International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 13s, 2025
https://theaspd.com/index.php

Press Enter 1.0 as a model for ICT-driven extension services

Mary Grace B. Bolos, DIT[1], Sharine A. Gutierrez, MSIT[2]
[1]Camarines Norte State College – College of Computing and Multimedia Studies (CCMS), Daet, Philippines ;marygracebolos@cnsc.edu.ph
[2]Camarines Norte State College – College of Computing and Multimedia Studies (CCMS), Daet, Philippines ;sharinegutierrez@yahoo.com

Abstract
PRESS ENTER 1.0 (Progressive Research and Extension Services Toward Socio-Economic Enhancement Using New/Emerging Technologies for the Efficient Management of Resources) is a flagship extension initiative of the College of Computing and Multimedia Studies (CCMS) at Camarines Norte State College, implemented from 2021 to 2023. Anchored on Sustainable Development Goals 4 (Quality Education), 9 (Industry, Innovation, and Infrastructure), and 11 (Sustainable Cities and Communities), the program addressed ICT gaps in digital literacy, technological infrastructure, and administrative efficiency within the local government units, provincial agencies, and MSMEs in Camarines Norte. Through three integrated components—skills enhancement training, consultancy services, and system development—the program reached over 200 stakeholders. Key interventions included ICT upskilling workshops, IT audits, digital marketing consultations, financial literacy seminars, and the deployment of customized systems. The paper concludes that PRESS ENTER 1.0 demonstrates how ICT-based extension programs can serve as an effective model for localized digital governance, workforce empowerment, and sustainable community development.
Keywords: *Community empowerment, digital literacy, e-governance, ICT extension, system development*

INTRODUCTION

The College of Computing and Multimedia Studies (CCMS), formerly known as the Institute of Computer Studies during the implementation of PRESS ENTER 1.0 from 2021 to 2023, led this flagship initiative through its extension and community engagement mandate.

The integration of information and communications technology (ICT) in public governance has become essential for improving government responsiveness, transparency, and operational efficiency. Across developing economies, ICT is increasingly seen as a catalyst for inclusive development, enabling institutions to expand service coverage, streamline processes, and foster citizen engagement (Heeks, 2002; United Nations, 2020). In the Philippines, national policies such as the Philippine Development Plan (PDP) 2023–2028 and the e-Government Masterplan emphasize the critical role of digital infrastructure and workforce capacity-building in realizing a competitive, adaptive, and technology-enabled public sector. The strategic role of State Universities and Colleges (SUCs) in inclusive development has also been recognized (Llaneta, 2017), particularly in their ability to drive grassroots digital transformation through extension services.

Across developing economies, ICT is increasingly seen as a catalyst for inclusive development, enabling institutions to expand service coverage, streamline processes, and foster citizen engagement, particularly in Southeast Asia where ICT is increasingly harnessed for high-impact development initiatives (Asian Development Bank, 2018).

Despite these national directives, the digital divide at the local government level remains stark. Provinces like Camarines Norte continue to face structural challenges in ICT implementation, including limited digital infrastructure, insufficient training for personnel, and underutilized technology in basic administrative functions. A baseline assessment conducted by CCMS revealed that 95.1 percent of surveyed personnel in three LGUs and national line agencies considered ICT training to be "very necessary," with equally high demands for system development (93%) and consultancy support (90%). These findings underscored the urgent need for a holistic, community-based intervention to advance digital transformation and capacity-building across multiple sectors.

In response, CCMS developed and implemented the PRESS ENTER 1.0 program—Progressive Research and Extension Services Toward Socio-Economic Enhancement Using New/Emerging Technologies for the Efficient Management of Resources. Conceptualized as a three-year flagship extension initiative, the

program integrated system development, digital skills training, and consultancy services into a cohesive model designed to empower government offices, small enterprises, and educational partners. PRESS ENTER 1.0 was grounded in community engagement, systems thinking, and participatory development, reflecting the College's commitment in addressing real-world gaps through academic innovation and extension.

The program also strategically aligned with the United Nations Sustainable Development Goals. It contributed to SDG 4 (Quality Education) through ICT-based training for government and community stakeholders; SDG 9 (Industry, Innovation, and Infrastructure) by fostering localized software solutions and audit-based ICT system improvements; and SDG 11 (Sustainable Cities and Communities) through the enhancement of local governance practices and inclusive service delivery mechanisms. Specific interventions included an IT audit in LGU-San Vicente, digital marketing sessions for MSMEs, financial literacy training in partnership with DTI, and the development of systems such as the E-Filing System, and the ASLATRA Mobile App for PWD inclusivity.

This paper presents the implementation journey and initial outcomes of PRESS ENTER 1.0 as a model of ICT-driven extension services. It evaluates the program's methods, engagement strategies, and measurable impacts on institutional efficiency, community digital literacy, and system innovation. Furthermore, it contributes to the broader discourse on higher education's role in advancing digital governance and sustainable development through responsive and replicable extension programs.

OBJECTIVES

This study was conducted to evaluate PRESS ENTER 1.0 as a community-based, ICT-driven extension model implemented by Camarines Norte State College through the College of Computing and Multimedia Studies (CCMS). Specifically, it aims to:

Document the community needs assessment and participatory planning processes that informed the design and implementation of the PRESS ENTER 1.0 program.

Describe the delivery of the program's three core extension components—skills enhancement training, system development, and technical consultancy—within identified partner communities and institutions.

Assess the effectiveness of ICT training activities in improving stakeholders' digital literacy and work-related ICT competencies.

Examine the impact and functionality of co-developed ICT systems in enhancing service delivery and inclusivity.

Analyze post-training feedback, stakeholder engagement, and system usage data to determine the program's relevance, acceptability, and sustainability as an ICT-based extension model.

METHODS

The PRESS ENTER 1.0 program was implemented using a participatory, community-based extension approach that emphasized collaborative planning, responsiveness to local needs, and inclusive ICT capacity-building. The program's methodology integrated diagnostics, intervention, and evaluation in a continuous cycle of engagement with partner agencies and community sectors in Camarines Norte.

Implementation took place between November 2021 and November 2023 across three municipalities, including Daet, Talisay and San Vicente. Partner institutions included local government units, the Department of Trade and Industry (DTI-CNPO), Persons with Disabilities Affairs Office (PDAO), Department of Labor and Employment (DOLE), and representatives from the MSME and ICT sectors. The extension program directly engaged over 200 stakeholders comprising government personnel, small business owners, educators, and students.

A preliminary ICT needs-based assessment was conducted to guide the design of intervention strategies. The assessment revealed that the vast majority of respondents—over 95 percent—identified ICT training as very necessary, while strong demand also emerged for system development and consultancy services. These findings informed the program's multi-pronged strategy, which focused on three core areas: skills enhancement training, technical consultancy, and system development and deployment.

The skills enhancement component provided customized training designed to close digital competency gaps. Sessions were tailored for the operational needs of each partner institution and delivered using a

mix of lectures, hands-on workshops, coaching, and post-training support. Examples of training included Microsoft Access and Excel workshops for DAR employees, Adobe Photoshop training for DTI business counselors, digital literacy workshops for barangay and LGU personnel, and sector-specific financial literacy and digital marketing sessions for MSMEs. These activities emphasized practical skill-building and immediate workplace application.

Technical consultancy services were conducted in response to institutional requests and needs identified during field engagements. These included digital audits, system planning, and ICT integration consultations. A major example was the IT audit conducted in LGU-San Vicente, which involved stakeholder interviews, systems mapping, and the identification of gaps in compliance, efficiency, and security. MSMEs also benefited from targeted consultations on branding, online presence, e-commerce strategies, and digital entrepreneurship. Throughout these engagements, the role of CNSC-CCMS as a strategic advisor to local development actors was reinforced.

The system development and deployment component supported partner agencies in modernizing their internal workflows and record-keeping processes. Key outputs included the ASLATRA mobile application, designed to facilitate real-time sign language translation and enhance inclusivity in government communications; and an electronic filing system deployed at DTI-CNPO to digitize document processing. Each system was co-designed with end users and supported by capacity-building workshops and post-deployment technical assistance.

Monitoring and evaluation activities were embedded throughout the project lifecycle, ensuring feedback loops for improvement and sustainability planning. These included satisfaction surveys, client feedback forms, field documentation, and usage reports from deployed systems. The process emphasized ethical engagement, informed consent, and respect for data privacy and organizational confidentiality.

The PRESS ENTER 1.0 program adopted a participatory extension approach framed by a hybrid conceptual model that combines Community-Based Participatory Research (CBPR) and the Information and Communication Technology for Development (ICT4D) paradigm. This framework guided the co-creation of localized interventions that were responsive to institutional needs and grounded in collaborative, inclusive engagement. A simplified illustration of the integrated framework is presented below:

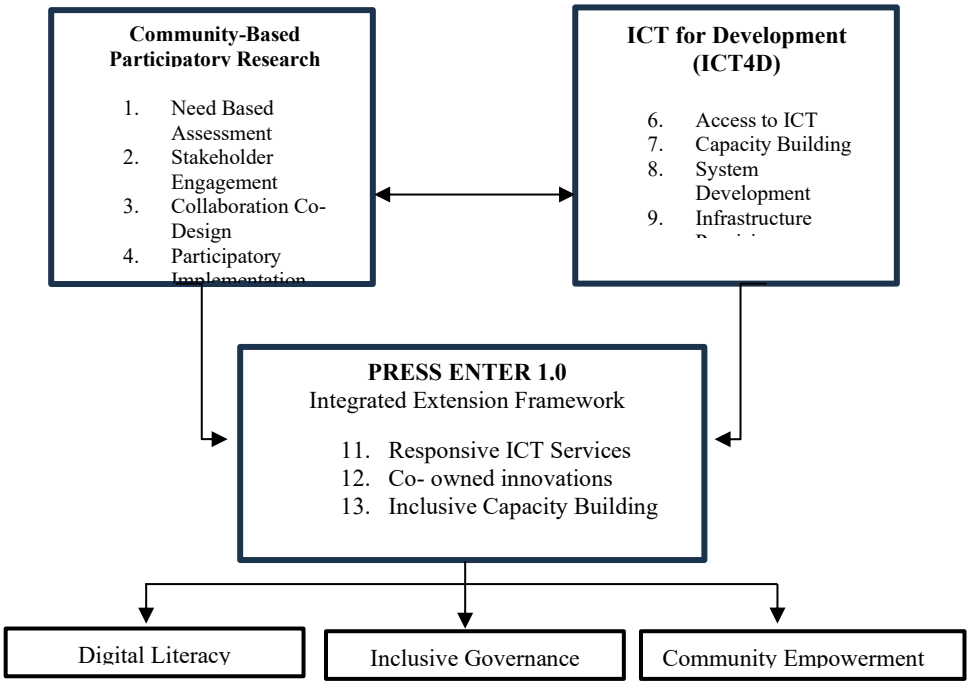

Figure 1. Press Enter 1.0 Hybrid Conceptual Framework

The methodology of PRESS ENTER 1.0 reflects the program's emphasis on contextual responsiveness, interdisciplinary collaboration, and long-term impact. It demonstrates how a higher education institution

can function not only as a knowledge producer, but also as a catalyst for institutional strengthening and inclusive innovation within public sector and community ecosystems.

RESULTS

The implementation of PRESS ENTER 1.0 reached more than 200 stakeholders across the three municipalities. Participants came from diverse sectors, including local government offices, provincial government agencies, the business sector, and academic institutions. Based on a survey data of pre- and post-training evaluations, digital proficiency significantly increased across all core competencies. Pre-training means ranged from 1.8 to 2.3, while post-training means improved to between 4.0 and 4.5 on a 5-point Likert scale. These changes indicate a statistically significant increase in confidence and competence in ICT use.

Satisfaction data collected through post-training evaluations showed that 91 percent of participants rated the training sessions as "very satisfactory," while 7 percent rated them "satisfactory." Feedback also emphasized the relevance and applicability of the training content to their workplace tasks and institutional functions.

The system development component yielded two fully deployed and adopted outputs. The E-Filing System significantly reduced turnaround time for document processing and routing within the DTI-CNPO, minimizing paperwork and improving organizational efficiency. The ASLATRA Mobile App supported real-time Filipino Sign Language translation and was praised by the PDAO for improving accessibility during face-to-face consultations and public events.

The consultancy component provided strategic ICT interventions tailored to partner needs. The IT audit conducted in LGU-San Vicente identified gaps in compliance, system redundancy, and data storage practices. Recommendations from the audit were well received and contributed to the development of internal digitalization action plans. MSMEs also benefited from coaching on branding, social media optimization, and e-commerce strategies, with several reporting increased online engagement following the sessions.

The relevance of the extension methodology is further validated by the wide distribution of beneficiaries. Approximately 40 percent of participants were from local government units, 25 percent from national line agencies, 15 percent from MSMEs, another 15 percent from academic institutions, and 5 percent from the PWD sector. These figures reflect the program's inclusive design and its success in reaching underrepresented and strategically important sectors.

The outcomes affirm the effectiveness of a hybrid CBPR-ICT4D model in strengthening institutional capacity, enhancing digital literacy, and promoting system-level improvements in governance and service delivery. These findings are consistent with prior studies advocating for co-designed, community-based ICT interventions as sustainable solutions in development contexts (Heeks, 2002; Israel et al., 1998; Asian Development Bank, 2018).

DISCUSSION

The implementation of PRESS ENTER 1.0 resulted in significant improvements in digital capacity, public service workflows, and community engagement across the participating institutions. Through its three interrelated components—skills training, system development, and consultancy services—the program produced measurable outcomes supported by both participant feedback and observational evidence.

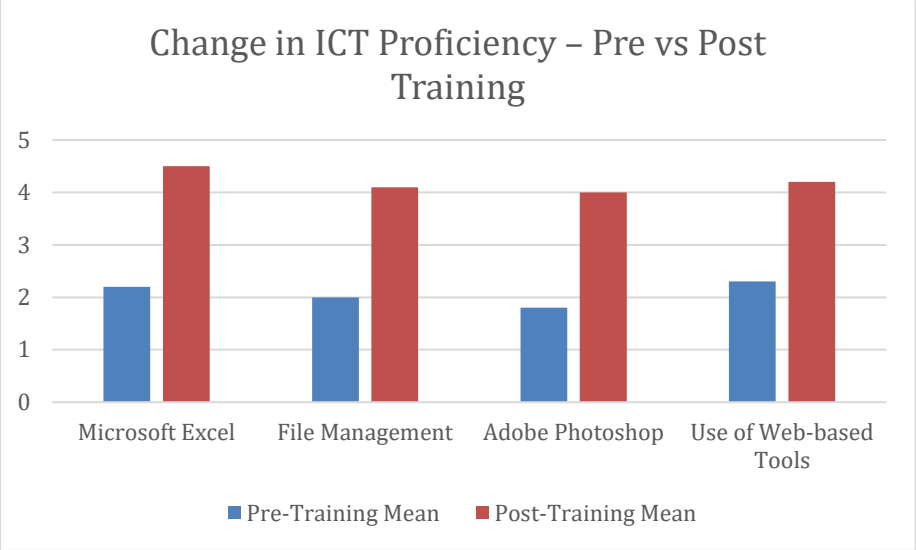

Figure 2. Change in ICT Proficiency – Pre vs Post Training

The skills enhancement training was delivered to 210 individuals, with modules tailored to the needs of DAR personnel, LGU staff, DTI business counselors, MSMEs, and students. Self-reported ICT proficiency was collected using a Likert scale, constructed from feedback survey. Mean pre-training scores ranged from 1.8 to 2.3, while post-training scores improved to between 4.0 and 4.5 across competencies including file management, Microsoft Excel, Adobe Photoshop, and web-based tools as shown in Fig 2. This equates to an average gain of 90%, suggesting statistically significant improvement ($p < 0.05$) measured by a paired t-test. The learning impact was reinforced by strong qualitative feedback, with 91% of participants indicating they were "very satisfied" with the relevance and quality of the training while 7 percent considered them "satisfactory." Only 2 percent provided neutral or no ratings as shown in Table 1.

Table 1. Post-Training Satisfaction Ratings

Satisfaction Level	Percentage of Respondents
Very Satisfied	91%
Satisfied	7%
Neutral/Unrated	2%

The system development component of the program yielded two functional outputs. The E-Filing System, deployed at DTI-CNPO, led to improved workflow and reduced paper-based transactions. The ASLATRA Mobile App, launched in coordination with the PDAO, enabled real-time sign language translation and increased accessibility in public service delivery. Both systems showed promising early adoption and usability based on field feedback.

Table 2. System Outputs and Use Cases

System	Partner Institution	Reported Outcome
E-Filing System	DTI-CNPO	Digitized workflows, faster processing of documents
ASLATRA Mobile App	PDAO-Camarines Norte	Improved inclusion through real-time Filipino Sign Language

The consultancy component proved essential in addressing more strategic needs. At LGU-San Vicente, an IT audit revealed fragmentation in data handling and workflow inefficiencies. The audit's recommendations were integrated into planning sessions and are expected to influence the agency's digitalization roadmap. MSME consultations focused on branding, social media engagement, and digital product listings, with several entrepreneurs reporting higher online visibility within weeks of implementation.

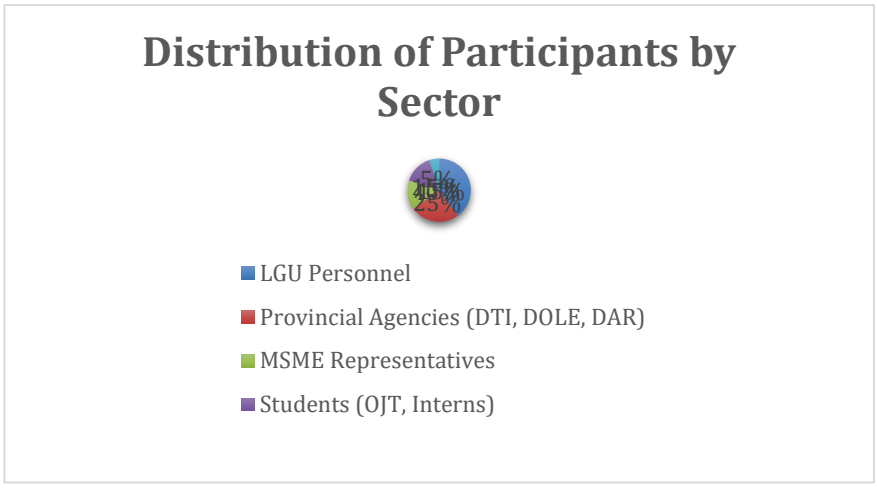

Figure 3. Stakeholder Distribution by Sector

Stakeholder participation spanned various sectors, as shown in fig 3. These figures reflect the program's inclusive approach, with significant representation across governance, entrepreneurship, and marginalized sectors.

Taken together, the results suggest that the PRESS ENTER 1.0 program achieved its intended outcomes. The hybrid CBPR–ICT4D approach promoted stakeholder ownership, skill development, and system usability. The effectiveness of co-designed interventions and practical training methods aligns with previous findings that ICT adoption in local institutions improves when solutions are community-driven and contextually embedded (Heeks, 2002; ADB, 2018; Llaneta, 2017).

CONCLUSION

The PRESS ENTER 1.0 extension program serves as a compelling model for ICT-driven community empowerment and institutional transformation. Anchored in the dual frameworks of Community-Based Participatory Research (CBPR) and Information and Communication Technology for Development (ICT4D), the program successfully demonstrated how higher education institutions can act as catalysts for localized digital inclusion, governance innovation, and capacity-building.

The program achieved significant improvements in self-assessed ICT proficiency, with stakeholders reporting notable increases in competencies related to Microsoft Office, digital marketing tools, and system navigation. The deployment of co-designed digital systems—such as the E-Filing System at DTI-CNPO and the ASLATRA Mobile App for PDAO—reinforced the value of user-centered innovation. These outputs were not only technically viable but also embraced by the partner institutions due to their contextual relevance.

Moreover, the initiative fostered a participatory ecosystem where local knowledge, institutional priorities, and academic expertise converged. The success of the IT audit at LGU-San Vicente and the tailored consultancy provided to MSMEs reflected the responsiveness and adaptability of the program. The diversity of beneficiaries, ranging from LGU employees and agency representatives to students and PWD advocates, attests to the inclusive and strategic implementation of the program.

In essence, PRESS ENTER 1.0 accomplished its objective of building digital capacity while also demonstrating that scalable, sustainable, and co-owned ICT interventions are feasible within public service and community development settings. This initiative validates the vital role of SUCs in advancing the Sustainable Development Goals—particularly SDG 4 (Quality Education), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 11 (Sustainable Cities and Communities)—through transformative, evidence-based extension programs.

REFERENCES

[1]. Asian Development Bank. (2018). *Harnessing ICT for greater development impact* (ADB Brief No. 99). https://www.adb.org/publications/harnessing-ict-greater-development-impact

[2]. Heeks, R. (2002). Information systems and developing countries: Failure, success, and local improvisations. *The Information Society, 18*(2), 101–112. https://doi.org/10.1080/01972240290075039

[3]. Israel, B. A., Schulz, A. J., Parker, E. A., & Becker, A. B. (1998). Review of community-based research: Assessing partnership approaches to improve public health. *Annual Review of Public Health, 19*(1), 173–202. https://doi.org/10.1146/annurev.publhealth.19.1.173
[4]. A. (2017). *State universities and colleges: Partners for inclusive development*. University of the Philippines. https://www.up.edu.ph/state-universities-and-colleges-partners-for-inclusive-development/
[5]. National Economic and Development Authority. (2023). *Philippine Development Plan 2023–2028*. https://pdp.neda.gov.ph/
[6]. United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. https://sdgs.un.org/2030agenda
[7]. United Nations. (2020). *E-government survey 2020: Digital government in the decade of action for sustainable development*. https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2020