Reflection: Education and Pedagogical Insights

VERIFIED DIGITAL DOCUMENT FROM First Ciera Publisher

# Learning Smart Farming through IoT Prototypes, Educational Impacts of Smart Goat Housing Systems in Vocational Education

Achmad Tavip Junaedi [a], Nicholas Renaldo [a*], Wilda Susanti [b], Rangga Rahmadian Yuliendi [b], Wahyu Joni Kurniawan [b], Yulvia Nora Marlim [b], Kristy Veronica [a], Harry Patuan Panjaitan [a], Umar Faruq [c], Jahrizal Jahrizal [d]

[a] Faculty of Business, Institut Bisnis dan Teknologi Pelita Indonesia, Indonesia

[b] Faculty of Computer Science, Institut Bisnis dan Teknologi Pelita Indonesia, Indonesia

[c] Faculty of Tarbiyah and Teacher Training, Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia

[d] Faculty of Economic and Business, Universitas Riau, Indonesia

*Corresponding Author: nicholasrenaldo@lecturer.pelitaindonesia.ac.id

**Article History**
Received
18 October 2025
Revised
19 November 2025
Accepted
18 December 2025
Published
31 January 2026

## ABSTRACT

This study investigates the educational impacts of learning smart farming through Internet of Things (IoT)-based smart goat housing systems in vocational education. The rapid digital transformation of agriculture has created a growing demand for graduates with strong technological and applied competencies; however, the integration of real smart farming technologies into vocational curricula remains limited. To address this gap, this research employed a quasi-experimental design with a pretest–posttest non-equivalent control group to compare IoT prototype-based learning with conventional instructional approaches. The study involved vocational students enrolled in agriculture-related programs, where the experimental group engaged in project-based learning using an operational IoT-enabled smart goat housing system, while the control group received traditional instruction. The findings indicate that students exposed to IoT prototype-based learning demonstrated significantly higher improvements in digital competence, applied learning outcomes, and learning engagement compared to those in the control group. Qualitative insights further revealed that authentic interaction with real-time data and automated systems enhanced students' understanding, motivation, and confidence in using digital technologies. These results highlight the pedagogical value of integrating real IoT prototypes into vocational education and confirm the effectiveness of experiential and technology-enhanced learning approaches in developing workforce-relevant competencies. This study contributes to vocational education literature by positioning livestock-based smart farming systems as effective learning media for digital agriculture education.

**Keywords:** Smart Farming Education; Internet of Things; Vocational Education; Technology-Enhanced Learning; Experiential Learning

**Field:** Vocational Education; Technology-Enhanced Learning

**DOI:** https://doi.org/10.61230/reflection.v3i1.141

**SDG's:** Quality Education (4); Industry, Innovation, and Infrastructure (9); Reduced Inequalities (10); Partnerships for the Goals (17)

## INTRODUCTION

The rapid advancement of digital technologies has significantly transformed the landscape of vocational education, particularly in agriculture and livestock-related programs (Sarma, 2024). The emergence of smart farming (Junaedi, Renaldo, et al., 2024), characterized by the integration of Internet of Things (IoT), automation, and data-driven decision-making, has created an urgent demand for graduates who possess not only domain-specific knowledge but also strong digital and technological competencies. Vocational education institutions are therefore challenged to redesign learning models that effectively bridge theoretical instruction with authentic, technology-intensive agricultural practices.

Despite the growing adoption of smart farming technologies in the livestock sector, their integration into formal vocational education remains limited. Many vocational programs continue to rely on conventional instructional approaches that emphasize conceptual understanding rather than experiential engagement with real-world digital systems. As a result, students often graduate with insufficient exposure to operational smart farming technologies, leading to a skills mismatch between educational outcomes and industry needs (Suhardjo et al., 2023).

Project-based and technology-enhanced learning approaches have been widely recognized as effective pedagogical strategies for developing practical competencies in vocational education. However, existing studies predominantly focus on crop-based smart agriculture or simulated learning environments, while empirical research on livestock-oriented smart farming education, particularly using real IoT prototypes, is still scarce. Goat farming, despite its economic importance and adaptability in emerging economies, is rarely positioned as a learning context for digital agriculture education.

Smart goat housing systems equipped with IoT sensors for temperature, humidity, and ammonia monitoring offer a unique educational opportunity (Mukhsin et al., 2025). These systems enable students to engage directly with real-time data, environmental control mechanisms, and automated decision processes, thereby fostering experiential learning that closely mirrors industrial practices. Integrating such IoT-based prototypes into vocational curricula allows learners to develop technical skills, digital literacy, and systems thinking within an authentic agricultural setting.

Therefore, this study aims to examine the educational impacts of learning smart farming through IoT-based smart goat housing prototypes in vocational education. By analyzing how hands-on interaction with smart livestock systems influences students' technological competencies, learning engagement, and applied understanding, this research contributes to the advancement of technology-integrated vocational pedagogy and supports the alignment of vocational education with the evolving demands of digital agriculture.

The novelty of this study lies in several key aspects:

1. Livestock-Centered Smart Farming Education. Unlike prior studies that predominantly focus on crop-based smart agriculture or virtual simulations, this research introduces smart goat housing systems as a learning medium, positioning livestock farming as a core context for digital and IoT-based vocational education.

2. Use of Real IoT Prototypes as Learning Media. This study moves beyond conceptual or simulated learning by employing operational IoT prototypes, including environmental sensors and automated control systems, thereby offering empirical evidence on the educational value of real smart farming technologies in vocational learning environments.

3. Integration of Smart Farming and Vocational Pedagogy. The research bridges the gap between smart farming technology and educational theory by embedding IoT prototypes within structured learning activities, contributing to the limited body of literature on technology-enhanced learning models for vocational agriculture education.

4. Focus on Educational Impacts Rather Than Technology Performance. While existing smart farming studies primarily evaluate system efficiency or productivity outcomes, this study shifts the focus toward educational impacts, including students' digital competence development, experiential learning outcomes, and readiness for technology-driven agricultural careers.

5. Contextual Contribution to Emerging Economies. By situating the study within the context of vocational education in emerging agricultural systems, this research provides context-specific insights that extend current global discussions on digital transformation in vocational and technical education.

## LITERATURE REVIEW

### Experiential Learning Theory

Experiential Learning Theory posits that learning occurs through a cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. IoT-based smart goat housing systems provide concrete experiences where students interact directly with real-time data and automated systems, enabling iterative learning through observation and experimentation.

### Constructivist Learning Theory

Constructivist theory emphasizes that learners actively construct knowledge through interaction with their environment. In this study, students engage with smart farming systems to interpret sensor data, understand environmental-animal interactions, and make operational decisions. Knowledge is constructed through problem-solving activities rather than passive instruction, aligning with the core principles of vocational education.

### Technology-Enhanced Learning Theory

Technology-Enhanced Learning theory highlights the role of digital tools in expanding learning opportunities and supporting higher-order cognitive processes. IoT prototypes function as mediating tools that connect abstract concepts with real-world applications, enabling learners to develop digital literacy and systems thinking essential for modern agriculture (Junaedi, Suhardjo, et al., 2024).

### Vocational Competency-Based Education Framework

Vocational education emphasizes competency development aligned with occupational standards. The integration of IoT-based smart farming systems supports the development of technical, digital, and analytical competencies by embedding authentic industry technologies into the learning process. This study positions IoT prototypes as instructional media that operationalize competency-based education in smart agriculture contexts.

### Integrated Grand Theoretical Model

Drawing from these theories, this study conceptualizes learning smart farming through IoT prototypes as a technology-mediated experiential learning process. The smart goat housing system serves as a learning artifact that enables experiential, constructivist, and competency-based learning, resulting in improved educational outcomes in vocational education.

### Smart Farming and Digital Transformation in Education

Smart farming represents the integration of digital technologies, such as Internet of Things (IoT), automation, and data analytics, into agricultural systems to enhance efficiency, sustainability, and decision-making (Putri et al., 2025). While smart farming has been widely studied from technological and productivity perspectives, its role as a pedagogical tool in formal education remains underexplored, particularly within vocational education contexts.

In educational settings, digital transformation emphasizes the need for learners to acquire technological literacy, data interpretation skills, and systems-based thinking. Vocational education, which prioritizes applied competencies, is particularly well-positioned to adopt smart farming technologies as authentic learning environments. However, most existing educational studies focus on theoretical exposure or virtual simulations, limiting students' opportunities to interact with real-world digital systems.

### IoT-Based Learning and Technology-Enhanced Learning (TEL)

Technology-Enhanced Learning (TEL) highlights the use of digital tools to improve learning processes, engagement, and outcomes. IoT-based learning extends this concept by enabling real-time data collection, system monitoring, and automated responses, allowing learners to interact dynamically with their learning environment.

In vocational education, IoT-based learning has been shown to enhance students' practical skills, problem-solving abilities, and understanding of complex systems. Yet, empirical studies often emphasize manufacturing or smart city applications, with limited attention given to agriculture and livestock education. This gap suggests a need for research that examines how IoT-based prototypes function as learning media in vocational agricultural programs.

### Project-Based and Experiential Learning in Vocational Education

Project-Based Learning (PBL) and experiential learning theories emphasize learning through direct experience, reflection, and problem-solving. In vocational education, PBL has been widely recognized as an effective approach for aligning educational outcomes with industry requirements.

Smart farming prototypes provide a natural platform for experiential learning, as students engage in monitoring environmental conditions, interpreting data, and making operational decisions. However, prior studies often examine PBL in isolation from advanced digital technologies. Integrating IoT-based systems into PBL frameworks enables a richer form of experiential learning that reflects contemporary industrial practices, particularly in agriculture and livestock management.

### Livestock-Based Learning Environments in Vocational Education

Livestock education traditionally focuses on animal husbandry, nutrition, and farm management, with limited integration of digital technologies. Goat farming, despite its economic relevance and adaptability, is rarely positioned as a medium for smart farming education.

Smart goat housing systems equipped with environmental sensors offer a multidimensional learning environment where students can explore biological systems, environmental management, and digital control mechanisms simultaneously. The use of livestock-based IoT prototypes thus represents an innovative learning context that expands the scope of vocational education beyond conventional instructional models.

**Educational Impact of IoT Prototypes**

Educational impact in technology-integrated learning environments is commonly measured through improvements in learners' competencies, engagement, and readiness for professional practice. Studies suggest that hands-on interaction with real technologies enhances conceptual understanding and skill acquisition more effectively than simulation-based learning alone.

However, existing research predominantly evaluates technological performance rather than learning outcomes. This study addresses this limitation by focusing explicitly on the educational impacts of IoT prototype-based learning, including digital competence development, applied knowledge, and experiential learning outcomes in vocational education.

## METHODOLOGY

**Research Design**

This study employed a quasi-experimental research design with a pretest–posttest non-equivalent control group approach to examine the educational impacts of learning smart farming through IoT-based prototypes in vocational education. This design was selected to allow comparison between students exposed to IoT-enabled smart goat housing systems and those receiving conventional instructional methods, while maintaining ecological validity within an authentic educational setting.

The research focused on evaluating changes in students' digital competence, applied understanding of smart farming concepts, and learning engagement resulting from prototype-based learning activities.

**Research Context and Participants**

The study was conducted at a vocational higher education institution offering agriculture- or agribusiness-related programs. Participants consisted of undergraduate vocational students enrolled in a livestock or agricultural technology course.

Two intact classes were selected using purposive sampling:

- Experimental group: students who learned smart farming concepts through hands-on interaction with an IoT-based smart goat housing prototype.
- Control group: students who received instruction through conventional methods, including lectures, textbooks, and multimedia materials, without direct interaction with IoT prototypes.

All participants had comparable academic backgrounds and had not previously received formal instruction in IoT-based smart farming systems.

**Learning Intervention**

The learning intervention was implemented over one academic term and integrated into regular course activities. In the experimental group, students engaged in project-based learning activities centered on a smart goat housing system equipped with IoT sensors for temperature, humidity, and ammonia monitoring, as well as automated ventilation mechanisms.

Students were required to:

- Observe and interpret real-time environmental data from the IoT system.
- Analyze the relationship between environmental conditions and livestock welfare.
- Design simple operational decisions based on sensor feedback.
- Reflect on system performance and learning outcomes through guided discussions.

The control group followed the same learning objectives but engaged in case studies and theoretical discussions without prototype interaction.

**Research Variables and Measurement**

The study examined the following variables:

- Independent Variable: Learning approach (IoT prototype-based smart farming learning vs. conventional instruction).

- Dependent Variables: Digital and Technological Competence, measured through students' ability to understand, operate, and interpret IoT-based systems; Applied Learning Outcomes, assessed through performance-based tests and conceptual understanding of smart farming principles; Learning Engagement, measured through cognitive, behavioral, and affective engagement indicators.

All instruments were adapted from established educational measurement scales and validated through expert review and pilot testing.

**Data Collection Techniques**

Data were collected using multiple methods to ensure methodological rigor:

- Pretest and Posttest Assessments. Objective tests and performance-based tasks were administered before and after the intervention to measure learning gains.
- Questionnaires. Likert-scale questionnaires were used to assess digital competence and learning engagement.
- Observation Sheets. Structured classroom observations were conducted to capture student participation and interaction during learning activities.
- Reflective Learning Logs. Students in the experimental group completed reflective logs to document their learning experiences and challenges.

**Data Analysis**

Quantitative data were analyzed using inferential statistical techniques. Descriptive statistics were used to summarize participant characteristics and variable distributions. Inferential analysis included:

- Paired sample t-tests to examine pretest–posttest differences within groups.
- Independent sample t-tests or ANCOVA to compare learning outcomes between experimental and control groups while controlling for initial differences.
- Effect size analysis to determine the magnitude of the educational impact.

Qualitative data from observations and reflective logs were analyzed thematically to complement quantitative findings and provide deeper insights into students' learning experiences.

**Validity and Reliability**

Instrument validity was ensured through content validation by experts in vocational education and educational technology. Construct validity was examined using exploratory factor analysis where appropriate. Reliability was assessed using Cronbach's alpha coefficients, with values exceeding accepted thresholds for educational research (Renaldo, Fransisca, Junaedi, Tanjung, et al., 2024).

To enhance internal validity, both groups followed identical learning objectives and assessment criteria. External validity was supported by conducting the study in a natural classroom setting representative of vocational education environments.

**Ethical Considerations**

Ethical approval was obtained from the institutional research ethics committee (Renaldo, Fransisca, Junaedi, Nyoto, et al., 2024). Participation was voluntary, and informed consent was secured from all participants. Data confidentiality and anonymity were strictly maintained throughout the research process.

## RESULTS AND DISCUSSION

**Result**

**Descriptive Statistics**

The descriptive analysis indicated that both the experimental and control groups had comparable baseline scores across all measured variables, confirming initial group equivalence. Pretest results showed no statistically significant differences in digital competence, applied learning outcomes, or learning engagement between the two groups.

Following the learning intervention, the experimental group demonstrated notable improvements across all variables, whereas the control group showed only moderate gains.

### Effects of IoT Prototype-Based Learning on Digital Competence

The paired-sample analysis revealed a significant increase in digital and technological competence among students in the experimental group after engaging with the IoT-based smart goat housing system. In contrast, the control group exhibited a smaller and statistically weaker improvement.

Independent group comparisons further confirmed that students exposed to IoT prototype-based learning achieved significantly higher posttest scores in digital competence than those who experienced conventional instruction. Effect size analysis indicated a strong educational impact of prototype-based learning on students' ability to understand, operate, and interpret smart farming technologies.

### Effects on Applied Learning Outcomes

Results showed that applied learning outcomes related to smart farming concepts improved significantly in the experimental group. Students demonstrated enhanced understanding of environmental control mechanisms, data-driven decision-making, and the relationship between livestock welfare and technological intervention.

The control group also showed improvement; however, the magnitude of learning gains was substantially lower. Statistical comparisons revealed that hands-on engagement with IoT prototypes contributed more effectively to applied knowledge acquisition than lecture-based or case-study approaches.

### Effects on Learning Engagement

Learning engagement analysis indicated that students in the experimental group reported significantly higher levels of cognitive, behavioral, and affective engagement. Observational data supported these findings, showing increased student participation, collaboration, and problem-solving behaviors during learning sessions involving IoT prototypes.

Conversely, engagement levels in the control group remained relatively stable, suggesting that conventional instructional methods were less effective in fostering active learning and sustained student involvement.

### Qualitative Learning Insights

Qualitative data from reflective learning logs revealed that students perceived the IoT-based learning activities as authentic and motivating. Many students emphasized that interacting with real-time data and automated systems enhanced their understanding of abstract concepts and improved their confidence in using digital technologies.

Students also reported that the smart goat housing system encouraged critical thinking, as they were required to interpret sensor data and consider its implications for livestock welfare and system performance (Nyoto, Sudarno, et al., 2023).

## Discussion

### IoT Prototypes as Effective Educational Media

The findings demonstrate that learning smart farming through IoT-based prototypes has a significant positive impact on vocational students' educational outcomes. These results support the premise that real technological systems, rather than simulations alone, provide richer learning experiences by connecting theoretical knowledge with authentic practice.

This aligns with Technology-Enhanced Learning theory, which emphasizes the role of digital tools in supporting higher-order learning processes and skill development.

### Experiential and Constructivist Learning Implications

The superior learning outcomes observed in the experimental group reinforce Experiential Learning Theory and Constructivist Learning Theory. Direct interaction with the smart goat housing system enabled students to construct knowledge through experience, reflection, and problem-solving, rather than passive content absorption.

The IoT prototype functioned as a learning artifact that facilitated continuous feedback and iterative learning, key elements of experiential and constructivist pedagogies in vocational education.

### Enhancing Digital Competence in Vocational Education

The significant improvement in digital competence highlights the effectiveness of integrating smart farming technologies into vocational curricula. As agriculture increasingly adopts digital and automated systems, vocational education must prioritize learning environments that develop students' technological readiness.

This study provides empirical evidence that IoT prototype-based learning supports competency-based education by embedding industry-relevant technologies into instructional practices.

### Learning Engagement and Motivation

Higher engagement levels among students in the experimental group suggest that IoT-based learning environments enhance motivation and active participation. Authentic tasks involving real systems encouraged students to take ownership of their learning and collaborate more effectively with peers.

These findings support prior research indicating that technology-rich, project-based learning environments foster deeper engagement and improved learning outcomes.

### Theoretical and Practical Contributions

From a theoretical perspective, this study extends existing literature by positioning livestock-based smart farming systems as effective pedagogical tools in vocational education. Practically, the findings suggest that integrating IoT prototypes into agricultural education can reduce the gap between educational outcomes and industry requirements.

The use of smart goat housing systems demonstrates that livestock farming contexts can serve as valuable platforms for digital learning, expanding the scope of smart agriculture education beyond crop-based models.

## CONCLUSION

### Conclusion

This study investigated the educational impacts of learning smart farming through IoT-based smart goat housing systems in vocational education. The findings provide empirical evidence that integrating real IoT prototypes into vocational learning environments significantly enhances students' digital competence, applied learning outcomes, and learning engagement. Compared to conventional instructional approaches, prototype-based learning enabled students to acquire a deeper, more practical understanding of smart farming concepts and digital agricultural systems.

The results underscore the pedagogical value of authentic, technology-rich learning environments in vocational education. By engaging directly with IoT-enabled systems, students were able to bridge theoretical knowledge and real-world application, supporting experiential and constructivist learning processes. This study therefore reinforces the role of IoT prototypes as effective instructional media for competency-based education in the context of digital agriculture.

### Implications

**Educational Implications**. The findings suggest that vocational education institutions should integrate smart farming technologies into curriculum design to strengthen students' technological readiness and industry relevance. IoT-based learning environments support the development of essential digital skills, systems thinking, and applied problem-solving abilities required in modern agricultural sectors.

**Pedagogical Implications**. Educators are encouraged to adopt project-based and experiential learning strategies supported by real technological systems rather than relying solely on simulations or theoretical instruction. The use of IoT prototypes facilitates active learning, continuous feedback, and reflective practice, thereby enhancing student engagement and learning effectiveness.

**Policy and Institutional Implications**. At an institutional level, the results support investment in smart farming infrastructure as part of vocational education development strategies. Policymakers and education administrators may consider smart agriculture laboratories as strategic assets for improving workforce alignment with digital transformation in agriculture.

### Limitations

While the findings are robust, this study was conducted within a single institutional context and over a limited duration. The sample size and institutional setting may limit the generalizability of the results to other vocational education contexts. Additionally, the study focused on short-term educational outcomes, and long-term retention of knowledge and skills was not assessed.

### Recommendations

Based on the findings, it is recommended that vocational education institutions incorporate IoT-based smart farming systems into relevant courses to enhance experiential learning. Educators should receive professional development to effectively integrate digital technologies into instructional practices. Furthermore, curriculum designers should align learning outcomes with industry-standard smart farming competencies to maximize the relevance of vocational education programs.

### Future Research

Future research should examine long-term learning impacts, scalability across different vocational institutions, and the comparative effectiveness of various smart farming technologies. Longitudinal studies are needed to assess skill retention and graduate employability outcomes. Additionally, comparative research across livestock and crop-based smart farming systems would provide deeper insights into the pedagogical potential of digital agriculture technologies (Nyoto, Renaldo, et al., 2023).

## ACKNOWLEDGEMENT

The authors gratefully acknowledge the financial support provided by the Directorate of Research and Community Service (DPPM) through the BIMA funding scheme in 2025, under the Research Downstreaming Program for Testing, Models, and Prototypes (*Program Hilirisasi Riset Pengujian – Model dan Prototipe*). This funding made it possible to develop and implement the IoT-based smart goat housing system that supported the educational research reported in this study. The authors also express their appreciation to the host institution for facilitating the implementation of the learning activities and providing the necessary infrastructure and academic support throughout the research process.

## REFERENCES

Junaedi, A. T., Renaldo, N., Susanti, W., Tendra, G., Jahrizal, J., Dalil, M., Veronica, K., Suhardjo, S., Musa, S., & Cecilia, C. (2024). Innovative Business Models and IoT-Driven Solutions for Smart Goat Farming Management. *Interconnection: An Economic Perspective Horizon*, *2*(2), 79–89. https://doi.org/10.61230/interconnection.v2i2.116

Junaedi, A. T., Suhardjo, S., Andi, A., Putri, N. Y., Hutahuruk, M. B., Renaldo, N., Musa, S., & Cecilia, C. (2024). Use of AI-based Banking Applications for Customer Service. *Luxury: Landscape of Business Administration*, *2*(2), 127–136. https://doi.org/https://doi.org/10.61230/luxury.v2i2.100

Mukhsin, M., Tendra, G., Suhardjo, S., Suharti, S., Suyono, S., Junaedi, A. T., Andi, A., Putri, N. Y., Augustine, Y., Renaldo, N., Musa, S., & Cecilia, C. (2025). Digital Information Systems on Business Agility and Innovation in the Era of Industry 6.0. *Journal of Applied Business and Technology*, *6*(1), 52–66. https://doi.org/https://doi.org/10.35145/jabt.v6i1.204

Nyoto, Renaldo, N., & Effendi, I. (2023). SWOT Analysis of Economic Impact Development of Potential Kuantan Singingi Pacu Jalur Tourism Development. *The Seybold Report*, *18*(02), 1342–1349. https://doi.org/10.17605/OSF.IO/T58CF

Nyoto, Sudarno, Priyono, Surikin, & Renaldo, N. (2023). Emotional Intelligence, Workload, and Cyberloafing on Organizational Commitment and Performance of Teachers at the Pelalawan High School Level. *Journal of Applied Business and Technology*, *4*(2), 134–143. https://doi.org/https://doi.org/10.35145/jabt.v4i2.129

Putri, N. Y., Veronica, K., Renaldo, N., Rusli Tanjung, A., Panjaitan, H. P., Junaedi, T., Nyoto, N., Purnama, I., Koto, J., & Jahrizal, J. (2025). Location-Based Analysis of Household Internet Access Trends in Indonesia Using Chi-Square Analysis. *Reflection: Education and Pedagogical Insights*, *2*(2), 55–61. https://doi.org/10.61230/reflection.v2i2.133

Renaldo, N., Fransisca, L., Junaedi, A. T., Nyoto, N., Suhardjo, S., Putra, R., Putri, N. Y., Purnama, I., Jahrizal, J., & Yovita, I. (2024). *Etika dalam Membuat Kuisioner bagi Ikatan Cendekiawan Muda Akuntansi*. *4*(2), 101–107.

Renaldo, N., Fransisca, L., Junaedi, A. T., Tanjung, A. R., Chandra, T., Suharti, S., Andi, A., Suhardjo, S., Augustine, Y., & Musa, S. (2024). Real-time Value Creation Metrics in Manufacturing Through Blue Innovation and IoT-Based Accounting. *International Conference on Business Management and Accounting*, *3*(1), 108–118. https://doi.org/10.35145/icobima.v3i1.4903

Sarma, P. K. (2024). Participation in livestock-based interventions and its impact on food security in Bangladesh: A quasi-experimental method. *Cleaner and Circular Bioeconomy*, *9*. https://doi.org/10.1016/j.clcb.2024.100098

Suhardjo, S., Renaldo, N., Sevendy, T., Yladbla, D., Udab, R. N., & Ukanahseil, N. (2023). Accounting Skills, Digital Literacy, and Human Literacy on Work Readiness of Prospective Accountants in Digital Technology Disruption Era. *Reflection: Education and Pedagogical Insights*, *1*(3), 106–115. http://firstcierapublisher.com/index.php/reflection/article/view/48