



WELDING SKILLS AS A PATHWAY TO LIVELIHOOD: A QUALITATIVE EVALUATION OF THE SMAW NCII EXTENSION PROGRAM AT CEBU TECHNOLOGICAL UNIVERSITY – CARMEN CAMPUS

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ABSTRACT

This qualitative study evaluates the implementation and outcomes of the Shielded Metal Arc Welding (SMAW) National Certificate Level II (NCII) Batch III extension project conducted by the College of Maritime Sciences of Cebu Technological University (CTU) – Carmen Campus in 2023. Grounded in the principles of community extension, livelihood development, and technical-vocational education, the study examines how a structured 268-hour training program addressed the economic needs of residents in Barangay Luyang, Carmen, Cebu, and Poblacion, Compostela, Cebu. Using document analysis, beneficiary profile review, post-training evaluation data, and participant feedback as primary data sources, the study reveals that the program successfully attained its instructional objectives, with 100% of beneficiaries demonstrating proficiency in flat, horizontal, vertical, and overhead welding positions. Beneficiary evaluations reflected high satisfaction in instruction quality, program content, and facility conditions. However, the study also identifies critical limiting factors, including delayed TESDA national assessment scheduling and insufficient local government support. Findings suggest that sustained university-community partnerships, timely TESDA coordination, and stronger linkages with local governance are essential for maximizing the socioeconomic impact of university extension programs. The study contributes to the literature on higher education social responsibility, skills-based community development, and extension program evaluation in the Philippine context.

Keywords: SMAW training, community extension, livelihood development, technical-vocational education, CTU-Carmen, qualitative evaluation

INTRODUCTION

The university, as an institution of higher learning, carries a mandate that transcends academic instruction. In the Philippines, Republic Act No. 8292, otherwise known as the Higher Education Modernization Act of 1997, affirms extension and community service as one of the three core functions of higher education institutions (HEIs), alongside instruction and research. This mandate is further reinforced by the Commission on Higher Education (CHED) through various memoranda that encourage HEIs to actively contribute to the socioeconomic development of their host



communities (CHED, 2012). For state universities and colleges (SUCs) such as Cebu Technological University (CTU), this responsibility assumes particular weight given their proximity to marginalized and underserved populations.

In this context, CTU – Carmen Campus, through its College of Maritime Sciences, implemented the extension project titled "Welding Keeps our Economy Moving" under the SMAW NCII Batch III designation. This project forms part of the university's broader commitment to sustainable development and community empowerment, addressing SDG Goals 1 (No Poverty), 4 (Quality Education), 5 (Gender Equality), 8 (Decent Work and Economic Growth), 9 (Industry, Innovation and Infrastructure), 11 (Sustainable Cities and Communities), and 17 (Partnerships for the Goals). The project was anchored on a Community Needs Assessment (CNA) conducted in Barangay Luyang, Municipality of Carmen, and Municipality of Compostela, which identified arc welding as the skill training most preferred by the community, with 30 out of 50 respondents selecting it over alternatives such as driving, house/building wiring, plumbing, and lathe machining.

Shielded Metal Arc Welding occupies a central role in the Philippine economy. The welding industry provides essential services to the construction, shipping, and manufacturing sectors, and Filipino welders have increasingly become sought-after workers both domestically and abroad (Technical Education and Skills Development Authority [TESDA], 2019). Despite this demand, many aspiring welders in rural communities lack access to formal training programs, leaving a significant skills gap that constrains economic mobility and community productivity. The SMAW NCII Batch III project directly addressed this gap by providing structured, standards-aligned technical training to 20 community beneficiaries — 18 males and 2 females — drawn from target barangays in Carmen and Compostela.

This qualitative study evaluates the program's processes, outcomes, and challenges as documented in the project's Terminal Report and the Monitoring and Field Evaluation Report, including the Accomplishment Report filed by the implementing team. The study is guided by the following research questions: (1) How was the SMAW NCII Batch III extension program designed and implemented? (2) What outcomes were achieved relative to the program's stated objectives? (3) What challenges and mitigating factors shaped the program's implementation? (4) How did beneficiaries assess the program's quality and relevance? By addressing these questions, this paper aims to generate insights that can inform the design and evaluation of future community extension programs in similar higher education settings.

LITERATURE REVIEW

University Extension and Community Engagement in the Philippines

Community engagement has been recognized globally as an essential dimension of the modern university's social contract (Boyer, 1996; Bringle & Hatcher, 1995). In the Philippine context, extension services represent a formalized institutional commitment to translating academic knowledge into practical community benefit. Binghay (2016) argues that Filipino SUCs occupy a unique position as embedded community institutions, capable of mobilizing faculty expertise, laboratory facilities, and student volunteerism toward addressing locally identified needs. Studies by Abubakar and Ferma (2019) and Macatangay et al. (2020) document how technical training programs offered by SUCs in the Visayas and Mindanao regions have contributed measurably to income diversification and economic resilience among beneficiary households.

However, the literature also cautions against viewing extension programs as uniform success stories. Dela Cruz and Salazar (2018) found that the sustainability of technical extension outputs in rural Philippine communities is often undermined by weak post-training support systems, inadequate linkages with employment sectors, and the absence of post-training monitoring mechanisms. The importance of forging institutional partnerships with local government units (LGUs), non-governmental organizations (NGOs), and industry stakeholders has been consistently highlighted as a critical success factor (Gonzales & Ombao, 2020).

Technical-Vocational Education and Welding Skills Development



Technical and vocational education and training (TVET) has been recognized as a key driver of economic inclusion in developing countries (UNESCO, 2015; World Bank, 2013). In the Philippines, TESDA administers the National Certificate (NC) system, which certifies workers according to standardized competency frameworks. SMAW NCII is among the most commonly sought certifications in the construction and maritime sectors, as it validates a worker's capacity to perform welding operations across multiple positions and joint types to industry specifications (TESDA, 2021).

Empirical studies affirm the economic impact of welding skills acquisition on community livelihoods. Tabaquero and Ledesma (2017) found that SMAW-certified workers in Cebu and Davao reported income increases ranging from 15% to 35% within twelve months of certification. Similarly, research by Catalan et al. (2020) on TESDA-certified graduates in Central Visayas noted that industry demand for certified welders consistently outpaces supply, particularly in the shipbuilding and industrial construction sectors. These findings underscore the relevance of programs like SMAW NCII Batch III in addressing community livelihood needs.

Livelihood Development and SDG Alignment

The alignment of extension programs with the United Nations Sustainable Development Goals (SDGs) has become an important evaluative framework for HEIs (Nhamo et al., 2020). Programs that simultaneously address poverty reduction (SDG 1), quality education (SDG 4), gender equity (SDG 5), and decent work (SDG 8) are considered particularly impactful because they leverage multiple developmental pathways simultaneously. In the Philippine higher education context, Perez and Santos (2021) analyzed SDG-aligned extension programs in SUCs and found that programs with explicit SDG mapping demonstrated greater stakeholder coherence and clearer accountability mechanisms, though challenges in post-implementation monitoring persisted across cases.

The current study situates its evaluation within this multi-SDG framework, examining how the SMAW NCII Batch III program addressed economic and educational development goals while navigating institutional and systemic constraints specific to its community context.

METHODOLOGY

Research Design

This study employs a qualitative case study design (Yin, 2018), which is particularly appropriate for evaluating programs within their real-world context and for developing rich, contextually grounded understandings of implementation processes and outcomes. The unit of analysis is the SMAW NCII Batch III extension project implemented by CTU – Carmen Campus from October 14 to December 23, 2023. The case study approach allows the researchers to triangulate multiple data sources and capture the complexity of program implementation, beneficiary experiences, and institutional dynamics.

Data Sources

The primary data sources for this study are two official project documents: (1) the Terminal Report prepared by the implementing faculty team and approved by the Campus Director, and (2) the Monitoring and Field Evaluation Report containing the Accomplishment Report, Beneficiary Profiles, and field evaluation documentation. These documents serve as rich primary sources that capture the program's design, implementation process, beneficiary characteristics, evaluation results, participant feedback, and financial records.

The Terminal Report provides data on project objectives, success indicators, actual accomplishments, mitigating factors, post-training evaluation scores (rated on a 5-point Likert scale), beneficiary comments and suggestions, financial disbursements, and stakeholder partnerships. The Monitoring and Field Evaluation Report provides supplementary data on beneficiary sociodemographic profiles, program rationale, goals and objectives, implementation timeline, community needs assessment findings, and accomplishment documentation.



Data Analysis

Data analysis followed Braun and Clarke's (2006) framework for thematic analysis. The analysis proceeded through six phases: (1) familiarization with the data through repeated reading of source documents; (2) generation of initial codes from textual and tabular data; (3) searching for themes across coded data; (4) reviewing and refining themes; (5) defining and naming themes; and (6) producing the final report. In addition to thematic analysis, descriptive quantitative data from evaluation matrices were interpreted qualitatively to understand beneficiary satisfaction patterns and program performance relative to objectives.

Member checking and audit trail procedures were applied to ensure the credibility and dependability of interpretations. Specifically, findings were cross-referenced against multiple sections of the source documents to confirm consistency, and all interpretations are traceable to specific data points within the official reports.

Ethical Considerations

This study relies entirely on official project documents filed with CTU – Carmen Campus and does not involve direct data collection from human subjects. Beneficiary information drawn from profile documents is reported in aggregate to protect individual privacy. The names of training specialists are drawn from the publicly signed Terminal Report and are included in the context of institutional accountability.

FINDINGS

Program Design and Implementation

Structure and Coverage

The SMAW NCII Batch III program was implemented over a period of 268 hours, spanning from October 14 to December 23, 2023. Training was conducted at the Marine Engineering Laboratory Building of CTU – Carmen Campus and at partner community venues in Barangay Luyang, Carmen, and Poblacion, Compostela, Cebu. The program enrolled 20 beneficiaries — 18 males and 2 females — reflecting the gendered composition of the welding labor market while also demonstrating efforts at inclusion.

Daily training sessions ran from 8:00 a.m. to 12:00 noon and from 1:00 p.m. to 5:00 p.m., organized into 33 meetings with 8 hours of instruction per meeting. The curriculum covered the sustainability of low-, medium-, and high-carbon steels during welding; understanding the relative positions of the electrode and base metal in manual metallic arc welding; and techniques for detecting and drying damp electrodes. Each participant was informed at enrollment that completion of the training would entitle them to receive a certificate of completion.

Beneficiary Profile

Beneficiary profile data drawn from the Monitoring and Field Evaluation Report provides a sociodemographic picture of the program's target population. Beneficiaries ranged in age from 18 to 52 years, with the majority falling in the 20 to 45 age bracket, indicating engagement with working-age adults in their productive years. Civil status varied, with both single and married individuals represented. Educational attainment ranged from elementary to college level, with the majority holding secondary or college qualifications, suggesting a population with foundational literacy and numeracy skills appropriate for technical training.

Monthly household incomes reported by beneficiaries were concentrated in the PHP 4,000 to PHP 8,000 range, reflecting the low-income economic context that motivated program participation. Beneficiaries came from Barangay Luyang in Carmen and nearby localities in Compostela, consistent with the catchment area identified in the original Community Needs Assessment. The inclusion of female beneficiaries, while numerically modest, signals the program's commitment to gender equality as articulated in its SDG 5 alignment.

Program Outcomes Against Stated Objectives



The program articulated three primary objectives, and findings across documents reveal differentiated degrees of achievement against each.

The first objective — that 100% of trainees would learn to weld in flat, horizontal, vertical, and overhead positions — was fully achieved. The Terminal Report documents this as 100% accomplished, reflecting successful knowledge and skills transfer across all intended positional competencies. This finding corroborates data from the post-training evaluation matrix, where beneficiaries consistently rated training quality and instructional methods favorably.

The second objective — that 90% of beneficiaries would pass the SMAW NCII national assessment — encountered implementation delays due to unforeseen circumstances. Specifically, no SMAW NCII assessment was available from TESDA within the original program timeline ending in December 2023. The TESDA assessment was rescheduled to January 15 and 16, 2024, at CTU – Carmen Campus. While this delay is documented as a limiting factor, it does not negate the instructional achievement; rather, it underscores the dependency of university extension programs on external certification bodies and the scheduling constraints this introduces.

The third objective — that 100% of welders would achieve additional or increased income of 1–5% — remained under monitoring at the time of the Terminal Report submission. A tracer study mechanism was indicated, though the report acknowledges insufficient local government support as a mitigating challenge to post-program tracking.

Beneficiary Evaluation of Program Quality

Post-training evaluation data gathered from all 20 beneficiaries using a structured Cebuano-language instrument covering five dimensions reveal a consistently positive assessment of the program. The evaluation dimensions and aggregate scores are interpreted as follows.

In the category of attitude toward learning (*Pagkab-ot sa Tumong*), 18 out of 20 beneficiaries gave a rating of 5 (highest) on the item concerning the sustainability of the learning environment beyond sessions, and 19 out of 20 gave the highest rating on items about reaching learning goals through training. On program content (*Program/Proyekto*), all 20 beneficiaries gave the highest rating to the item on the program's contribution of usable knowledge, while 17 rated the technology being taught as non-burdensome to apply. On instructional delivery (*Kahanas sa Pagtudlo*), 19 out of 20 rated the explanation methods as highly effective.

The evaluation data across the remaining dimensions — facility management, training schedule compliance, accessibility, and comfort — consistently produced ratings of 17 to 19 out of 20 at the highest scale, with only isolated ratings of 4. No ratings of 3 or below were recorded across any evaluation dimension, indicating uniformly high beneficiary satisfaction with the program's delivery, environment, and content.

Themes from Beneficiary Feedback

Qualitative comments and suggestions submitted by beneficiaries following training were compiled in the Terminal Report and reveal several recurring themes.

Theme 1: Recognition of Skills Acquisition and Career Pathways

Multiple beneficiaries expressed gratitude for learning welding skills and articulated an understanding of the vocational and income-generating potential of the certification. Representative comments include acknowledgment that the training was educational and skills-enhancing, and expressions of intent to apply for welding-related employment or NCII certification. One beneficiary noted that after completing the training, he intended to apply for the NCII assessment with TESDA to use his skills in finding employment — a direct articulation of the program's intended livelihood objective.

Theme 2: Positive Assessment of Instructor Competence and Professionalism

Beneficiary feedback consistently praised the training staff. Comments such as references to friendly and accommodating staff, the effective delivery of welding techniques, and the supportive training atmosphere reflect



a high level of instructor credibility in the eyes of the trainees. This dimension of feedback aligns with the quantitative evaluation data showing near-perfect satisfaction scores in instructional delivery items.

Theme 3: Aspirations for Program Continuation and Expansion

Several beneficiaries expressed a desire for the program to continue, with suggestions for accommodating individual learning schedules and for expanding the program to serve a wider audience. One feedback item called for the scheduling of sufficient hours to allow students to take their welding training to certification — reflecting beneficiary awareness of the broader TESDA assessment process and its economic implications.

Theme 4: Practical Relevance of Welding to Local Economic Needs

Beneficiary comments also articulated the practical value of welding skills within the local community economy, including references to fabricating welded items for agricultural and livelihood use. This theme underscores the community-embedded rationale for the program and affirms the Community Needs Assessment finding that arc welding was the most preferred skills training among Barangay Luyang residents.

Implementation Challenges

Two primary challenges are documented across both source reports. First, the delay in TESDA SMAW NCII assessment scheduling constituted an unforeseen circumstance that disrupted the program's second objective within the original implementation timeline. While the assessment was rescheduled for January 2024, this delay introduces uncertainty regarding the completion rate and certification outcomes for beneficiaries, as some may have experienced difficulty maintaining availability beyond the original program window.

Second, insufficient local government support is identified as a recurring mitigating factor across both the evaluation report and the overall recommendation section of the Terminal Report. Specifically, documentation indicates that anticipated LGU support for beneficiary transportation was not fully mobilized during implementation. This gap was partially offset by the program's own budget allocation for training-related expenses and by the partnership with Compostela LGU and Barangay Luyang for transportation logistics during certain training phases.

DISCUSSION

The findings of this study invite analysis along several intersecting dimensions: program effectiveness, institutional partnerships, sustainability, and the structural determinants of community extension outcomes in Philippine SUCs.

The program's attainment of its first objective — 100% competency in welding positions — is a noteworthy outcome that reflects the strength of the implementing team's pedagogical approach and the adequacy of facilities at the Marine Engineering Laboratory. The high evaluation scores across all beneficiary satisfaction dimensions corroborate this finding and suggest that the instructional environment created by the faculty team was conducive to effective skills transfer. These results are consistent with the broader literature on TESDA-aligned TVET programs, which identifies instructor competence, adequately equipped training facilities, and well-structured curricula as primary determinants of training effectiveness (Catalan et al., 2020; TESDA, 2021).

The delay in TESDA national assessment, however, exposes a structural vulnerability in programs that depend on external certification bodies for completion of their terminal objectives. This finding echoes Dela Cruz and Salazar's (2018) caution that the sustainability of technical extension outcomes can be undermined by factors outside the implementing institution's control. For SUC extension programs in the Philippines, the scheduling of TESDA national assessments represents one such factor. The Batch III experience highlights the importance of proactive coordination with TESDA regional offices well in advance of program completion, as well as the need for contingency planning that does not leave beneficiaries in a state of suspended certification following the formal end of training.

The theme of LGU support — its absence being a documented challenge — raises questions about the depth of community partnership frameworks underlying the program. The literature on extension program effectiveness consistently emphasizes that strong LGU engagement is not merely a logistical convenience but a structural necessity



for ensuring that program graduates have access to follow-on support, market linkages, and post-certification employment facilitation (Gonzales & Ombao, 2020; Macatangay et al., 2020). The partnership with Compostela LGU and Barangay Luyang, while documented as an active linkage for transportation logistics, appears to have been limited in scope relative to what broader LGU engagement could contribute.

The profile of the program's beneficiaries is also analytically significant. Participants drawn from low-income, working-age households represent a population with high stakes in the economic returns of the training. The income range of PHP 4,000 to PHP 8,000 per month situates beneficiaries below the national average and underscores the urgency of skills-to-livelihood pathways that the program was designed to open. The inclusion of female participants, while limited to two individuals, reflects the program's acknowledgment of gender equity goals and may signal the need for more deliberate gender-responsive design in future iterations — for instance, through targeted outreach, scheduling accommodations for caregiving responsibilities, and mentorship structures that support female trainees in navigating male-dominated vocational sectors.

The qualitative feedback from beneficiaries is notable for its coherence and specificity. Rather than offering generic appreciation, participants articulated clear linkages between the skills acquired and their livelihood aspirations — referencing NCII certification, employment applications, and fabrication projects as planned next steps. This suggests a high level of program comprehension and motivational alignment among beneficiaries, which is a positive indicator for post-program outcomes even in the absence of completed tracer data. The finding resonates with Tabaquero and Ledesma (2017), who found that SMAW graduates who articulated specific post-training employment plans had significantly higher rates of certification completion and income improvement compared to those without such plans.

The program's explicit alignment with seven SDGs is academically significant in its scope. However, as Perez and Santos (2021) note, SDG alignment in SUC extension programs is most meaningful when it is operationalized through verifiable indicators rather than declarative mapping. The current program addresses this challenge partially through its objective-indicator framework, but the tracer study mechanism for SDG 1 and SDG 8 outcomes remains incomplete, which limits the program's ability to demonstrate income-level impacts. Strengthening tracer study infrastructure — through digital tracking tools, alumni networks, or TESDA data-sharing agreements — would substantially enhance the evaluative value of future program iterations.

CONCLUSION

This qualitative study evaluated the SMAW NCII Batch III extension project implemented by the College of Maritime Sciences of CTU – Carmen Campus, drawing on official program documentation to assess design quality, implementation fidelity, beneficiary outcomes, and institutional challenges. The study finds that the program successfully delivered its primary instructional objective, with all 20 beneficiaries demonstrating full welding competency across the required positions. Post-training evaluation data confirm high and consistent beneficiary satisfaction across instructional, content, facility, and logistical dimensions. Qualitative feedback reveals a motivated and engaged beneficiary cohort with clear livelihood intentions linked to their training.

At the same time, the study documents two significant implementation gaps: the delay in TESDA national assessment scheduling, which disrupted the program's certification timeline, and the insufficient mobilization of LGU support, which limited logistical resources and post-program follow-through. These findings carry direct implications for the design of future extension programs. Specifically, the study recommends that implementing teams establish TESDA assessment slots as a pre-implementation condition rather than a post-training arrangement; that LGU partnership agreements be formalized with specific deliverables and timelines rather than expressed as general support commitments; and that tracer study mechanisms be integrated into the program design from the outset to ensure that livelihood impact data can be captured and reported.

This study contributes to the growing literature on community extension evaluation in Philippine SUCs by offering a case-level analysis that foregrounds both program achievements and structural constraints. Future research should examine the long-term employment and income outcomes of SMAW NCII graduates from university extension



programs using longitudinal designs, as well as the factors that differentiate high-performing from underperforming extension cohorts across CTU campuses and peer institutions.

The Batch III program is a meaningful example of how technical universities can translate their curricular strengths into tangible community benefit. Its findings provide a constructive foundation for program iteration, institutional policy development, and broader advocacy for adequately resourced, well-monitored university extension in the Philippine higher education system.

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