

Deep Vocational Learning for Agricultural Competence and Character Formation

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Abstract

This study aims to analyze the implementation of deep vocational learning in Food Crops and Horticulture Agribusiness (ATPH) learning and its contribution to strengthening the competencies and character building of students at SMKN 2 Tanah Grogot. The study used a qualitative approach with a case study design. Data were collected through participatory observation, semi-structured interviews, and documentation studies involving the principal, the head of the expertise program, productive teachers, and ATPH students. Data analysis was carried out interactively through data reduction, data presentation, and conclusion drawing, while data validity was obtained through source triangulation, technical triangulation, and member checking. The results showed that the implementation of deep vocational learning was able to create more contextual, authentic, and work-oriented learning. Field practice-based learning was proven to improve students' technical competencies, problem-solving skills, learning motivation, work readiness, and shape students' character of discipline, responsibility, cooperation, and independence. In addition, authentic learning experiences helped students develop a professional mindset and entrepreneurial spirit in the field of agricultural agribusiness. This research confirms that deep vocational learning is a relevant learning approach to strengthen competency-based vocational education through the integration of authentic work experiences, competency mastery, and character development. The study contributes to the vocational education literature by providing empirical evidence that deep vocational learning functions not only as a strategy for improving technical competence and work readiness but also as an integrated pedagogical framework that simultaneously fosters professional character, reflective learning, and entrepreneurial orientation within the context of agricultural vocational education.

Abstrak

Penelitian ini bertujuan untuk menganalisis implementasi pembelajaran vokasi mendalam dalam pembelajaran Agribisnis Tanaman Pangan dan Hortikultura (ATPH) dan kontribusinya dalam memperkuat kompetensi dan pembentukan karakter siswa di SMKN 2 Tanah Grogot. Penelitian ini menggunakan pendekatan kualitatif dengan desain studi kasus. Data dikumpulkan melalui observasi partisipatif, wawancara semi-terstruktur, dan studi dokumentasi yang melibatkan kepala sekolah, kepala program keahlian, guru produktif, dan siswa ATPH. Analisis data dilakukan secara interaktif melalui reduksi data, penyajian data, dan penarikan kesimpulan, sedangkan validitas data diperoleh melalui triangulasi sumber, triangulasi teknis, dan pengecekan anggota. Hasil penelitian menunjukkan bahwa implementasi pembelajaran vokasi mendalam mampu menciptakan pembelajaran yang lebih kontekstual, autentik, dan berorientasi kerja. Pembelajaran berbasis praktik lapangan terbukti meningkatkan kompetensi teknis siswa, keterampilan pemecahan masalah, motivasi belajar, kesiapan kerja, dan membentuk karakter siswa yang disiplin, bertanggung jawab, kooperatif, dan mandiri. Selain itu, pengalaman belajar autentik membantu siswa mengembangkan pola pikir profesional dan semangat kewirausahaan di bidang agribisnis pertanian. Penelitian ini menegaskan bahwa pembelajaran vokasional mendalam merupakan pendekatan pembelajaran yang relevan untuk memperkuat pendidikan vokasional berbasis kompetensi melalui

Kata kunci:

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integrasi pengalaman kerja otentik, penguasaan kompetensi, dan pengembangan karakter. Studi ini berkontribusi pada literatur pendidikan vokasional dengan memberikan bukti empiris bahwa pembelajaran vokasional mendalam tidak hanya berfungsi sebagai strategi untuk meningkatkan kompetensi teknis dan kesiapan kerja, tetapi juga sebagai kerangka pedagogis terintegrasi yang secara simultan menumbuhkan karakter profesional, pembelajaran reflektif, dan orientasi kewirausahaan dalam konteks pendidikan vokasional pertanian.

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INTRODUCTION

Vocational education in the 21st century faces significant challenges in preparing students with not only technical competence but also adaptive skills, critical thinking, collaborative skills, and work character that meet the needs of industry and modern society (Purwanto, et al., 2023; Nasution, I., & Adiyono, A., 2026). This synthesis aligns with international studies that confirm that authentic, workplace-integrated, and reflective learning not only enhances technical competence but also adaptive skills, problem-solving, collaboration, and work character in vocational education (Hadian, S. Z., Salimi, L., & Fallah, V., 2025). Vocational learning grounded in authentic work experiences strengthens professional competence, work identity, and adaptive skills through engagement with real-world tasks and social practices (Agussuryani et al., 2022; Lahn & Berntsen, 2023). This view is supported by studies in agricultural and vocational contexts that show that contextualized, practice-based learning increases intrinsic motivation and engagement, fostering sustained participation and the transfer of knowledge to real-world workplace situations (Agussuryani et al., 2022; González-Pérez & Soledad, 2022; Yusop et al., 2022). Specifically, project- and problem-based approaches embedded in authentic agricultural environments have been associated with deeper engagement and relevance, facilitating collaboration, critical thinking, and resilience when facing production risks and market dynamics (Nugroho, 2016; Tshong & Yasin, 2023; Mistamiruddin & Nasri, 2024).

The observation that immersive vocational learning integrates competency mastery, character development, and authentic work experiences aligns with the evolution toward deep learning or immersive vocational mastery learning, where reflection and real-world tasks are inseparable from the achievement of technical outcomes and the formation of professional dispositions (Triyono et al., 2023; Tarekegne et al., 2022). While previous research has often focused on general VET or technical/industrial fields, this synthesis reinforces the application of authentic, reflective, and workplace-integrated pedagogy in agricultural vocational education, addressing calls for an integrated curriculum that combines technical skills with character, teamwork, and work readiness in a 21st-century economy (Gregson &

Gregson, 2024; Hu, 2026; Vonog & Prokhorova, 2020). However, consistent with the literature, challenges remain such as limited facilities, varying student readiness, and environmental constraints requiring strong industry partnerships, targeted mentoring, and supportive learning environments to realize the full benefits of authentic, immersive learning in agriculture (Abraukhova & Zimovetc, 2021; Gregson & Gregson, 2024; Hartini et al., 2025). Overall, these sources support the research claim that in-depth vocational mastery learning offers a coherent and sustainable framework for developing essential 21st-century technical competencies and dispositions in agricultural vocational education (Agussuryani et al., 2022; Lahn & Berntsen, 2023; Triyono et al., 2023; Nugroho, 2016).

Integrating authentic work experiences with reflection and character development results in deeper learning and increased preparedness for the modern agricultural workplace. Vocational learning grounded in authentic work experiences strengthens students' professional competence, work identity, and adaptability through engagement with real-world tasks and communities of practice (Agussuryani et al., 2022; Lahn & Berntsen, 2023; Adiyono et al., 2024). Contextual and experiential learning has also been shown to increase motivation and engagement, facilitating the transfer of knowledge to real-world work contexts in agriculture and related fields (González-Pérez & Soledad, 2022; Yusop et al., 2022). Deep or “deep” vocational mastery learning combining competency acquisition, authentic work experiences, reflective practice, and character development offers a cohesive framework for developing the technical and dispositional outcomes necessary for 21st-century agricultural careers (Triyono et al., 2023; Tarekegne et al., 2022; Gregson & Gregson, 2024).

While initial research focused on industrial and technological vocations, emerging international scholarship supports the application of authentic, reflective, and project-based approaches to agricultural vocational education to address gaps in workforce readiness and socio-emotional development (Edwards-Robb, T., 2025). However, researchers caution against implementation barriers such as infrastructure, industry partnerships, and equity in access to field experiences, which require robust systemic strategies and industry-to-business collaboration (Nugroho, 2016; Hu, 2026; Vonog & Prokhorova, 2020; Abraukhova & Zimovetc., 2021). Overall, these findings strengthen the research proposition that in-depth vocational learning can bridge the competency-character gap in agricultural education, in line with the global call for an integrated curriculum that fosters technical skills, adaptive thinking, collaboration, and work ethics aligned with real-world agricultural contexts (Agussuryani et al., 2022; Lahn & Berntsen, 2023; Triyono et al., 2023; Gregson & Gregson, 2024).

Although various previous studies have shown that authentic learning, practice-based learning, and competency-based vocational education contribute to improving students' job skills, learning motivation, and job readiness, most research still focuses on the development of technical competencies or the relationship between vocational education and industry needs. Furthermore, existing studies are generally conducted in the context of industrial and technological vocational education, while research

specifically examining how deep vocational learning integrates competency mastery, character development, authentic work experiences, and job readiness in the context of agricultural agribusiness education is still very limited (Dahalan et al., 2023). Several studies also primarily highlight learning outcomes without in-depth explanations of the pedagogical mechanisms that enable technical competencies and character to develop simultaneously through authentic learning experiences (McGrath, S., & Yamada, S., 2023). Yet, the challenges of 21st-century vocational education relate not only to the gap in job competencies but also to the need to develop professional character, adaptability, and problem-solving skills in a dynamic work environment (Kamaruzaman et al., 2025). Therefore, this study attempts to fill this gap by exploring the implementation of deep vocational learning in the Food Crops and Horticulture Agribusiness Expertise Program (ATPH) and analyzing its contribution to strengthening students' competencies and character building in the context of agricultural vocational education.

Based on these problems, this study aims to analyze the implementation of *deep vocational learning* in the Food Crops and Horticulture Agribusiness Expertise Program (ATPH) at SMKN 2 Tanah Grogot and examine its contribution to strengthening competencies and character formation of students. This study uses a qualitative approach with a case study design to deeply understand the authentic experiential experience-based vocational learning process in the context of agricultural education. The units of analysis in this study include learning activities, teacher-student interaction, field practice, and student learning experiences in agricultural agribusiness activities. This article is organized into several main sections that include introduction, research methods, research results, discussion, and conclusions. Through this study, it is hoped that a conceptual and empirical understanding of the implementation of *deep vocational learning* as a vocational learning model that is able to integrate the strengthening of technical competence, character building, and work readiness of students in agricultural vocational education will be obtained.

RESEARCH METHODS

This study uses a qualitative approach with a case study design to explore in depth the implementation of in-depth vocational learning in the Agribusiness of Food Crops and Horticulture (ATPH) learning and its contribution in strengthening students' competencies and character building. The case study approach was chosen because it allows researchers to understand learning phenomena contextually and in depth in the real environment of vocational education (Yin, 2018). This study was conducted at SMKN 2 Tanah Grogot, Paser Regency, East Kalimantan, in the 2025 academic semester. This approach is relevant to use because the research focuses on the authentic learning process that occurs naturally in the agricultural vocational education environment. In qualitative research, the researcher acts as the main instrument directly involved in collecting, interpreting, and analyzing data in the field (Creswell & Poth, 2018). The research subjects consisted of the principal, the head of the ATPH expertise program, ATPH productive teachers, and ATPH expertise program students who were selected

purposively based on their active involvement in the implementation of in-depth vocational learning. This study focuses on the integration of practice-based learning, mastery learning, character building, and authentic work experiences in the context of agricultural vocational education.

Data collection techniques included participant observation, semi-structured interviews, and documentation studies to obtain comprehensive and in-depth data. Observations were conducted during theoretical and practical learning activities to observe student engagement, learning interactions, the application of contextual learning, and authentic activities such as land preparation, planting, plant maintenance, harvesting, and marketing agricultural products. According to Patton (2015), participant observation allows researchers to directly understand participants' behaviors and experiences within their social context. Semi-structured interviews were conducted with key informants to explore student experiences, learning strategies, implementation challenges, and the impact of learning on the development of technical competencies, work attitudes, and character. Research instruments included observation guides, interview guides, field notes, digital documentation tools, and supporting documents such as learning modules, teaching materials, student worksheets, and learning evaluation results. Instrument development was based on indicators of in-depth learning, authentic vocational learning, and character development in vocational education, ensuring that the data obtained were relevant to the research objectives and able to illustrate the relationship between contextual learning and students' work readiness.

Data analysis was conducted interactively through the stages of data reduction, data presentation, and continuous conclusion drawing throughout the research process, as outlined by Miles, Huberman, and Saldaña (2014). The data obtained were coded and categorized to identify patterns related to the development of vocational competencies, character formation, authentic work skills, and student work readiness. Data validity was maintained through triangulation of sources and techniques, comparing observations, interviews, and documentation to ensure consistency of research findings (Lincoln & Guba, 1985). Furthermore, the researchers conducted member checks with several informants to confirm the accuracy of data interpretation and conducted ongoing observations (prolonged engagement) to gain a deeper contextual understanding. Through these procedures, this study produced a valid and reliable description of how the implementation of in-depth vocational learning was able to build technical competency, responsibility, discipline, collaboration, and character in students in agricultural vocational education.

To enhance the credibility of the findings, the research results are presented not only through the researcher's interpretation but also supported by direct quotations (verbatim quotations) from the principal, the head of the ATPH expertise program, ATPH productive teachers, and students. The use of direct quotations aims to strengthen the connection between the empirical data and the resulting interpretations, thereby increasing the transparency and validity of the research findings.

RESULTS OF RESEARCH AND DISCUSSION

Results

Implementation of Deep Vocational Learning in ATPH Learning

The results of the study show that the implementation of *deep vocational learning* in the Food Crops and Horticulture Agribusiness Expertise Program (ATPH) at SMKN 2 Tanah Grogot has succeeded in creating more contextual, active, and authentic work experience-oriented learning. Learning is carried out through the integration of theory in the classroom with hands-on practice in the field gradually and continuously. Students are not allowed to proceed to the next stage before the previous competency is declared complete. The learning process starts from land sanitation, soil tillage, planting, plant maintenance, pest control, to marketing agricultural products. The learning model makes students understand that agribusiness is not only related to cultivation activities, but also includes the management of farming and the marketing of production products.

ATPH productive teachers explained that practice-based learning is more effective than conventional methods because students gain real experience that suits the needs of the world of work. Learning is carried out through group work and intensive mentoring so that students are used to cooperating, being responsible, and able to solve problems that arise during practice. The head of the ATPH program also explained that deep learning is applied so that students really understand each stage of agricultural work thoroughly and not just memorize learning theories in the classroom.

Tabel 1

Implementation of Deep Vocational Learning in ATPH Learning

Learning Components	Implementation in the Field
Theoretical Learning	Delivery of the concept of cultivation, agribusiness, and farm business management
Field Practice	Land tillage, planting, maintenance, harvesting, and marketing
Mastery Learning	Students complete one competency before moving on to the next stage
Contextual Learning	Students face real problems in agricultural practice
Collaborative Work	Practice is carried out through group work and shared responsibility

Table 1 shows that the implementation of *deep vocational learning* takes place through the gradual integration of theoretical learning, authentic practice, and mastery of competencies. Learning centered on real experience makes students more active and understands the relationship between the concept of learning and the needs of the agricultural vocational work world. These findings show that experiential vocational learning is able to build job skills while increasing student learning engagement in a more meaningful way. An ATPH Productive Teacher explained:

“Practical learning allows students to grasp the material more quickly because they directly observe and carry out the cultivation process in the field. When students experience the process from land preparation to harvest, their

understanding is much deeper than if they only learn theory in the classroom.”
(ATPH Productive Teacher)

The ATPH Program Head emphasized:

“We implement gradual learning. Students are not allowed to move on to the next competency until they have fully mastered the previous one. The goal is for them to have comprehensive skills and be ready to face the world of work.”
(ATPH Program Head)

An ATPH student expressed:

“I understand the lessons more easily when I practice directly in the garden. We learn how to deal with real-world conditions such as changing weather, pest attacks, and how to properly care for plants.” (ATPH Student-1)

These quotes demonstrate that immersive vocational learning provides authentic learning experiences and helps students connect theoretical concepts with real-world work practices in the agricultural agribusiness sector.

The results of the interviews show that the implementation of *deep vocational learning* provides a more meaningful learning experience because students not only receive the material theoretically, but also engage directly in real agricultural work activities. One of ATPH's prolific teachers explained that students become easier to understand the material when they learn through field practice rather than just through classroom learning. The teacher also emphasized that the students' direct involvement in the process of cultivating plants makes them more active, disciplined, and responsible for the tasks given. One student revealed that hands-on practice in the field helped them understand farm working conditions in real life, including how to deal with challenges such as weather change, pest infestation, and crop management that require precision and consistency of work. In addition, students feel more confident because they gain real experience in cooperating, discussing, and solving problems during practical activities. The findings suggest that authentic experiential learning is able to build higher learning engagement and create a stronger relationship between the concept of learning and the needs of the agricultural vocational workforce.

Improving Students' Competencies and Character

The results of the study show that the implementation of *deep vocational learning* has a significant impact on improving student competence, both in terms of knowledge, skills, and character. In the aspect of knowledge, students become more aware of the concept of plant cultivation and the agribusiness process as a whole because learning is carried out contextually and integrated with field practice. Students not only understand agricultural theory, but are also able to connect learning concepts with real conditions in the field.

In the skill aspect, students show an improvement in practical skills in land cultivation, the use of agricultural tools, planting, plant maintenance, and the harvesting process according to agricultural work standards. Students look more confident in doing practice because learning is done directly and repeatedly through real experiences. In

addition, practical activities help students understand work risks, time management, and the importance of rigor in agricultural agribusiness activities.

This study also found that real-life experiential learning contributes greatly to the formation of students' character. The teacher explained that students are trained to have discipline, responsibility, cooperation, independence, and honesty during the practice process. Students are responsible for the plants they manage so that awareness arises to take care of plants consistently. Even when there is a crop failure, students are invited to reflect to understand the cause of the failure and find solutions for improvement.

Table 2

The Impact of Deep Vocational Learning on Students' Competencies and Character

Aspects	Research Findings
Knowledge	Students' understanding of cultivation and agribusiness increases
Skills	Ability to practice and use agricultural tools develop
Discipline	Students' attendance and responsibilities in practice are increasing
Cooperation	Students are more active in working in groups
Independence	Students are more confident in completing practical tasks
Problem Solving	Students are able to face real obstacles in agricultural practice

Table 2 shows that the implementation of *deep vocational learning* not only improves technical competence, but also shapes students' character and social skills. Practice-based learning provides a more meaningful learning experience because students learn through real-life activities and reflection on hands-on experience. A Productive ATPH Teacher explained:

“After regularly participating in field practice, students became more disciplined. They arrived on time, were more responsible for the plants they were managing, and worked more actively in groups.” (Productive ATPH Teacher)

One student stated:

“The agricultural practice taught me to be patient and meticulous. If we were late in watering or caring for the plants, the results were immediately visible in their growth.” (Student ATPH-2)

Another student added:

“When the plants failed to grow well, we didn't immediately give up. We discussed the cause and tried to fix it for the next planting.” (Student ATPH-3)

These findings indicate that experiential learning not only strengthens students' technical competencies but also fosters character traits such as discipline, responsibility, perseverance, and problem-solving skills.

The results of the interviews show that real-life experience-based learning makes students better understand the meaning of responsibility and discipline in agricultural agribusiness activities. ATPH's productive teachers explained that students began to show behavioral changes after being directly involved in field practice, especially in maintaining consistency in caring for plants, working on schedule, and completing

group tasks together. One of the students said that farming practices made them learn to be more patient, meticulous, and responsible because the success of plants is highly dependent on the maintenance process carried out every day. Other students also explained that the experience of facing crop failure provides important lessons about hard work, self-evaluation, and how to find solutions to problems that arise in the field. The findings show that the implementation of *deep vocational learning* not only improves students' mastery of technical competence, but also shapes work character, social skills, and reflective mindset through authentic learning experiences. The learning process that takes place in a contextual and collaborative manner helps students understand that the world of agricultural work requires technical skills that are balanced with an attitude of discipline, cooperation, responsibility, and adaptability to real work challenges. Thus, in-depth vocational learning is an effective approach in building students' holistic competencies in agricultural agribusiness education.

Student Learning Engagement and Motivation in Authentic Learning

The results showed that students' involvement and motivation to learn increased significantly after the implementation of *deep vocational learning*. Students find learning to be more engaging because they are directly involved in field practice and can see the results of their work in real life. Activities such as planting, caring for plants, and harvesting are the learning activities that students are most interested in because they provide concrete experiences that are not obtained through theoretical learning alone.

Students explained that practical learning makes it easier for them to understand the material than just listening to the teacher's explanations in class. In addition, the learning atmosphere becomes more interactive because students can discuss, collaborate, and express opinions during the practice. The teacher also explained that students who were previously passive began to show the courage to actively participate in learning after being given the opportunity to learn through hands-on experience.

Despite several obstacles such as limited practical facilities, differences in students' abilities, and weather factors, the learning process continues to run effectively through teacher assistance and group work divisions. The school also continues to develop cooperation with the industrial world and improve practice facilities so that learning is more relevant to the needs of the world of work. Overall, the implementation of *deep vocational learning* has succeeded in creating vocational learning that is more meaningful, adaptive, and oriented towards the formation of work competencies and character of students in the field of agricultural agribusiness.

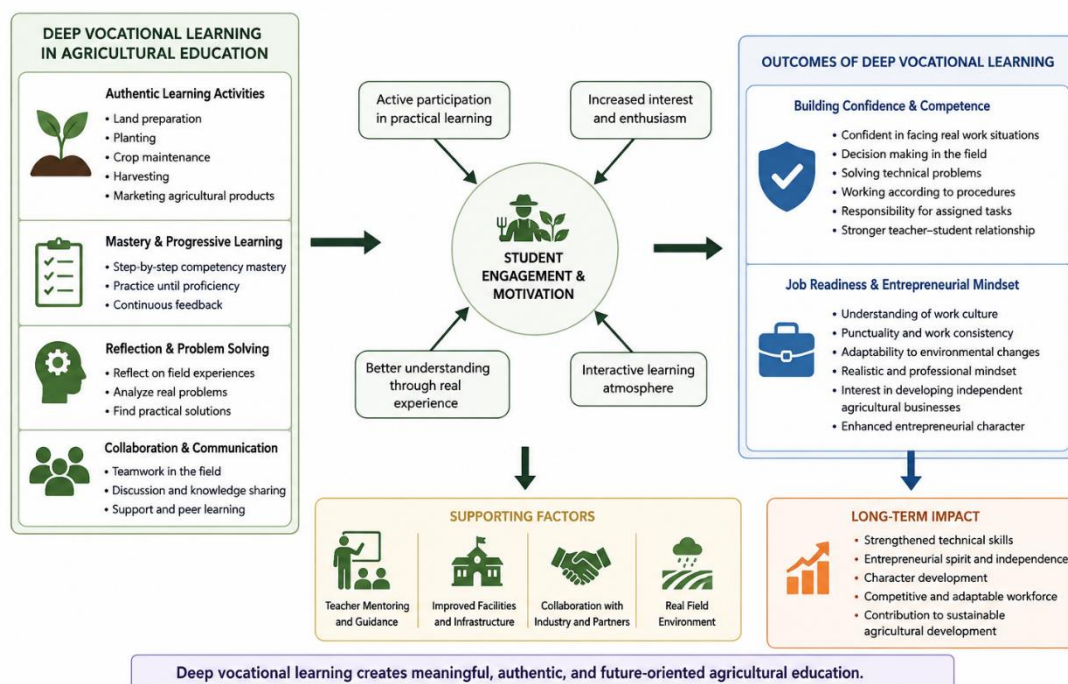


Figure 1. Conceptual Framework of Deep Vocational Learning in Agricultural Agribusiness Education

Figure 1 shows the conceptual framework for the implementation of *deep vocational learning* in agricultural agribusiness education which is oriented towards strengthening competencies, character building, and work readiness of students. This diagram illustrates that deep vocational learning is built through the integration of authentic learning, field practice experience, collaborative learning, and gradual *mastery learning*. Through direct involvement in real farming activities, students develop decision-making skills, technical problem-solving, job skills, and a sense of responsibility for assigned tasks. In addition, a communicative and participatory learning process also forms the character of discipline, cooperation, independence, and students' adaptability to the dynamics of the modern agribusiness world of work. The diagram also shows that continuous practical experience not only improves students' academic competence and technical skills, but also builds a professional mindset, entrepreneurial spirit, and job readiness that is relevant to the needs of future vocational education based on authentic experience and real world of work.

The results of the interviews showed that authentic learning based on field practice made students more motivated and felt that they had a more meaningful learning experience than conventional learning in the classroom. One of the students explained that they became more enthusiastic about learning because they could see firsthand the results of the work done during the process of agricultural practices, from planting to harvesting. ATPH productive teachers also explained that students' active involvement increased significantly after learning was carried out through a *deep vocational learning* approach, especially in students who were previously passive and lacked confidence in following learning. In addition, practice activities carried out collaboratively help students build communication, the courage to express opinions, and

the ability to work together in completing group tasks. The findings show that authentic experiential learning is able to create a learning environment that is more interactive, participatory, and relevant to the needs of the modern agribusiness workforce. The implementation of *deep vocational learning* also shows that direct involvement in real activities can strengthen students' intrinsic motivation, build job readiness, and form a professional mindset and entrepreneurial spirit in agriculture. Thus, in-depth vocational learning is a strategic approach in improving the quality of agricultural vocational education because it is able to integrate competency strengthening, character building, and authentic work experience in one complete and sustainable learning process. An ATPH student explained:

"I'm more enthusiastic about learning because I can see the results of my own work. From planting to harvesting, we can see the process firsthand." (Student ATPH-4)

Another student said:

"Learning in the field is more interesting than just listening to the teacher's explanation. We can discuss, collaborate, and directly try out what we've learned." (Student ATPH-5)

ATPH Productive Teachers also observed changes in student behavior:

"Students who were previously passive began to ask questions and express their opinions when they were directly involved in practical activities. They seemed more confident and more active during the learning process." (Student ATPH Productive Teacher)

This quote demonstrates that authentic learning experiences can increase students' intrinsic motivation, learning engagement, and self-confidence in participating in vocational learning.

Discussion

Findings from the Food Crops and Horticulture Agribusiness Expertise Program (ATPH) of SMKN 2 Tanah Grogot align with international evidence that authentic, practice-based learning enhances competency development, job readiness, and professional identity in vocational education. As noted in open-access and Scopus-indexed works, experiential and authentic learning in vocational contexts enhances engagement, motivation, and transfer of theory to real-world work (Rank & Retallick, 2016), with implications for agricultural and horticultural education where field-based activities such as land preparation, planting, crop maintenance, and marketing are central to learning outcomes (Acuña et al., 2019; Roberts & Robinson, 2018). International studies repeatedly emphasize that learning through practice, embedded in real-world contexts, strengthens technical mastery while fostering social skills, responsibility, and work readiness, including the formation of professional identity and work-related dispositions (Rank & Retallick, 2016). (Barr, n.d.). For example, case-study-based and project-oriented vocational programs in horticulture and agribusiness demonstrate that integrating theory with field practice results in more meaningful learning experiences

and better aligns with 21st-century competencies, such as adaptability and authentic workplace performance (Acuña et al., 2019; Goodburn, 2020).

The view that authentic activities such as work whether through land-based assignments, agribusiness projects, or industry partnerships contribute to increased motivation and engagement, which in turn supports the development of professional competencies and work identity (Vertsman, 2023; Wells et al., 2019; Rank & Retallick, 2016). Overall, these sources corroborate research claims that mastery-based learning approaches with theory-practice integration promote contextual and authentic learning and strengthen work competencies and character, experiential cycle of concrete experience, reflection, conceptualization, and active implementation in real-world settings (Rank & Retallick, 2016; Roberts & Robinson, 2018; Junge et al., 2019). While some literature addresses the challenges of translating internships and field experiences into equitable learning outcomes and stakeholder alignment (Chan, 2017; Kholida et al., 2025), the bulk of international evidence confirms that authentic vocational learning substantially increases motivation, engagement, and preparedness for the agribusiness landscape, supporting research conclusions about 21st-century vocational education needs (Chan, 2017; Mulei et al., 2020; Rank & Retallick, 2016). Nuanced discussions across sources also highlight the importance of well-designed partnerships and contextual adaptations to maximize the benefits of authentic learning for diverse student groups (Acuña et al., 2019; Roberts & Robinson, 2018; Zhao & Ko, 2024).

The current findings align with international evidence that immersive vocational learning, practiced through authentic, practice-based experiences, contributes to the development of character as well as technical competence in TVET contexts. A bibliometric synthesis of educational productivity found that when learning is embedded in real-life practices and supported by reflective cycles, the visibility of educational research increases when it is grounded in authentic classroom and workplace environments (Roslin et al., 2022; Ramadani, J, et al., 2026). Knowledge and identity are shaped through participation in authentic, peripheral communities of practice; in vocational education, students learn through social practices and real-life work communities, thereby developing responsibility, cooperation, and adaptive problem-solving as they navigate weather, pests, and agricultural risks in field settings (Roslin et al., 2022). Supporting this, studies on practice-based and mastery-oriented learning in vocational education and training (TVET) emphasize that failure analysis, feedback, and repeated practice foster the development of competencies and work dispositions essential for modern agricultural contexts.

These findings align with recommendations that mastery learning in vocational settings should integrate authentic work experiences and reflective components to foster work readiness beyond mere technical mastery (Yusop et al., 2022; Irawan et al., 2024). Collectively, these sources corroborate research propositions about an enhanced, in-depth vocational mastery learning model that combines competency attainment with character building and authentic work engagement, consistent with the shift in vocational education toward integrating technical skill development, reflective practice,

and professional identity within real-world work communities (Yusop et al., 2022; Irawan et al., 2024; Roslin et al., 2022). While some literature cautions about potential inequities in access to field-based experiences and stakeholder alignment, the dominant international consensus reinforces the core claim that authentic, practice-based learning fosters discipline, collaboration, and resilience as integral aspects of modern vocational education (Yusop et al., 2022; Irawan et al., 2024; Roslin et al., 2022).

The finding that authentic, practice-based learning enhances student engagement aligns with international evidence that contextualized vocational experiences increase active participation, enthusiasm, and intrinsic motivation in agriculture and beyond. In a business simulation study within an exploratory agriculture course, engaging students through authentic, real-world tasks can enhance the learning experience and entrepreneurial thinking, thus supporting greater student investment in learning activities (Junge et al., 2019; Smalley et al., 2019; Adiyono et al., 2026). Problem-based and project-based approaches embedded in real-world work contexts foster deeper engagement and perceived relevance, which in turn encourages continued participation and persistence in vocational settings (Suhirman & Prayogi, 2023). Research in agricultural education suggests that work-based programs focused on SAE (Safety, Acquisition, and Experience) in urban contexts rely on teacher engagement, structured supervision, and industry partnerships to maintain student interest and participation, underscoring the role of authentic tasks and a supportive ecosystem in fostering engagement (Rubenstein et al., 2016).

Challenges in implementing authentic vocational learning—such as limited facilities, diverse student abilities, and environmental constraints—can be mitigated through collaborative learning, targeted mentoring, and strengthened industry collaboration, echoing the conclusions of current research on the need for supportive environments and competent practitioners for immersive vocational learning to realize its engagement benefits (Jjuuko, n.d.; Misbah, n.d.). Overall, these sources support research claims that immersive vocational mastery learning not only enhances technical competence and job readiness but also increases student engagement through authentic and contextual experiences, while acknowledging persistent barriers that require systemic responses (Roslin et al., 2022; Yusop et al., 2022; Irawan et al., 2024; Rubenstein et al., 2016).

This research finding occurs because immersive vocational learning places students in authentic work situations, so that the learning process occurs not only at the level of conceptual understanding but also through direct experience, reflection, and solving real-world problems. This condition aligns with Experiential Learning Theory, which explains that knowledge is formed through the transformation of concrete experiences into new understandings and actions (Kingkaew et al., 2023). Furthermore, the integration of theoretical learning, field practice, collaboration, and reflection allows students to connect academic knowledge with real-world work contexts, so that technical competencies and character develop simultaneously (Curto et al., 2025). This finding expands previous studies that generally position authentic learning as a means

of improving work skills or job readiness alone, by showing that immersive vocational learning also functions as a mechanism for character development such as discipline, responsibility, cooperation, and resilience in the face of failure. Unlike previous research, which has mostly been conducted in the context of industrial vocational education or business-based internship programs, this study shows that in the context of agricultural agribusiness, the experience of managing crops sustainably from land preparation to harvest marketing creates a more holistic learning process because students face environmental uncertainty, production risks, and the demands of decision-making directly (Yamini et al., 2025). Thus, this research contributes to the development of the concept of deep vocational learning as a learning model that integrates competency mastery, character building, and authentic work experience in one integrated pedagogical framework.

CONCLUSION

The conclusion of this study shows that the implementation of in-depth vocational learning in the Food Crops and Horticulture Agribusiness Expertise Program (ATPH) at SMKN 2 Tanah Grogot is able to create vocational learning that is more contextual, authentic, and oriented towards real work experiences. 1) The implementation of learning that integrates theory, field practice, mastery learning, and authentic experiences has been proven to be able to improve students' technical competencies in the field of agricultural agribusiness in a deeper and sustainable manner. 2) In-depth vocational learning not only contributes to strengthening work skills, but also shapes students' character such as discipline, responsibility, cooperation, independence, and problem-solving abilities through real practical experiences in the field. 3) Authentic experience-based learning increases student engagement, learning motivation, and work readiness because students are directly involved in the agricultural production process from the land preparation stage to marketing agricultural products. The findings of this study reinforce the importance of transforming vocational learning from conventional approaches to in-depth learning that is more relevant to the needs of the world of work and the development of 21st-century education. This study also proposes the development of the concept of in-depth vocational mastery learning as a vocational learning model that integrates competency mastery, character building, and authentic work experiences into a cohesive learning process. Further research can be conducted in other vocational education contexts with a broader approach to test the effectiveness of this model in improving work readiness, 21st-century skills, and the sustainability of vocational learning across various fields of expertise.

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