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# Impact of the SIET Community Extension Program on the Kawayan Collective

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**Index Terms:**

community extension program, productivity, 5s, lean six sigma, DOWNTIME waste identification, workplace efficiency, kawayan collective

**Abstract.** This study assessed the impact of the School of Industrial Engineering Technology (SIET) Community Extension Program on the Kawayan Collective in Dauin. Specifically, it examined how the program influenced administrative organization, productivity, housekeeping and sanitation, safety, and waste management practices among 34 workers. A descriptive-correlational research design was utilized, employing a structured questionnaire as the primary data collection instrument. Statistical tools such as mean and Spearman's rank-order correlation were applied to analyze the data and determine the relationships among variables. The findings revealed a high to very high level of perceived impact across all assessed areas, with particularly strong results in productivity and safety practices. Participants reported significant improvements in their knowledge, skills, and practical application of workplace procedures, indicating that the program effectively enhanced their overall performance, awareness, and efficiency in daily operations. Furthermore, the correlation analysis showed a very strong positive relationship between the extent of program implementation and overall productivity, suggesting that improvements in organizational practices directly contributed to better work outcomes and increased work efficiency. Despite these positive results, certain areas particularly consistency in the application of learned practices and waste management require further reinforcement. These gaps highlight the need for sustained interventions, continuous support, and follow-up evaluations. The study concludes that ongoing training, regular monitoring, and the integration of hands-on activities are essential to maintain progress, strengthen implementation, and ensure the long-term effectiveness and sustainability of the community extension program for all participants involved in the study and future similar extension initiatives and programs implemented.

## Introduction

Higher education institutions globally play a growing role in advancing sustainable development through community extension, using participatory and service-learning approaches to strengthen sustainability education, student learning, and community outcomes (Cornet et al., 2024; Rodríguez-Zurita et al., 2024). Community extension programs, often considered the "third mission" of universities, aim to translate academic knowledge into measurable social impact, fostering stronger communities and supporting local capacity-building initiatives (Corpuz et al., 2022). Despite these objectives, monitoring and evaluation (M&E) remain a persistent gap, as many programs lack systematic frameworks, clear indicators, and rigorous assessment, thereby limiting evidence of whether social, professional, and developmental outcomes are achieved (De Souza & Kochhann, 2023; Santos, Campo, & Woo, 2024). Approaches such as logic models, which map inputs, activities, outputs, and outcomes, can help address these gaps by improving data coherence and supporting evidence-based decision-making (Santos, Campo, & Woo, 2024).

Community extension programs in the Philippines play a vital role in enhancing local development and strengthening engagement between higher education institutions and communities (Corpuz et al., 2022). However, sustaining behavioral change and institutional practices remains challenging, with persistent M&E gaps such as fragmented data, inefficient

reporting, and lack of standardized tools, which limit timely feedback and program improvement (Ybañez et al., 2025; Reyes et al., 2025). Strengthening M&E through structured frameworks and harmonized indicators is therefore essential to accurately assess program impact and enhance community outcomes.
In response to these challenges, the School of Industrial Engineering and Technology (SIET) of Foundation University continues to implement community extension initiatives that aim at capacity-building and sustainable practices. However, similar to global and national trends, existing assessments remain limited, often relying on self-reported data and lacking standardized evaluation tools, which restrict a comprehensive understanding of program effectiveness (Cornet et al., 2024; Rodríguez-Zurita et al., 2024; Ybañez et al., 2025).

The development of this study is further strengthened by strategic directions identified during SIET's internal discussions on enhancing its Community Extension Program. These emphasize consolidating key operational domains risk management, waste management, safety, productivity, and performance grading into a unified and measurable framework for the Kawayan Collective. Anchored in Lean Six Sigma principles, this approach promotes efficiency, minimizes wastes, reduces risks, and ensures safe and standardized practices while improving productivity and output quality. To support continuous improvement, a grading mechanism is incorporated to systematically assess performance, identify gaps, and guide data-driven interventions. This integrated framework positions the SIET program as a transformative model that combines technical knowledge, process optimization, and community development, ensuring sustainable and measurable outcomes.

This study was undertaken to address gaps in previous research on community extension programs, particularly the lack of systematic evaluation of their impact. It examines the SIET Community Extension Program and gathers feedback from Kawayan Collective workers, focusing on initiatives such as environmental awareness sessions, 5S Lean Six Sigma, and the DOWNTIME Waste Identification Program, using Total Quality Management (TQM) theory as the evaluation framework. The findings aim to identify areas for improvement and provide recommendations aligned with industrial engineering principles, while promoting environmental awareness, productivity, and community capacity. Furthermore, the study supports United Nations Sustainable Development Goal 12: Responsible Consumption and Production, particularly Target 12.5, by encouraging efficient resource use and sustainable workplace practices.

*Statement of the Problem*

This study aims to assess the impact of the SIET *Community Extension Program* on the *Kawayan Collective* as a basis for proposing program enhancements.

Specifically, this study sought to answer the following questions:

1. What is the perceived impact of the SIET *Community Extension Program* on the *Kawayan Collective* in terms of:
   1.1 administrative organization;
   1.2 *productivity*;
   1.3 housekeeping and sanitation;
   1.4 safety; and
   1.5 waste management?
2. What is the level of perceived overall *productivity* of the *Kawayan Collective* after the implementation of the SIET *Community Extension Program*?

Is there a relationship between the perceived impact of the SIET *Community Extension Program* and the perceived overall *productivity* of the *Kawayan Collective*?

## Methodology

*Research Design.*

This study utilized a descriptive-correlational research design to examine institutional perceptions and the relationship between engagement levels and the perceived impact of extension programs. This approach was suitable for systematically documenting participant evaluations and assessing the effectiveness of completed programs. The research focused on post-implementation evaluations to understand stakeholder perceptions of program outcomes and benefits. Descriptive-correlational methods were prevalent in studies of community extension programs in higher education, facilitating the documentation of stakeholder feedback and program performance based on experience. Additionally, impact assessment highlighted the need to evaluate program impact and identify observable community improvements post-implementation.

*Research Environment.*

The study was conducted in the Municipality of Dauin, with the Kawayan Collective, located at KM 21, Maayongtubig, Dauin, Negros Oriental, serving as the primary site. This location was an industrial workplace where DOWNTIME waste identification and 5S Lean Six Sigma practices were implemented. The distinct operational setups, monitoring methods, and instructional structures within this environment allowed for a comprehensive assessment of the community extension initiatives and their impact on workplace practices and organizational efficiency.

*Research Respondents.*

The study's respondents comprised individuals who observed and supervised beneficiaries of community extension programs by the School of Industrial Engineering and Technology (SIET) at the Kawayan Collective in Dauin, Negros Oriental. Total enumeration was used to ensure all key observers, including Kawayan collective workers, supervisors, and industrial personnel, were included for feedback on the program's impact. This approach minimized sampling error and facilitated a comprehensive assessment of the programs' effectiveness. A total of 34 respondents were involved, including 30 workers and various managerial roles.

*Research Instruments.*

The research instruments used to evaluate the Industrial Engineering-led community extension programs by SIET included structured questionnaires based on a 5-point Likert scale. These instruments were validated by experts to ensure clarity and relevance and were pre-tested for reliability. Each questionnaire was tailored to specific programs and respondents, facilitating evidence-based evaluation for program improvement. Content validity was confirmed through expert evaluation, and a pilot test established internal consistency, with Cronbach's alpha indicating "excellent" reliability across various sections, ranging from 0.91 to 0.95.

*Ethical Considerations.*

To ensure ethical compliance, this study followed strict ethical standards throughout the investigation. Ethical clearance was granted by the Foundation University Ethics Review Board, and permission was obtained from the Kawayan Collective. Respondents received a disclosure statement outlining the study's purpose, their voluntary participation, and their right to withdraw at any time without penalty. The researcher maintained a professional demeanor during data collection, ensured anonymity, and allowed data retraction within one month. After data collection, all information was handled confidentially, stored securely, and disposed of in accordance with institutional guidelines. Additionally, AI tools such as OpenAI's GPT and QuillBot were used solely for language support, with all outputs carefully reviewed and validated by the researcher to maintain the study's integrity.

*Research Procedure.*

This study systematically assessed the impact of SIET community extension programs on the Kawayan Collective through several phases. Phase I involved securing the necessary approvals and incorporating feedback to comply with local requirements. Phase II included conducting a dry run with a small group to refine the questionnaire and ensure data quality. Phase III focused on data collection, in which during the process, researchers explained the study's objectives and ethical considerations to encourage honest responses. In Phase IV, data were organized using Microsoft Excel and Jamovi for analysis. Finally, Phase V encompassed data analysis using descriptive statistics and SWOT analysis, leading to evidence-based recommendations for program improvement and insights for future implementation.

*Statistical Treatment of the Data*

Data analysis utilized the mean to assess the effectiveness of the 5S Lean Six Sigma and DOWNTIME Identification Implementation programs, converting ordinal Likert-scale responses into a single interpretable value. Additionally, Spearman's rank-order correlation (ρ) was employed to examine the relationship between respondents' perceived impact and the SIET community extension programs.

The following scales were also applied in presenting the level of perception of the respondents about the extension program:

| Range | Level of Perceived Impact (LoPI) |
|---|---|
| 4.21 – 5.00 | Very High (VH) |
| 3.41 – 4.20 | High (H) |
| 2.61 – 3.40 | Moderate (M) |
| 1.81 – 2.60 | Low (L) |
| 1.00 – 1.80 | Very Low (VL) |

## Results and Discussion

This section analyzes the data regarding the SIET Community Extension Program's impact on the Kawayan Collective, focusing on its influence on participants' operations, skills, and development. It is divided into three parts: (1) program implementation, (2) impacts on productivity, skills, and livelihood, and (3) the relationship between implementation and outcomes. Data are collected from participating collective members, with results presented in tables and discussions that interpret the findings and evaluate the program's overall effectiveness.

| | **Due to the community extension program of SIET, the …** | **x̄** | **LoPI** |
|---|---|---|---|
| 1 | employees understand the importance of proper documentation and record-keeping for operational efficiency. | 4.38 | VH |
| 2 | employees can apply 5S principles to improve workflow and administrative order. | 4.29 | VH |
| 3 | employees are able to reduce delays caused by disorganized processes. | 4.26 | VH |
| 4 | employees demonstrate improved organization in managing files, tools, and workstations. | 3.97 | H |
| 5 | employees are satisfied with the clarity and relevance of the lecture on administrative organization. | 3.91 | H |
| | **Composite** | **4.18** | **H** |

*Table 1. Perceived Impact of the Community Extension Program on the Kawayan Collective in terms of Administrative Organization (n=34)*

Table 1 shows the perceived impact of the SIET Community Extension Program on the Kawayan Collective in terms of administrative organization. The results indicate a high level of impact, with a composite mean of 4.18, suggesting that the program generally enhances respondents' administrative practices, including documentation, workflow management, and operational efficiency. These findings reflect the program's effectiveness in promoting structured and organized workplace behavior.

The results highlight that the highest scores are in understanding proper documentation ($\bar{x}$ = 4.38), application of 5S principles ($\bar{x}$ = 4.29), and reduction of process delays ($\bar{x}$ = 4.26), all interpreted as very high. This demonstrates that respondents develop stronger awareness and practical skills in managing records and streamlining processes. Such results are consistent with studies showing that structured systems and standardized procedures improve coordination, reduce errors, and enhance operational performance (Apriliani & Kurniawati, 2025; Almuhamidh, 2024). Additionally, the application of workplace organization principles reflects Lean Six Sigma and 5S frameworks, which emphasize order, consistency, and accountability ( Blicharska et al., 2025). Variables such as workplace organization practices ($\bar{x}$ = 3.97) and lecture clarity and relevance ($\bar{x}$ = 3.91) received slightly lower but still high ratings. This suggests the need for reinforcement through additional discussion, hands-on practice, and monitoring to ensure consistent application, aligning with literature emphasizing continuous follow-up in training programs (Santos, Campo, & Woo, 2024; Ybañez et al., 2025).

This is supported by the observed 20% increase in sorting efficiency, where processing time was reduced from 1–2 hours per shift, indicating improved workflow and reduced delays (refer to Appendix E, II, No. 1). This was disclosed by the Operations and Production Manager of Kawayan Collective during an interview conducted by the researchers. The addition of a nearby warehouse and the strategic rearrangement of workstations based on process flow minimized delays and improved material accessibility, thereby reinforcing better organization and workflow efficiency (see Appendix E, II, No. 4).

| | **Due to the community extension program of SIET, the …** | **x̄** | **LoPI** |
|---|---|---|---|
| 1. | employees can apply learned strategies to improve daily work output. | 4.38 | VH |
| 2. | employees are satisfied with the relevance and usefulness of the productivity training. | 4.41 | VH |
| 3. | employees understand methods for identifying downtime and inefficiencies in production. | 4.18 | H |
| 4. | employees demonstrate a reduction in non-value-adding activities in operations. | 4.15 | H |
| 5. | employees are able to sustain higher productivity levels after the workshop. | 4.15 | H |
| | **Composite** | **4.24** | **VH** |

*Table 2. Perceived Impact in terms of Productivity(n=34)*

Table 2 presents the perceived impact of the SIET Community Extension Program on the Kawayan Collective in terms of productivity. The results indicate a very high level of impact, with a composite mean of 4.24, suggesting that the program effectively enhances respondents' productivity practices and overall operational performance. The findings show that the program provides practical strategies and tools that respondents can apply to improve efficiency and optimize daily operations.

Notably, the top-rated indicators include usefulness of the training ($\bar{x}$ = 4.41) and application of productivity strategies ($\bar{x}$ = 4.38), both interpreted as very high. This implies that respondents recognize the relevance of the program and effectively apply the strategies learned to improve work output and address workflow challenges. Similarly, understanding inefficiencies ($\bar{x}$ = 4.18) reflects heightened awareness of production issues and the ability to identify areas for improvement. These results align with studies emphasizing that Lean Six Sigma and DOWNTIME approaches reduce waste, enhance efficiency, and optimize workflow processes (Dumbuya et al., 2025; Chiscop et al., 2025).

The results further indicate that reduction of non-value-adding activities ($\bar{x}$ = 4.15) and sustaining productivity ($\bar{x}$ = 4.15) receive slightly lower but still high ratings. This suggests that while improvements are evident, maintaining these gains requires continuous monitoring, reinforcement, and hands-on practice, as reflected in respondents' feedback. These observations are consistent with studies weight the importance of ongoing evaluation, support, and iterative training in sustaining productivity improvements over time (Menteşoğulları, 2023; Rais et al., 2021).

This is supported by the observed 20% increase in sorting efficiency, as processing time was reduced from one to two hours per shift, indicating improved workflow and minimized operational delays (see Appendix E, II. No. 1). This improvement reflects the effectiveness of process adjustments in enhancing overall efficiency. Moreover, the implementation of a customization fee system resulted in the elimination of idle time, achieving zero recorded time wastage. This suggests a significant reduction in non-value-adding activities and a more streamlined production process (refer to Appendix E, II. No. 3). In addition, equipment upgrades contributed to notable improvements in operational performance. Bamboo cutting capacity increased from one to five pieces per cycle, while sanding time was reduced from 20 minutes to 5 minutes. These enhancements led to higher production output and reduced processing delays, further strengthening productivity (see Appendix E, II. No. 6).

| **Due to the community extension program of SIET, the …** | | **$\bar{x}$** | **LoPI** |
|---|---|---|---|
| 1. | employees show consistency in maintaining cleanliness and order in the workplace. | 4.24 | VH |
| 2. | employees understand the principles of maintaining a clean and organized workplace. | 4.15 | H |
| 3. | employees can identify areas that need improvement in housekeeping and sanitation. | 4.12 | H |
| 4. | employees demonstrate proper housekeeping practices based on the 5S method. | 4.09 | H |
| 5. | employees are satisfied with the practical guidance provided on housekeeping and sanitation. | 4.09 | H |
| | **Composite** | **4.12** | **H** |

*Table 3. Perceived Impact in terms of Housekeeping and Sanitation (n=34)*

Table 3 displays the perceived impact of the SIET Community Extension Program on the Kawayan Collective in terms of housekeeping and sanitation. The results indicate a high level of impact, with a composite mean of 4.12, suggesting that the program effectively enhances cleanliness, organization, and workplace maintenance practices among respondents. This reflects the program's contribution to a more orderly and hygienic work environment, promoting discipline and operational efficiency.

The findings show that the leading indicators are consistent in maintaining cleanliness ($\bar{x}$ = 4.24), understanding cleanliness principles ($\bar{x}$ = 4.15), identifying areas for improvement ($\bar{x}$ = 4.12), and applying 5S practices ($\bar{x}$ = 4.09). This indicates that respondents have developed strong awareness and practical skills in maintaining a clean and organized environment. These results align with the "Seiso" component of 5S and Lean Six Sigma principles, emphasizing standardization, accountability, and continuous improvement.

Determinants such as satisfaction with guidance ($\bar{x}$ = 4.09) and consistent application of 5S received slightly lower but still high ratings. This suggests that respondents may benefit from additional hands-on practice, follow-up sessions, and monitoring to reinforce skills and ensure consistent application in daily routines (Menteşoğulları, 2023; Rais et al., 2021).

These findings are further supported by qualitative data, particularly the addition of a nearby warehouse and the strategic rearrangement of workstations based on process flow, which minimized delays and improved material accessibility, indicating enhanced organization and workflow efficiency. This was disclosed by the Operations and Production Manager of Kawayan Collective during an interview conducted by the researchers. Furthermore, the installation of a spray booth

reduced workers' exposure to hazardous fumes and prevented product contamination, reinforcing safer working conditions while enabling parallel processing and improving overall operational efficiency.

| | **Due to the community extension program of SIET, the …** | **x̄** | **LoPI** |
|---|---|---|---|
| 1. | employees demonstrate increased awareness of unsafe practices and risks. | 4.26 | VH |
| 2. | employees understand potential safety hazards caused by poor organization and waste accumulation. | 4.21 | VH |
| 3. | employees can apply 5S and downtime reduction methods to improve workplace safety. | 4.21 | VH |
| 4. | employees are able to implement effective safety measures learned. | 4.18 | H |
| 5. | employees are satisfied with the clarity and relevance of the safety training. | 4.18 | H |
| | **Composite** | **4.22** | **VH** |

*Table 4. Perceived Impact in terms of Safety (n=34)*

Table 4 shows the perceived impact of the SIET Community Extension Program on the Kawayan Collective in terms of safety. The results indicate a very high impact, with a composite mean of 4.22, suggesting that the program effectively enhances respondents' awareness of workplace hazards, safety procedures, and preventive practices. These findings show that the program contributes to a safer work environment by improving knowledge, alertness, and practical skills related to risk management.

The results further indicate that the top-performing indicators are understanding hazards ($\bar{x}$ = 4.21), application of 5S and downtime reduction ($\bar{x}$ = 4.21), and awareness of unsafe practices ($\bar{x}$ = 4.26). This demonstrates that respondents are able to identify potential risks and apply strategies to mitigate them, reflecting practical knowledge and proactive safety behaviors. These findings are consistent with studies showing that Lean Six Sigma principles reduce clutter, standardize workflows, and improve overall safety performance (Mutaza et al., 2020; Özdemir et al., 2025).

Values such as implementation of safety measures ($\bar{x}$ = 4.18) and training satisfaction ($\bar{x}$ = 4.18) received slightly lower but still high ratings. This suggests that respondents may benefit from additional hands-on practice, follow-up sessions, and ongoing monitoring to ensure consistent application of safety practices and sustainable improvement over time, as supported by prior studies emphasizing continuous evaluation and reinforcement (Menteşoğulları, 2023; Rais et al., 2021).

These findings are further supported by observed full PPE compliance (earmuffs, goggles, safety boots), indicating improved safety awareness and adherence to procedures, as confirmed by the Operations and Production Manager. Furthermore, the installation of a spray booth reduced exposure to hazardous fumes and prevented contamination, thereby improving safety conditions and operational efficiency.

| | **Due to the community extension program of SIET, the …** | **x̄** | **LoPI** |
|---|---|---|---|
| 1. | employees demonstrate increased awareness of the impact of waste on productivity and cost. | 4.29 | VH |
| 2. | employees understand the types of waste that affect operational efficiency. | 4.21 | VH |
| 3. | employees apply strategies to minimize unnecessary waste in daily operations. | 4.18 | H |
| 4. | employees can implement proper segregation, disposal, and reuse of materials. | 4.15 | H |
| 5. | employees are satisfied with the strategies provided for effective waste management. | 4.12 | H |
| | **Composite** | **4.18** | **H** |

*Table 5. Perceived Impact in terms of Waste Management (n=34)*

Table 5 displays the perceived impact of the SIET Community Extension Program on the Kawayan Collective in terms of waste management. The results indicate a high level of impact, with a composite mean of 4.18, suggesting that the program effectively enhances respondents' awareness, knowledge, and practical application of waste reduction and resource management practices. These findings demonstrate that the program supports operational efficiency, reduces unnecessary material use, and promotes environmental responsibility among respondents.

The findings show that the leading indicators are understanding types of operational waste ($\bar{x}$ = 4.21) and awareness of its effect on productivity and cost ($\bar{x}$ = 4.29). This indicates that respondents recognize the impact of waste on efficiency and expenses and are able to apply strategies to minimize non-value-adding activities. These results align with studies emphasizing that Lean Six Sigma and DOWNTIME approaches help detect waste, reduce material losses, and improve

operational performance (Dumbuya et al., 2025). Structured waste management practices also contribute to cost reduction and environmental sustainability.

Indicators such as implementation of segregation and disposal ($\bar{x}$ = 4.15), application of waste-reduction strategies ($\bar{x}$ = 4.18), and satisfaction with strategies provided ($\bar{x}$ = 4.12) received slightly lower but still high ratings. This suggests that respondents may require additional hands-on practice, follow-up sessions, and monitoring to ensure consistent application and long-term behavioral change, consistent with studies highlighting the importance of ongoing support and iterative learning (Ybañez et al., 2025).

These findings are further supported by the implementation of a customization fee system, which eliminated idle time and resulted in zero-time wastage, indicating improved efficiency and reduced non-value-adding activities. This was confirmed by the Operations and Production Manager during an interview conducted by the researchers. Furthermore, equipment upgrades significantly enhanced operational performance by increasing bamboo cutting capacity from one to five pieces per cycle and reducing sanding time from 20 minutes to 5 minutes, thereby increasing output and reducing processing delays.

| **Due to the community extension program of SIET, the …** | **$\bar{x}$** | **LoPI** |
|---|---|---|
| 1. Effectiveness of the trainers | 4.41 | VH |
| 2. Quality of the training materials | 4.35 | VH |
| 3. Relevance of the training content | 4.32 | VH |
| 4. Venue and logistics | 4.24 | VH |
| 5. Overall satisfaction | 4.12 | H |
| **Composite** | **4.28** | **VH** |

*Table 6. Evaluation Criteria (n=34)*

Table 6 shows the respondents' evaluation of the SIET Community Extension Program in terms of key training criteria. The results indicate a very high level of perceived effectiveness, with a composite mean of 4.28, suggesting that the program is well-delivered, relevant, and satisfactory for the Kawayan Collective. These findings demonstrate that the program successfully meets respondents' learning needs while providing a supportive and engaging training environment.

The results highlight that the highest ratings are in trainer effectiveness ($\bar{x}$ = 4.41) and quality of training materials ($\bar{x}$ = 4.35), indicating that facilitators communicate content clearly, engage respondents effectively, and provide resources that enhance understanding. Relevance of content ($\bar{x}$ = 4.32) and venue/logistics ($\bar{x}$ = 4.24) also received very high ratings, suggesting that the program aligns with participant needs and is conducted in a conducive learning environment (Santos, Campo, & Woo, 2024; Del Mundo Martin & Ildefonso, 2025).

Factors such as overall satisfaction ($\bar{x}$ = 4.12) received slightly lower but still high ratings. This suggests that minor improvements such as extended hands-on activities, follow-up sessions, and enhanced engagement may further reinforce learning and ensure consistent application of skills. Continuous feedback and iterative refinement remain essential to sustain program quality and maximize its impact (Ybañez et al., 2025).

| **Due to the community extension program of SIET, the …** | **$\bar{x}$** | **LoPI** |
|---|---|---|
| Evaluation Criteria | 4.28 | VH |
| Productivity | 4.24 | VH |
| Safety | 4.22 | VH |
| Administrative Organization | 4.18 | H |
| Waste Management | 4.18 | H |
| Housekeeping & Sanitation | 4.12 | H |
| **Composite** | **4.20** | **H** |

*Table 7. Summary of Perceived Impact (n=34)*

Table 7 presents the perceived impact of the SIET Community Extension Program across key areas. The overall factor average of 4.20 indicates a high level of impact, suggesting that the program effectively enhances both operational and organizational practices of the Kawayan Collective. This demonstrates that the extension initiatives contribute to improved workflow efficiency, safety awareness, and service delivery.

The analysis shows that the highest ratings are in evaluation criteria ($\bar{x}$ = 4.28), productivity ($\bar{x}$ = 4.24), and safety ($\bar{x}$ = 4.22). This indicates that respondents recognize the relevance of the program, are able to apply strategies to enhance work output, and adopt safer practices. These findings align with studies showing that Lean Six Sigma and structured process improvement strategies improve efficiency and reduce risks (Dumbuya et al., 2025; Mutaza et al., 2020).

Indicators such as administrative organization ($\bar{x}$ = 4.18), housekeeping and sanitation ($\bar{x}$ = 4.12), and waste management ($\bar{x}$ = 4.18) are slightly lower but still high, suggesting that consistent application requires ongoing reinforcement, hands-on practice, and monitoring. This aligns with Total Quality Management (TQM) principles of continuous improvement and institutional support (Menteşoğulları, 2023; Rais et al., 2021; Ybañez et al., 2025).

| **Due to the community extension program of SIET, the …** | | **$\bar{x}$** | **LoPI** |
|---|---|---|---|
| 1. | employees are satisfied with the relevance and usefulness of the productivity training. | 4.41 | VH |
| 2. | employees can apply learned strategies to improve daily work output. | 4.38 | VH |
| 3. | employees understand methods for identifying downtime and inefficiencies in production. | 4.18 | H |
| 4. | employees demonstrate a reduction in non-value-adding activities in operations. | 4.15 | H |
| 5. | employees are able to sustain higher productivity levels after the workshop. | 4.15 | H |
| | **Composite** | **4.24** | **VH** |

*Table 8. Perceived level of Overall Impact in terms of Productivity (n=34)*

Table 8 reveals the perceived overall impact of the SIET Community Extension Program on productivity among the Kawayan Collective. The results indicate a very high level of impact, with a composite mean of 4.24, suggesting that the program effectively enhances respondents' understanding and application of work strategies, contributing to improved workflow and efficiency.

The findings show that the leading indicators are application of productivity techniques ($\bar{x}$ = 4.38) and usefulness of the training ($\bar{x}$ = 4.41). Recognition of inefficiencies ($\bar{x}$ = 4.18) also received very high ratings, reflecting respondents' ability to identify delays and unproductive activities. These results align with studies showing that Lean Six Sigma and DOWNTIME approaches improve operational efficiency (Dumbuya et al., 2025; Chiscop et al., 2025).

Determinants such as reduction of non-value-adding activities ($\bar{x}$ = 4.15) and sustaining productivity ($\bar{x}$ = 4.15) received slightly lower but still high ratings, suggesting that ongoing monitoring, reinforcement, and structured support are essential for maintaining improvements (Menteşoğulları, 2023; Rais et al., 2021).

These findings are further supported by a 20% increase in sorting efficiency, as processing time decreased from one to two hours per shift, indicating improved workflow and reduced delays (see Appendix E, II, No. 1). This was confirmed by the Operations and Production Manager during an interview conducted by the researchers. Furthermore, the implementation of a customization fee system eliminated idle time, resulting in zero-time wastage and improved operational efficiency by reducing non-value-adding activities.

In addition, equipment upgrades enhanced productivity by increasing bamboo cutting capacity from one to five pieces per cycle and reducing sanding time from 20 minutes to 5 minutes, thereby increasing output and minimizing processing delays.

| **Variables correlated to overall productivity……** | **$r_s$** | **Interpretation** |
|---|---|---|
| Safety vs Productivity | 0.991 | VSR |
| Administrative Organization vs Productivity | 0.990 | VSR |
| Waste Management vs Productivity | 0.983 | VSR |
| Evaluation Criteria vs Productivity | 0.974 | VSR |
| Housekeeping vs Productivity | 0.967 | VSR |
| **Overall Correlation** | **0.981** | **VSR** |

*Table 9. Correlation Analysis (Spearman's rho) (n=34)*

Table 9 displays the correlation analysis using Spearman's rho between the perceived impact of the various components of the SIET Community Extension Program and the overall productivity of the Kawayan Collective. The results indicate very strong positive relationships across all dimensions, suggesting that each program component is closely associated with increased productivity. The overall correlation is very high ($r_s$ = 0.981), confirming that the program is strongly associated with improved operational efficiency, effective workflow management, and overall organizational performance.

The analysis shows that safety ($r_s$ = 0.991) has the strongest relationship with productivity, implying that proactive safety measures and risk prevention contribute to smoother operations and reduced disruptions. Similarly, housekeeping and administrative organization ($r_s$ = 0.967) and waste management ($r_s$ = 0.983) also exhibit very strong positive correlations, emphasizing that cleanliness, proper safety protocols, and effective waste practices are essential in sustaining higher productivity levels.

Evaluation criteria ($r_s$ = 0.974) likewise demonstrate a very strong relationship, indicating that respondents' perceptions of training relevance, trainer effectiveness, material quality, and logistical support are closely linked to productivity outcomes. Overall, these findings highlight the importance of sustaining well-structured program components, continuous monitoring, and institutional support to achieve lasting operational and organizational improvements among respondents.

| Theme | Summary of Responses | n | % |
|---|---|---|---|
| ● Improved Knowledge & Understanding | Training deepened understanding, introduced new knowledge, and enhanced awareness of work processes | 10 | 29.41 |
| ● Enhanced Skills & Work Performance | Helped improve efficiency, productivity, and quality of work; made tasks easier and faster | 8 | 23.53 |
| ● Safety Awareness & Proper Practices | Learned proper use of equipment and PPE; improved safety and accident prevention | 6 | 17.65 |
| ● Value of Hands-on Training | Training was more effective when actual activities were included | 4 | 11.76 |
| ● Positive Work Attitude & Teamwork | Promoted respect, cooperation, and better relationships among workers | 3 | 8.82 |
| ● Need for Further Training | Some respondents expressed the need for additional training to enhance skills | 3 | 8.82 |

*Table 10. Assessment of Impact on the Community Extension Program of the School of Industrial Engineering (SIET)*

Table 10 shows the impact of the community extension program of the School of Industrial Engineering (SIET) on the respondents. The findings indicate a generally positive effect, with the highest percentage in improved knowledge and understanding (29.41%), followed by enhanced skills and work performance (23.53%) and safety awareness (17.65%). These results show that the program strengthens respondents' knowledge, competencies, and workplace practices, demonstrating that participants improve their awareness and their ability to perform tasks efficiently and safely. These findings support existing literature emphasizing that community extension programs help transform knowledge into practical application through direct experience. Similarly, studies show that extension initiatives improve productivity and workplace competence when aligned with real-world activities (Asio et al., 2022; Corpuz et al., 2022; Mahinay et al., 2025). The high rating for knowledge improvement indicates that respondents shift from awareness to functional understanding, thereby supporting effective performance in work settings. However, lower responses in hands-on training (11.76%) and the need for further training (8.82%) reveal gaps in sustained skill development. This suggests that respondents require continuous training and reinforcement to fully strengthen competencies. This observation aligns with studies emphasizing that maintaining the impact of extension programs requires ongoing monitoring and follow-up interventions to ensure consistent application over time (Ybañez et al., 2025; Reyes & Ananayo, 2025).

| Theme | Summary of Responses | n | % |
|---|---|---|---|
| ● More Hands-on Activities | Increase practical or actual activities for better learning | 9 | 26.47 |
| ● More Time & Training Materials | Extend training duration and provide additional materials | 6 | 17.64 |
| ● Clear Discussion & Demonstration | Improve clarity of instructions and provide more examples | 5 | 14.71 |
| ● Continuous/Regular Training | Conduct training regularly (e.g., annually) | 4 | 11.76 |
| ● Improve Understanding of Topics | Ensure respondents fully understand processes and safety | 4 | 11.76 |
| ● Interactive & Engaging Sessions | Make training more interactive (e.g., engaging methods, snacks) | 3 | 8.82 |
| ● Additional Relevant Topics | Include topics like waste management and workplace practices | 3 | 8.82 |

*Table 11. Suggestions for Improvement*

Table 11 presents the suggestions for improvement provided by respondents regarding the program. The results indicate that the highest recommendation is to include more hands-on activities (26.47%), followed by extending training time and providing additional materials (17.64%), and improving clarity of discussion and demonstration (14.71%). This suggests that while the program delivers value, respondents see opportunities to enhance learning through practical engagement, sufficient resources, and clear instruction.

Across the indicators, respondents also highlight the need for continuous or regular training (11.76%), improving understanding of topics (11.76%), making sessions more interactive and engaging (8.82%), and including additional relevant topics (8.82%). These findings imply that respondents aim to strengthen comprehension and application of knowledge, particularly in safety practices and workplace processes. They demonstrate a desire for reinforcement, clarity, and broader coverage of relevant subjects to maximize learning outcomes.

These observations align with studies on training effectiveness, which emphasize that providing practical exercises, clear guidance, and consistent follow-up enhances participant competence and confidence (Alsalamah & Callinan, 2021; Ybañez et al., 2025). Integrating these suggestions supports improved skill application, ensures understanding, and fosters sustainable development of workplace practices for respondents.

## Conclusion and Recommendations

The results of the study highlight the significant role of structured and experiential training in improving the operational performance and productivity of the Kawayan Collective. The SIET Community Extension Program not only enhanced respondents' technical knowledge but also strengthened their ability to apply practical skills, improve efficiency, and adopt better workplace practices. The integration of hands-on learning, clear instruction, and safety-oriented approaches contributed to meaningful improvements in daily operations.

The correlation results further indicate that all program components have very strong positive relationships with productivity, emphasizing that improvements in administrative organization, housekeeping, safety, waste management, and training quality are associated with better performance outcomes. These findings suggest that a comprehensive and well-implemented program may contribute to substantial and consistent productivity gains.

Participant feedback also emphasizes the importance of continuous engagement, practical application, and reinforcement strategies. Elements such as hands-on training, extended learning sessions, and interactive methods play a crucial role in sustaining improvements. Overall, the SIET Community Extension Program serves as an effective and replicable model for community-based training initiatives, demonstrating its capacity to enhance skills, promote efficiency, and support long-term productivity development.

Based on the findings and conclusions drawn, it is hereby recommended that:

1. School of Industrial Engineering Technology (SIET) establish a comprehensive monitoring and evaluation system to regularly assess the effectiveness of community extension programs. This can include gathering participant feedback, using performance indicators, and conducting periodic assessments to ensure continuous improvement and relevance to workplace needs.
2. Program coordinators and trainers conduct regular refresher sessions and incorporate more hands-on activities to reinforce learning, improve knowledge retention, and allow respondents to apply concepts effectively in real work settings. They should ensure clarity and consistency in training delivery through structured modules, practical demonstrations, and ongoing monitoring of participant progress.
3. Kawayan Collective respondents apply the skills and knowledge acquired from the program in their daily operations, focusing on administrative organization, safety, housekeeping, and waste management. respondents are encouraged to engage in follow-up activities such as peer mentoring, group discussions, and self-assessment to reinforce learning, strengthen teamwork, and sustain improvements over time.
4. Future program designers incorporate longer training durations, supplementary materials, and interactive learning strategies to enhance participation and knowledge retention. Advanced topics such as Lean practices, digital workflow systems, and continuous improvement techniques should also be introduced with regular reinforcement to sustain productivity gains and operational efficiency.

Researchers and policymakers conduct longitudinal and comparative studies to examine the long-term effectiveness of community extension programs. They should also develop evidence-based policies and guidelines that support program replication, efficient resource allocation, and collaboration among institutions to promote sustainable community development.

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## Data Availability Statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study; all data used were obtained from previously published sources as cited in the reference list.

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## Appendices

No appendices are attached to this study.