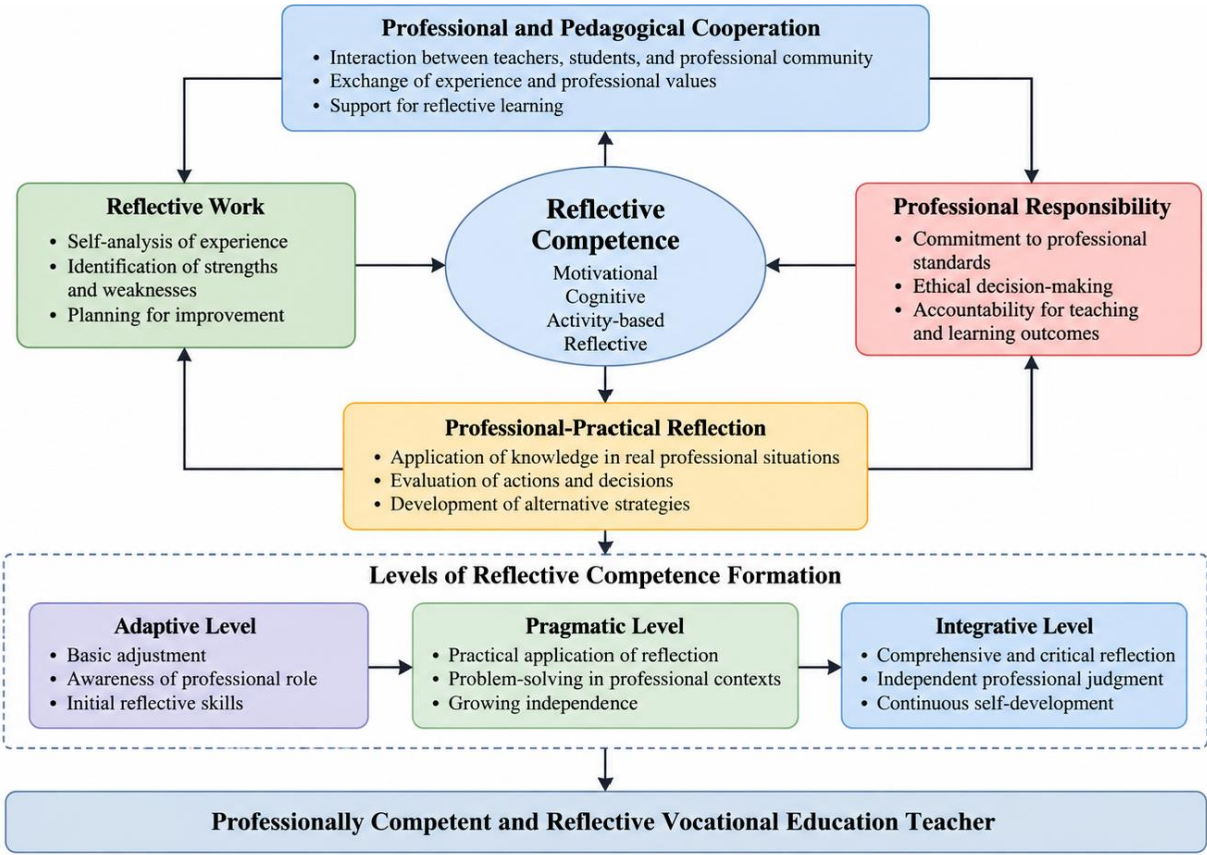


Fig. 1. Structural-functional model of reflective competence formation.

E. Contextual Learning and Reflective Professional Development

Contextual learning and reflection are closely connected. Reflection becomes more meaningful when learners evaluate actions performed within authentic or professionally relevant situations. A professional context provides concrete experiences that students can analyze, while reflection allows those experiences to be transformed into knowledge for future actions. The integrated model used in this study can therefore be interpreted as a developmental sequence: Professional context → technical interpretation → professional communication → professional action → self-evaluation → reflection → professional competence.

The relationship among these stages is summarized in Table 2. Competence-oriented and interdisciplinary approaches have previously demonstrated potential to strengthen practical competence, professional readiness, and applied problem-solving in vocational and engineering education (Shahroni et al., 2022; Khamdamovna, 2025; Khimmataliev et al., 2024; Mukhamedov et al., 2025).

TABLE II INTEGRATION OF CONTEXTUAL AND INTERDISCIPLINARY LEARNING IN THE PROPOSED MODEL.			
Learning Stage	Main Activity	Integrated Element	Expected Competence

Professional context identification	Recognizing a professionally relevant situation	Contextual learning	Situational understanding
Technical interpretation	Analyzing engineering-related information	Engineering instruction	Cognitive and technical competence
Professional communication	Explaining technical reasoning	Foreign language instruction	Communication competence
Professional action	Applying knowledge to professional problems	Interdisciplinary learning	Activity-based competence
Self-evaluation	Evaluating actions and decisions	Reflective learning	Professional judgment
Reflection and improvement	Identifying limitations and possible improvements	Reflective practice	Reflective competence and self-regulation

F. Research Gap

Previous studies have separately emphasized employability skills, contextual learning, interdisciplinary competence, and reflective professional development. However, future vocational education teachers require these competencies simultaneously. Technical competence without reflection may limit teachers' ability to improve their professional actions, while reflective ability without professionally relevant learning experiences may remain disconnected from authentic vocational practice. A research gap therefore remains in the systematic integration of professional context, engineering knowledge, communication, interdisciplinary activity, and reflection within vocational teacher education. The study addresses this gap by evaluating an integrated contextual learning model in which engineering-related instruction and foreign language learning are connected to the development of motivational, cognitive, activity-based, and reflective competence.

III. METHODOLOGY

A. Research Design

This study employed a mixed-methods research design combining pedagogical modelling and experimental instruction. The approach was used to evaluate the development of reflective competence among future vocational education teachers. Quantitative assessment was used to compare competence development between experimental and control groups, while qualitative

observations supported interpretation of students' professional and reflective development. The source explicitly describes the use of questionnaires, reflective competence tests, observational instruments, and Student's t-test. The research was conducted in three major stages: initial diagnosis, instructional intervention, and final evaluation. The first phase was the identification of students' reflective competence before the intervention. At the instructional stage, the experimental group was taught with the integrated contextual and interdisciplinary model, while the control group was taught by the conventional discipline-separated instruction. Finally, the stage assessed the differences in reflective competence between the groups.

B. Participants and Group Organization

The participants were prospective vocational education teachers and were assigned to experimental and control groups. In the experimental group, engineering-related subjects and foreign language learning were taught in an integrated way, while in the control group, they were taught in a conventional discipline-separated way. The engineering component included subjects related to vehicle technical operation and service. These technical subjects were combined with language-based instruction to create professionally relevant interdisciplinary learning experiences.

C. Integrated Contextual Learning Model

The engineering part covered topics related to vehicle technical operation and service. The integration of these technical topics with language-based instruction created professionally relevant interdisciplinary learning experiences. The integrated contextual learning model was developed to link professional situations, engineering knowledge, communication, professional activity, and reflection. Technical content provided the technical context, and foreign language learning supported professional communication and interpretation. The methodological organization of this approach is shown in Figure 2. It organizes the intervention through objective, substantive, process, diagnostic, and outcome components.

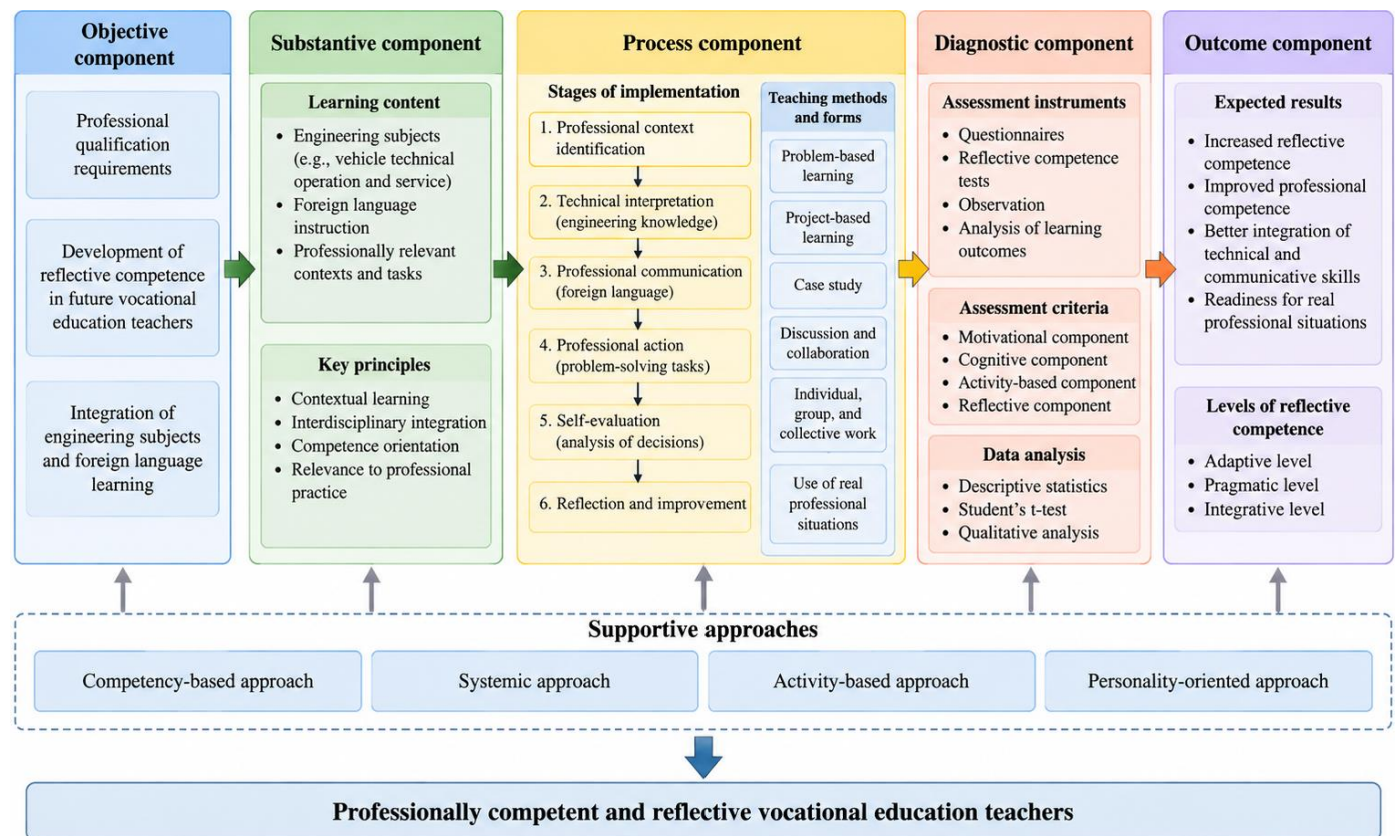


Fig. 2. Methodological model for developing reflective competence through interdisciplinary integration.

Professional qualification requirements, the purpose of reflective competence development, learning content, pedagogical strategies, teaching methods, experimental stages, assessment criteria, and expected competence results are included in the model. The model also includes teaching methods and forms of learning that promote interdisciplinary interaction. The figure includes collective, group, and individual forms of learning and such approaches as competency-based, systemic, activity-based, and personality-oriented instruction. These elements provide a structure to connect professional knowledge and reflective practice.

D. Learning Procedure

The instructional procedure was structured in a sequence where students faced professional situations, interpreted technical information, communicated professional reasoning, applied knowledge, and evaluated their actions.

The experimental learning sequence consisted of:

- identification of a professionally relevant engineering situation;
- interpretation of technical information;
- application of engineering knowledge;
- communication of professional reasoning through language-based activities;
- evaluation of professional actions and decisions; and
- reflection on limitations and possible improvements.

This sequence reflects the model shown in Figure 2 and operationalizes the relationship between interdisciplinary learning and reflective competence.

E. Reflective Competence Assessment

Reflective competence was assessed through four principal components: motivational, cognitive, activity-based, and reflective. These components correspond to the conceptual framework summarized previously in Table 1. The motivational component concerned students' professional interest and readiness for development. The cognitive component assessed knowledge and understanding relevant to professional situations. The activity-based component focused on the application of knowledge in professional and pedagogical activities. The reflective component addressed self-analysis, evaluation, and regulation of professional actions. Students were subsequently classified according to levels of reflective competence. The study distinguishes low, medium, and high levels, which are used in the final comparative analysis.

F. Data Collection Instruments

Data were collected using questionnaires, reflective competence tests, and observational instruments. The questionnaires allowed the measurement of motivational and reflective characteristics, and competence tests were used to measure students' knowledge and ability to analyze professional situations. The use of knowledge and reflective behavior in instructional activities was evaluated by means of observational instruments. To examine reflective competence as a multidimensional construct and not as one single measurement, multiple instruments were used.

G. Data Analysis

Quantitative data were analyzed using descriptive and inferential statistical procedures. Descriptive analysis was used to identify the distribution of students across low, medium, and high reflective competence levels. Student's t-test was used to determine whether the differences between the experimental and control groups were statistically significant. The study reports statistical significance at $p < 0.05$. Qualitative observations were used to support interpretation of the quantitative findings.

IV. RESULTS AND DISCUSSION

A. Overall Development of Reflective Competence

The implementation of the integrated contextual learning model produced a clear improvement in reflective competence among future vocational education teachers. The evaluation was performed based on motivational, cognitive, activity-based, and reflective components, described in the competence structure of Fig. 1. Before the intervention, students of both groups were characterized mainly by a low-medium level of reflective competence, i.e., poor skills of systematic self-analysis, regulation of professional activities, and critical assessment of instructional decisions concerning engineering.

Reflective competence is structured as a multidimensional system in which professional responsibility, practical reflection, and competence development are interrelated (see Fig. 1). The model also differentiates between adaptive, pragmatic, and integrative levels, with a progression from basic adjustment to more comprehensive and independent professional reflection.

The experimental group developed all the components of reflective competence to a greater extent after the application of the integrated model than the control group. This finding suggests that the development of reflective competence may be enhanced if students are required to connect together technical knowledge, professional communication, instructional activity, and self-evaluation rather than learning these components in isolation.

Findings align with the notion that reflective learning bolsters professional judgment and improves learners' capacity to convert experience into a platform for future development. This is particularly important when students are required to reflect not only on whether a task was completed but also on why particular decisions were made and how those decisions might be improved in future professional contexts (Ashwin et al., 2015; Kember et al., 2008).

B. Role of the Integrated Contextual Learning Model

Figure 2 illustrates the instructional mechanism behind these changes. In the model, objectives, learning content, instructional processes, diagnostic activities, and expected outcomes are integrated into a single professional-learning framework. Instruction in engineering-related courses provides the technical and professional context, and foreign

language learning supports interpretation and communication of professional knowledge. This combination calls for students to go beyond the passive acquisition of knowledge toward activities involving understanding, application, communication, evaluation, and reflection.

The integrated structure differs from the traditional discipline-separated instruction in that students have to relate knowledge from different learning domains when dealing with professionally relevant situations. Interdisciplinary learning is particularly important in vocational teacher education, as professional practice calls for the simultaneous application of technical knowledge, pedagogical reasoning, communication, and professional judgment (Knight et al., 2013; Lattuca et al., 2013).

The contextual orientation of the model also adds to the relevance of learning. Professional contexts provide students with real experiences to analyze and evaluate, and reflective activities challenge them to examine the quality of their decisions. This leads to a developmental sequence of professional context, technical interpretation, professional communication, professional action, self-evaluation, and reflection.

C. Distribution of Reflective Competence Levels

Table 3 shows a final distribution of the levels of reflective competence. Table 3. The gap between the experimental and control groups is quite big. In the control group, 32.4% of students were at the low level, 48.1% at the medium level, and only 19.5% at the high level. In contrast, the experimental group showed only 11.3% of students at the low level, 34.6% at the medium level, and 54.1% at the high level of reflective competence.

TABLE III DISTRIBUTION OF REFLECTIVE COMPETENCE LEVELS (%).			
Group	Low Level (%)	Medium Level (%)	High Level (%)
Control Group	32.4	48.1	19.5
Experimental Group	11.3	34.6	54.1

The integrated contextual learning model was linked to a shift in the overall competence distribution to higher levels. More than half of the experimental group achieved high reflective competence, while the control group was still mainly concentrated at low and medium levels. This difference means that interdisciplinary contextual learning provides students with more opportunities to evaluate professional situations, apply technical knowledge, and regulate their own professional actions. Recent studies have also emphasized that reflective practice and professional competence development are improved when teachers systematically analyze instructional experiences and connect reflection to authentic professional activities (Zohrabi & Xodabande, 2024; Chotijah et al., 2025; Khurniawan et al., 2026).

D. Development across Reflective Competence Components

Component-based analysis showed that the most pronounced improvements occurred in the reflective and activity-based components. Students in the experimental group demonstrated a stronger capacity to evaluate engineering-related instructional decisions, apply technical knowledge in pedagogical contexts, and regulate their professional actions.

The development of the activity-based component can be explained by the contextual character of the intervention. Students were required to use their knowledge within professional situations rather than respond only to abstract academic tasks. This provided opportunities to connect technical understanding with actual professional action.

The strong development of the reflective component indicates that students were increasingly capable of evaluating how they performed professional actions and identifying opportunities for improvement. Reflective competence therefore extends learning beyond task completion toward systematic self-analysis, professional judgment, and continuous improvement. Recent evidence also indicates that structured individual and collaborative reflection can strengthen teachers' ability to analyze instructional experiences and develop more informed professional practices (Zohrabi & Xodabande, 2024; Khurniawan et al., 2026).

Improvements were also observed in the motivational and cognitive components. This suggests that the model supported reflective competence as an integrated construct rather than affecting only one dimension. Professional reflection requires knowledge to evaluate a situation, motivation to engage in improvement, the ability to act, and the capacity to reconsider the quality of that action.

These findings are consistent with recent vocational education research indicating that professional competence is strengthened when pedagogical, professional, and practical competencies are developed within integrated and professionally relevant learning environments (Khimataliev et al., 2024; Mukhamedov et al., 2025; Chotijah et al., 2025). Recent evidence on vocational teachers also highlights the importance of reflective learning for sustaining instructional improvement and professional development (Khurniawan et al., 2026).

E. Statistical Evidence of Model Effectiveness

Statistical validation using Student's *t*-test confirmed that post-intervention differences between the experimental and control groups were significant across the assessed reflective competence components, with $p < 0.05$.

This statistical result supports the descriptive pattern shown in Table 3. The experimental group demonstrated a substantially larger proportion of students at the high competence level, whereas the control group remained concentrated at lower levels.

The significance of the intervention extends beyond the statistical difference between the groups. Its pedagogical value lies in the mechanism through which competence was

developed: students were required to interpret technical information, communicate professional reasoning, apply knowledge in contextual situations, evaluate decisions, and reflect on their own performance. This combination is particularly relevant to contemporary vocational teacher education, where professional competence increasingly requires integration of pedagogical knowledge, professional expertise, adaptability, and reflective practice (Chotijah et al., 2025; Khurniawan et al., 2026).

This process is particularly relevant to vocational teacher education because future teachers must continuously adapt to technological, pedagogical, and occupational changes. Reflective competence enables professional experience to become a continuing source of learning by allowing teachers to identify instructional limitations, evaluate alternative strategies, and modify subsequent professional actions. Recent studies support the integration of structured reflection into teacher education and professional development because reflective practice can promote more deliberate and adaptive instructional decision-making (Zohrabi & Xodabande, 2024; Khurniawan et al., 2026).

F. Implications for Vocational Teacher Education

The findings provide theoretical, pedagogical, practical, and institutional implications for vocational teacher education. Theoretically, reflective competence should be understood as a multidimensional professional construct involving motivational, cognitive, activity-based, and reflective components rather than as an isolated self-evaluation activity. The improvement observed across these components indicates that professional reflection develops through interaction among knowledge, professional action, communication, and self-regulation.

Pedagogically, reflective competence should be incorporated explicitly into learning outcomes, instructional activities, and assessment processes in vocational teacher preparation. Reflection can be embedded before, during, and after professional tasks so that future teachers learn to identify assumptions, evaluate decisions, and formulate alternative actions. Recent teacher education research similarly emphasizes that structured reflective practice can strengthen professional learning when it is systematically integrated into teacher preparation rather than treated as an occasional activity (Zohrabi & Xodabande, 2024).

Practically, the findings suggest that engineering-related and language-based instruction can be integrated around professionally meaningful tasks. This approach allows students to simultaneously develop technical understanding, professional communication, problem-solving, and reflective judgment. Such integration is relevant to contemporary vocational education, where teacher competence increasingly involves pedagogical, professional, social, and adaptive capabilities (Chotijah et al., 2025).

At the institutional level, vocational teacher education programs can strengthen reflective competence through practicum activities, case-based learning, peer observation, mentoring, reflective reports, and professional learning communities. Recent evidence from vocational teachers shows that structured reflection is associated with improved instructional practice and continuous professional learning,

indicating that reflection should remain part of professional development after initial teacher preparation (Khurniawan et al., 2026).

The proposed model provides a practical framework for linking university-based teacher preparation with authentic vocational practice. By integrating technical knowledge, professional communication, contextual activity, self-evaluation, and reflection, vocational teacher education institutions can better prepare future teachers to respond adaptively to changing technological, pedagogical, and occupational demands.

CONCLUSION

This study evaluated an integrated contextual learning model designed to strengthen the professional and reflective competence of future vocational education teachers. The model connected engineering-related instruction with foreign language learning and organized reflective competence through motivational, cognitive, activity-based, and reflective components. The experimental group demonstrated substantially stronger outcomes than the control group, with 54.1% of students reaching a high reflective competence level compared with 19.5% in the control group. Statistical analysis also confirmed significant differences between groups at $p < 0.05$. The greatest improvements occurred in reflective and activity-based competence, indicating that contextual and interdisciplinary learning can strengthen professional self-evaluation, application of technical knowledge, and professional self-regulation. The findings demonstrate that integrating professional context, technical knowledge, communication, action, and reflection provides a promising framework for preparing adaptive and reflective future vocational education teachers.

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