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CAMPUS-TO-WORKSHOP ADAPTATION GAPS IN PRE-SERVICE VOCATIONAL TEACHER EDUCATION

Ahmad Surur Ramziqi[1], Dian Julianto Wahyudi[1], Muhammad Yudi Syaputra[1], Ramadhan Dwi Widodo[1], Ulfi Ayu Masluchi[1], Zaky Fatkhur Naufal Afif Malik[1] , Zulkifli[1], Hananda Riski Ramadani[1]

[1] Universitas Negeri Malang, Malang, Indonesia

*ahmad.surur.2305116@students.um.ac.id

Abstract

Preparing vocational teacher candidates requires more than strengthening technical knowledge and digital competence; it also requires readiness to teach in authentic workshop environments. This study examines pre-service vocational teacher students' adaptation during a Teaching Assistance programme in the Machining Engineering expertise concentration at SMK Islam 1 Blitar, Indonesia. Using an evaluative qualitative case study design, data were collected from four mentor teachers who supervised seven Mechanical Engineering Education students during school placement. Structured interviews and student performance assessment documents were analysed across four domains: material mastery, facility and tool mastery, classroom or workshop management, and learning administration. The findings show an uneven readiness profile. Students demonstrated stronger readiness in facility and tool mastery, particularly in digital and laboratory-based learning such as CAD/GTM, while their readiness was less stable in workshop management and school-based learning administration. The study identifies a campus-to-workshop adaptation gap, where university-based preparation supported digital and theoretical readiness but did not fully transfer into conventional machine practice, safety-oriented workshop control, pedagogical authority, and administrative flexibility. The study concludes that vocational Teaching Assistance should be designed as a structured transition process supported by workshop-based microteaching, machine familiarisation, shared administrative templates, and mentor-guided reflection.

Keywords: pre-service vocational teachers; teaching assistance; workshop pedagogy; vocational teacher readiness; campus-to-workshop adaptation

INTRODUCTION

Vocational teacher education is expected to prepare prospective teachers for learning environments where technical competence, pedagogy, safety awareness, and professional judgement operate together. In vocational schools, teaching does not take place only through classroom explanation. It is also enacted in laboratories, workshops, industrial-standard facilities, simulated production settings, and school-specific administrative systems. This makes vocational teacher preparation more complex than general teacher preparation because prospective teachers need to translate university-based knowledge into practical instruction while managing equipment, student behaviour, learning documents, and workplace-like routines. Recent studies on vocational education emphasise that teacher readiness is shaped by the interaction between technical expertise, pedagogical competence, digital capacity, interpersonal skills, and institutional partnerships (Jaedun et al., 2024; Kholifah et al., 2024; Yasdin et al., 2023; Yoto et al., 2024). In Indonesia, this issue is increasingly relevant because vocational schools are expected to respond to industrial change while teacher education institutions are expected to provide more practice-oriented learning pathways for prospective vocational teachers. Such preparation requires more than increasing field exposure. It requires a clearer understanding of which forms of competence transfer smoothly from campus to school and which ones become difficult when prospective teachers enter authentic vocational learning spaces.

Teaching Assistance and practicum-based programmes are designed to reduce the distance between university preparation and school practice. Through school placement, prospective teachers encounter real learners, school cultures, curriculum documents, mentor expectations, and classroom constraints that cannot be fully simulated on campus. In vocational teacher education, this transition is more demanding because prospective teachers must also adapt to workshop procedures, industrial tools, occupational safety requirements, and productive subject teaching. Work-based and

apprenticeship-oriented models have been recommended as ways to strengthen prospective vocational teachers' readiness because they expose students to authentic technical environments and the professional routines of vocational teaching (Suhartanta et al., 2024; Suyitno et al., 2022). Studies on practicum and digital technology integration also show that prospective teachers may possess certain digital skills, yet still face difficulty when they must convert those skills into situated teaching practice (Istiningsih, 2022; Roll & Ifenthaler, 2021; Salim et al., 2023). This indicates that readiness cannot be inferred from campus achievement alone.

The issue becomes more specific in machining engineering education. Teaching machining is not limited to explaining technical theory or demonstrating software-based design. It also involves operating conventional and CNC machines, managing tool preparation, supervising students in noisy and high-risk workshop spaces, maintaining occupational safety, and ensuring that practical learning follows school and industry standards. Safety culture is therefore not an additional concern but part of vocational pedagogy, especially when students work with machines, measuring tools, and workshop procedures (Sayuti et al., 2024). At the same time, digital competence remains important because CAD, CAM, and simulation tools are increasingly embedded in vocational learning. Recent work on vocational teacher digital competence suggests that digital readiness develops through curriculum support, use frequency, attitude toward technology, and structured training rather than through access to technology alone (Deschênes et al., 2024; Mariah et al., 2025). For prospective machining teachers, the challenge is therefore not simply whether they can use digital tools, but whether they can connect digital, mechanical, pedagogical, and safety-related demands in the same teaching setting.

Previous studies have discussed vocational teacher competence, MBKM-related learning experiences, digital competence, industry collaboration, and internship evaluation. However, less attention has been

given to the adaptation gap experienced by pre-service vocational teacher students when they move from campus-based preparation to workshop-based teaching in partner schools. Some studies highlight the importance of industry involvement and demand-driven vocational education (Gupta et al., 2024; Yoto et al., 2024), while others discuss professional development, teacher performance, assessment practice, critical thinking, and digital competence in vocational contexts (Kholifah et al., 2024; Sandal, 2023; Zuurmond et al., 2024). These studies provide important background, but they do not fully explain how prospective vocational teachers are evaluated by mentor teachers when they teach productive subjects in a real machining workshop. This is a relevant gap because mentor teachers observe prospective teachers' daily adaptation to materials, machines, workshop discipline, safety routines, and school administrative formats. Their perspective can reveal forms of readiness and difficulty that may not appear in campus-based assessments.

This study addresses that gap by examining the Teaching Assistance programme undertaken by pre-service Mechanical Engineering Education students at SMK Islam 1 Blitar, particularly in the Machining Engineering expertise concentration. The study focuses on how mentor teachers evaluate students' readiness across four domains: material mastery, mastery of workshop and laboratory facilities, classroom or workshop management, and learning administration. The research problem is that prospective vocational teachers may show adequate digital and theoretical readiness, yet still experience difficulty in adapting to workshop-based pedagogy, machine-specific practice, safety supervision, and school-specific administrative expectations. The novelty of this study lies in its focus on campus-to-workshop adaptation in vocational teacher preparation. Rather than evaluating the programme only as a placement activity, the study examines how readiness differs across digital, technical, pedagogical, and administrative domains in machining engineering practice. This focus keeps the evaluation on readiness domains that are central to vocational teaching, rather than treating school

placement as a single, uniform learning experience. The study is guided by three research questions: (1) How do mentor teachers evaluate pre-service vocational teacher students' readiness during Teaching Assistance in machining engineering? (2) What adaptation gaps appear between campus-based preparation and workshop-based teaching practice? and (3) What forms of university-school support are needed to strengthen prospective vocational teachers' technical, pedagogical, safety, and administrative readiness for workshop teaching?

LITERATURE REVIEW

Vocational teacher readiness refers to the capacity of prospective teachers to combine subject knowledge, pedagogical judgement, technical competence, and professional conduct in authentic vocational learning settings. In machining engineering, readiness is not limited to explaining concepts or demonstrating software. It also includes the ability to guide practical work, manage tools and machines, supervise students' safety, and translate technical content into teachable learning experiences. Sirk (2024) argues that vocational teacher professionality is shaped by changing demands in vocational education, where teachers must negotiate professional identity, subject expertise, pedagogy, and institutional expectations. This view is relevant to pre-service vocational teacher preparation because readiness develops through the interaction between campus-based learning and school-based practice.

The transition from university preparation to vocational school practice can be understood as a boundary-crossing process. Prospective vocational teachers move between two learning environments with different expectations: the university, where knowledge is often structured through courses and simulation, and the vocational school, where teaching is shaped by workshop routines, school administration, learner behaviour, equipment availability, and industry-related standards. Collaboration between teacher

education institutions and workplaces is therefore central to vocational learning (Arinaitwe, 2021; Hiim, 2023). Without close collaboration, campus preparation may not fully represent the practical conditions that prospective teachers encounter during school placement. This is especially important in workshop-based subjects because technical familiarity does not automatically become instructional readiness.

Vocational teaching also requires multidimensional competence. Diao and Hu (2022) describe TVET teacher competence as involving teaching ability, professional development, digital awareness, and adaptation to changing educational and workplace demands. Tuah et al. (2021) similarly emphasise the role of pedagogical and professional competence in vocational learning. In the context of Industry 4.0, digital readiness is important, but it should be connected to real teaching problems. Cox and Prestridge (2020) show that vocational pedagogy is shaped by teaching context, learner interaction, and the limits of digital implementation. Amin and Mustaqim (2021) also indicate that vocational teachers' readiness for Industry 4.0 depends on educational, technological, global, strategic, and counselling-related competencies. These perspectives suggest that mastery of CAD or digital tools is only one part of vocational teacher readiness.

Programme evaluation provides a useful lens for examining teaching assistance in vocational teacher education. Ratnaya et al. (2022) argue that evaluation in vocational education should examine not only outcomes, but also the conditions, processes, and resources that shape programme implementation. Sudira et al. (2022) further show that project-based vocational learning requires careful attention to opportunities and constraints in practice. In this study, teaching assistance is therefore viewed as a professional adaptation process. The key issue is not only whether students complete their placement, but how they adapt across material mastery, workshop facility use, class and workshop management, safety supervision, and school-based learning administration.

METHOD

This study employed an evaluative qualitative case study design to examine pre-service vocational teacher students' adaptation during the Teaching Assistance programme in the Machining Engineering expertise concentration at SMK Islam 1 Blitar. The case was bounded by one partner school, one vocational expertise area, and one placement period involving seven Mechanical Engineering Education students. This design was appropriate because the study focused on how mentor teachers evaluated students' readiness in a real workshop-based teaching setting. Qualitative case study is useful for examining context-rich educational practice, while evaluative inquiry allows researchers to interpret programme implementation through evidence from those directly involved in the setting (Cobian et al., 2022; Greenhalgh, 2025; Lim, 2025).

The participants were four mentor teachers who supervised and assessed the seven Teaching Assistance students during the school placement. They were selected purposively because they taught the productive subjects in which the students were placed and had direct responsibility for observing their teaching performance. Data were collected through structured interviews and student performance assessment documents. The interview guide focused on four evaluation domains: material mastery, mastery of workshop and laboratory facilities, classroom or workshop management, and learning administration. The assessment documents were used to compare mentor teachers' narrative evaluations with recorded performance scores. Document analysis was used because institutional assessment records can provide relevant evidence for understanding programme implementation when interpreted together with interview data (Morgan, 2022).

Data analysis was conducted through evaluative qualitative content analysis. First, interview transcripts and assessment documents were organised according to the four evaluation domains. Second, mentor teachers' comments were coded to identify patterns of readiness, difficulty, and

adaptation across digital, technical, pedagogical, safety-related, and administrative aspects. Third, the performance scores were used as descriptive indicators to locate stronger and weaker domains, while the interview data explained why those patterns appeared. The interpretation moved from individual mentor-teacher evaluations to a cross-domain synthesis of campus-to-workshop adaptation. This process followed the logic of qualitative content analysis, which supports systematic reduction, categorisation, and interpretation of textual evidence (Lindgren et al., 2020; Nicmanis, 2024). Credibility was supported by comparing interview accounts with performance documents and by keeping the analysis grounded in the same evaluation domains across all mentor teachers.

FINDINGS AND DISCUSSION

Mentor Teachers' Evaluation of Pre-Service Vocational Teacher Readiness

The findings show that pre-service vocational teacher students demonstrated uneven readiness during the Teaching Assistance programme in the Machining Engineering expertise concentration at SMK Islam 1 Blitar. The evaluation was based on four domains: material mastery, facility and tool mastery, classroom or workshop management, and learning administration. These domains are important because vocational teacher readiness cannot be understood only from the ability to explain subject content. In machining engineering, prospective teachers are also expected to operate or guide the use of workshop tools, supervise students in practical learning spaces, manage safety-sensitive activities, and prepare learning documents that fit school-based curriculum requirements. The evaluation from mentor teachers therefore provides a useful view of how students adapted when moving from university-based preparation to school-based vocational practice.

Table 1 presents the evaluation results from the four mentor teachers who supervised the seven pre-service Mechanical Engineering Education students during the programme.

Table 1. Mentor Teachers' Evaluation of Pre-Service Vocational Teacher Readiness

Evaluation domain	MT1: CNC/CAM and bench work	MT2: CAD/GTM	MT3: Lathe, milling, and measuring tools	MT4: Lathe and milling	Mean score	Category
Material mastery	80%	80%	80%	60%	75%	Good
Facility and tool mastery	80%	100%	100%	60%	85%	Very good
Classroom or workshop management	60%	80%	80%	60%	70%	Sufficient
Learning administration	80%	60%	80%	60%	70%	Sufficient

Table 1 indicates that facility and tool mastery received the highest mean score, with an average of 85%. This suggests that students were relatively able to adapt to several learning facilities and laboratory tools used in the partner school. The strongest score appeared in CAD/GTM and in several laboratory-based practical domains. MT2 gave a score of 100% for facility mastery because students were able to operate Autodesk Inventor and support digital drawing activities. MT3 also gave 100% in facility mastery in the context of lathe, milling, and measuring tools. These results indicate that the students had brought useful technical preparation from their university learning experience, especially when the school tasks were close to tools, software, and laboratory routines that were already familiar to them. This finding is consistent with recent studies which argue that vocational teacher readiness includes technical competence, digital competence, and the ability to connect technology with teaching practice (Deschênes et al., 2024; Mariah et al., 2025).

However, facility and tool mastery was not equally strong across all productive subject areas. MT4 gave only 60% for facility mastery in lathe and milling practice. This difference suggests that technical readiness did not

transfer evenly across all workshop contexts. Students appeared more confident in digital or familiar laboratory-based environments, but their readiness became less stable when they encountered machine configurations, workshop routines, and practical conditions that required more situated experience. This is important because vocational readiness is not only a matter of having technical knowledge. It also requires the ability to recontextualise that knowledge in a real teaching environment where equipment, learners, safety routines, and school expectations shape the instructional process (Diao & Hu, 2022; Sirk, 2024).

Material mastery received a mean score of 75%, which placed it in the good category. Three mentor teachers gave a score of 80%, while MT4 gave 60%. The interview data show that students were generally able to explain theoretical content, but still needed to strengthen the practical translation of that content into workshop instruction. MT1 stated that “in theory it is good, but for practice it needs to be improved.” MT2 similarly observed that “students have mastered the theoretical material that is taught well.” These two comments show that students had a reasonable conceptual foundation, but conceptual understanding alone was not enough for vocational teaching. In machining engineering, the teacher must be able to demonstrate procedures, anticipate student errors, explain tool use, manage practical time, and connect theoretical material with real workshop tasks. This aligns with Kholifah et al. (2024) and Yasdin et al. (2023), who position vocational teacher competence as an integration of content knowledge, pedagogical judgement, technical practice, and professional responsibility.

The lower scores in classroom or workshop management and learning administration reveal another layer of readiness. Both domains received a mean score of 70%, which indicates that students were able to perform these tasks at a sufficient level, but not yet with the stability expected from stronger professional readiness. Workshop management was more difficult in areas involving direct machine operation, student movement, noise, and safety-

sensitive activity. MT3 stated that "students' courage in classroom control needs to be improved." MT4 also warned that "if educators have not mastered the practice there will be a sense of underestimation by students." These comments suggest that classroom management in vocational education is closely connected to technical confidence and practical credibility. In a machining workshop, pedagogical authority is not built only through verbal explanation. It is also shaped by the teacher's visible ability to handle tools, control practical routines, and respond to risks in the workshop.

Learning administration also appeared as an area of adaptation. The challenge was not simply whether students could prepare teaching documents, but whether they could adjust university-based planning habits to the format and expectations of the partner school. MT2 gave 60% in this domain because students had difficulty aligning teaching modules with the school's curriculum format. MT1 noted that the quality of administration "*depends on the student, if you are thorough, it is good*." This comment suggests that administrative readiness requires attention to detail and flexibility. In vocational schools, teaching modules, job sheets, student worksheets, assessment rubrics, and practical instructions need to correspond to workshop activities, available tools, safety procedures, and expected student products. If campus templates are used rigidly, they may not fully support the actual flow of practical teaching.

Taken together, the mentor teachers' evaluation shows that students' readiness was multidimensional and uneven. They had stronger readiness in facility and tool mastery, particularly in digital or familiar laboratory-based settings, and reasonable readiness in material mastery. However, their readiness was less stable in workshop management and learning administration. This pattern supports Tuah et al. (2021), who argue that vocational teacher competence involves both pedagogical and professional dimensions. It also suggests that the evaluation of pre-service vocational teachers should not focus only on what students know or what tools they can

operate, but on how they perform teaching roles in authentic vocational settings.

Campus-to-Workshop Adaptation Gap in Vocational Teacher Preparation

The second finding concerns the adaptation gap between campus-based preparation and workshop-based teaching practice. The clearest contrast appeared between students' readiness in digital or laboratory-based learning and their readiness in conventional workshop teaching. Students performed strongly in CAD/GTM and several facility-related domains, but their readiness was weaker in lathe, milling, workshop control, and school-based administration. This pattern suggests that university preparation supported some parts of the Teaching Assistance placement, but did not fully prepare students for all the demands of machining engineering teaching.

This adaptation gap can be understood as a boundary-crossing issue. Pre-service vocational teachers move from the university environment, where learning is usually organised through courses, simulations, assignments, and controlled practicum, into a school workshop environment where teaching is shaped by equipment availability, workshop routines, student behaviour, curriculum formats, and occupational safety expectations. Arinaitwe (2021) and Hiim (2023) argue that vocational learning develops across institutional and workplace boundaries. The present findings support this view. Students did not enter the partner school without preparation, but their preparation needed to be adjusted to the specific technical, pedagogical, and administrative conditions of the school.

The contrast between CAD-based readiness and conventional workshop readiness is especially important. In CAD/GTM learning, students adapted more quickly because the tasks were closer to digital design tools that were familiar from university learning. CAD-based instruction also provided a more controlled environment. Students could focus on software operation, visual explanation, and guided technical tasks. In contrast, conventional

machining workshops required a different kind of readiness. Teaching lathe and milling practice involved machine operation, tool preparation, student movement, noise, physical risk, and direct supervision. In this environment, a prospective teacher's credibility depends not only on technical knowledge, but also on practical confidence, procedural clarity, and the ability to maintain student attention in a risk-sensitive learning space.

This finding resonates with Roll and Ifenthaler's (2021) argument that digital technology in vocational education needs to be interpreted in relation to workplace learning and professional practice. Digital competence is valuable, but it does not automatically solve the pedagogical and practical demands of vocational teaching. In this study, CAD competence helped students in digital learning spaces, but it did not automatically produce strong readiness for workshop management. The implication is not that digital preparation is insufficient in itself. Rather, digital preparation needs to be connected with real workshop problems so that students understand how CAD, CAM, CNC operation, conventional machines, job sheets, and practical teaching procedures relate to one another.

Workshop management made the adaptation gap more visible. In general classrooms, management may centre on attention, participation, and discipline. In machining workshops, management also involves safety supervision, tool distribution, movement control, risk prevention, and procedural compliance. Sayuti et al. (2024) emphasise that safety culture is part of vocational education, particularly when learning involves machines and tools. The comments from MT3 and MT4 suggest that students still needed stronger confidence in controlling the workshop environment. When practical mastery was incomplete, students' authority as prospective teachers became less secure. This indicates that pedagogical authority in vocational education is partly built through visible practical competence.

Administrative adaptation formed another layer of the campus-to-workshop gap. Students had experience preparing learning documents, but

they still needed to adapt those documents to the partner school's format. This is not a minor issue. In vocational education, learning administration should guide practical teaching. Teaching modules, job sheets, and assessment rubrics need to correspond to tools, machines, safety rules, time allocation, and student work products. Ratnaya et al. (2022) argue that programme evaluation should examine not only outcomes, but also the processes and conditions that shape implementation. The administrative difficulty in this study reflects the need for clearer coordination between university expectations and school-based curriculum practices.

The adaptation pattern is summarised in Figure 1. The figure shows that students entered the Teaching Assistance placement with campus-based preparation, including technical theory, CAD/CAM familiarity, and university-based templates. During placement, they encountered vocational school workshop demands, including machines and tools, safety routines, and school administration. The evaluation showed stronger readiness in digital and laboratory tasks, but also revealed gaps in workshop management, practical machine adaptation, administrative flexibility, and pedagogical authority. The figure therefore helps explain the main argument of the study: readiness develops when campus preparation is connected with workshop-based demands through deliberate university-school support.

Figure 1. Campus-to-Workshop Adaptation Gap in Vocational Teacher Preparation

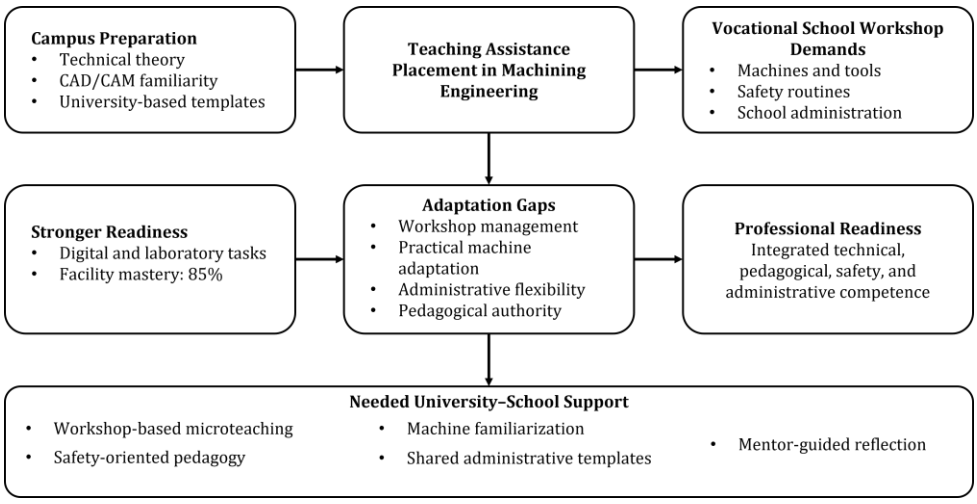

Table 2 summarises the same pattern in relation to the evaluation evidence and development needs.

Table 2. Campus-to-Workshop Adaptation Gaps in Teaching Assistance

Area of adaptation	Evidence from findings	Interpretation	Development need
Digital and laboratory adaptation	High scores in CAD/GTM and several facility mastery domains	Students were relatively prepared for digital and familiar laboratory-based learning	Connect CAD/CAM preparation with workshop-based teaching scenarios
Practical machine adaptation	Lower facility mastery in some lathe and milling contexts	Students' technical readiness varied across machine types and school equipment	Provide pre-placement machine familiarisation across different workshop settings
Workshop management	Lower scores in classroom or workshop management in some productive subjects	Managing noisy and safety-sensitive spaces required stronger authority and confidence	Strengthen workshop management, safety briefing, and practical discipline training
Administrative adaptation	Lower scores in learning administration in some evaluations	Campus-based planning documents did not always fit school formats	Develop shared administrative templates and school-specific orientation
Pedagogical authority	Mentor comments showed concern about confidence and practical mastery	Teacher authority in vocational workshops depends on technical and pedagogical credibility	Integrate practical demonstration, feedback practice, and mentor-guided reflection

Table 2 shows that the issue was not simply the students' lack of ability. The more precise issue was uneven transfer of readiness from campus to

school. Students brought useful knowledge and skills, but those skills did not move evenly across all domains of vocational teaching. This supports the idea of a campus-to-workshop adaptation gap. The gap appeared when campus-based technical, digital, and administrative preparation did not fully match the practical demands of workshop-based teaching. In this study, the gap was visible in conventional machine adaptation, workshop management, administrative adjustment, and pedagogical authority.

This synthesis also clarifies the contribution of the study. Teaching Assistance should not be evaluated only by asking whether students completed the placement or obtained acceptable scores. A more useful question is what kinds of readiness were strengthened, what kinds of readiness remained unstable, and what forms of support were needed before students entered the school workshop. The findings suggest that readiness for machining engineering teaching requires the integration of digital skill, practical machine competence, workshop pedagogy, safety supervision, administrative flexibility, and mentor-guided reflection.

University-School Support for Strengthening Vocational Teacher Readiness

The third finding concerns the forms of support needed to strengthen pre-service vocational teacher readiness. The evidence suggests that university preparation and school placement need to be connected more deliberately. The Teaching Assistance programme gave students access to real vocational teaching experience, but several difficulties appeared because students had to adjust quickly to school-specific tools, workshop routines, curriculum formats, and mentor expectations. These difficulties point to the need for stronger coordination before and during placement.

The first area of support is workshop-based preparation before placement. Students need more than general microteaching. They need microteaching that resembles vocational workshop conditions. This may include preparing job sheets, giving safety instructions, arranging student

groups around machines, demonstrating machine operation, responding to unsafe behaviour, and managing practical learning time. Suyitno et al. (2022) and Suhartanta et al. (2024) emphasise the value of authentic and work-based learning in vocational teacher preparation. The present study suggests that this authenticity should begin before students are sent to partner schools. Campus preparation should expose students to different machine configurations, workshop routines, and realistic teaching scenarios.

The second area is safety-oriented pedagogy. In machining engineering, occupational safety is inseparable from teaching. Prospective teachers need to learn how to make safety visible in every stage of instruction, from preparation and demonstration to student practice and assessment. Safety should not be treated only as a rule stated at the beginning of class. It should be integrated into job sheets, task sequencing, classroom management, feedback, and practical supervision. The lower scores in workshop management suggest that students need guided practice in maintaining order and safety in a dynamic workshop environment. This is important because limited confidence in controlling the workshop may affect both learning quality and student safety.

The third area is administrative co-design. The findings show that students had difficulty when university-based planning formats did not match school requirements. A practical response is to develop shared orientation and administrative templates before placement. University supervisors and mentor teachers can jointly introduce the school's teaching module format, assessment rubrics, job sheet structure, productive subject schedule, and safety procedures. This would reduce unnecessary confusion and allow students to focus more on teaching quality. Sudira et al. (2022) notes that vocational learning requires attention to opportunities and constraints in practice. Administrative preparation should therefore be grounded in actual school practice, not only in generic campus requirements.

The fourth area is mentor-guided reflection. Mentor teachers should not only assess students at the end of placement. They can help students

interpret their difficulties during the placement process. When students struggle with workshop control, mentors can discuss specific moments in which instructions were unclear, safety routines were weak, or student movement became difficult to manage. When students struggle with administration, mentors can show how school documents are connected to lesson flow, assessment, and workshop practice. Sandal et al. (2023) and Zuurmond et al. (2024) suggest that vocational assessment and professional development should be connected to authentic professional tasks. Mentor feedback is valuable because it helps students connect evaluation with actual teaching improvement.

The fifth area is university-school partnership. Gupta et al. (2024) and Yoto et al. (2024) highlight the importance of collaboration in vocational education. The findings of this study add that collaboration should not stop at placement agreements. It should include shared preparation, shared evaluation instruments, shared expectations about workshop teaching, and follow-up discussion after placement. If universities and schools use different assumptions about readiness, students may experience avoidable confusion. A shared framework would help both institutions identify which competencies should be developed on campus, which should be strengthened in school, and which require joint supervision.

The findings therefore suggest that Teaching Assistance in vocational teacher education should be understood as a structured transition process. The placement is important, but the quality of transition depends on preparation, mentoring, assessment, and institutional communication. The students in this study showed promising readiness in digital and laboratory-related domains, but they still needed stronger support in conventional machine adaptation, workshop management, safety supervision, and administrative adjustment. These findings point to a more integrated model of vocational teacher preparation in which campus-based technical learning, workshop-based pedagogical practice, and school-specific curriculum work

are planned as connected stages.

In summary, the study shows that pre-service vocational teacher readiness during Teaching Assistance was uneven across domains. Facility and tool mastery was the strongest area, especially in digital and laboratory learning, while classroom or workshop management and learning administration were less stable. The findings reveal a campus-to-workshop adaptation gap in which students' campus-based preparation did not transfer equally into all areas of vocational school practice. This gap is not a reason to dismiss the value of Teaching Assistance. Rather, it shows where the programme needs to be strengthened. Pre-service vocational teachers need preparation that integrates material mastery, digital competence, practical machine operation, safety-oriented workshop management, administrative flexibility, and mentor-guided reflection. Such preparation can help them move more confidently from campus learning into the professional realities of vocational workshop teaching.

CONCLUSION

This study shows that pre-service vocational teacher students' readiness during the Teaching Assistance programme was uneven across technical, pedagogical, and administrative domains. The mentor teachers' evaluation indicated that students demonstrated stronger readiness in facility and tool mastery, particularly in digital and laboratory-based learning such as CAD/GTM, while their readiness was less stable in classroom or workshop management and learning administration. This pattern suggests a campus-to-workshop adaptation gap: students entered the partner school with useful theoretical, digital, and technical preparation, but still needed further support to translate that preparation into workshop-based teaching practice. The findings also show that vocational teacher readiness cannot be judged only from material mastery or digital competence. It requires practical machine familiarity, safety-oriented workshop management, pedagogical authority,

administrative flexibility, and the ability to adapt teaching documents to school-based curriculum expectations. Therefore, Teaching Assistance in vocational teacher education should be designed as a structured transition process rather than only as school placement. Stronger university-school coordination is needed through workshop-based microteaching, machine familiarisation, safety supervision practice, shared administrative templates, and mentor-guided reflection. These forms of support can help prospective vocational teachers move more confidently from campus preparation to the professional realities of vocational workshop teaching.

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