Assessing the impact of community extension program in a Philippines state university: A comprehensive framework and analysis

Allen Paul Esteban[1*]
[1]Graduate School, Nueva Ecija University of Science and Technology, Philippines; estebanallenpaul@neust.edu.ph (A.P.E.).

Abstract: This paper aimed to assess the impact of the implemented extension program of the Graduate School of Nueva Ecija University of Science and Technology in different partner communities. It also determined the number of program outputs; the impact of each output in terms of Satisfaction, Effectiveness, Relevance, and Impact (SERI) and its sustainability. It sought to understand the organizational, external, and individual impact and propose recommendations to enhance the delivery of the community extension program. This sequential explanatory mixed-method study used survey methods, narrative, and content analysis validated by internal and external groups and individuals. Qualitative findings reveal themes such as Successful Implementation with Limited Continuity, Hardware/Resource Limitation, and Knowledge Application, highlighting both successes and challenges in project execution. Concurrently, the quantitative data provide insights into client satisfaction, effectiveness, relevance, and impact across different projects, highlighting notable achievements alongside areas for improvement. A comprehensive analysis revealed that despite facing challenges amidst the pandemic, the program demonstrated significant outcomes and impacts in the partner communities. With 15 extension projects, it addresses community needs and promotes development. SERI criteria rated the program 3.33, indicating "Some Evidence of Impact" with short-term sustainability. Relevance was the highest rate among the criteria. Despite encountering challenges such as budget utilization issues and sustainability concerns, the programs demonstrate significant impacts, including increased productivity, cost savings, and skill development among participants. This research provides valuable insights for program improvement and emphasizes the importance of holistic approaches to community engagement and development.

Keywords: Community extension program, Impact study, Sequential explanatory mixed method.

1. Introduction

Extension is an integral component of the four-fold functions of Philippines State Universities and Colleges (SUCs) for enhancing higher education along with Instruction, Research and Production. Under Republic Act 7722, the Commission on Higher Education (CHED) requires higher education institutions such as SUCs to respond to the call for societal transformation. It was also mentioned by Bellen [1]; Symaco [2] and Department of Budget and Management and Commission on Higher Education [3] and in the mandate and function of the university. As a cornerstone of social growth, educational institutions have the social responsibility to engage in empowering communities and changing lives through the transfer of information and technology through training, workshops, seminars and professional advisory services.

In view of this, Higher Education Institutions (HEIs) empower their faculty members in order for them to become efficient and effective extension providers as they share their expertise with the communities. While extension services respond to the needs of the communities, the same also correspond to the vision, mission, goals and objectives of the university. Therefore, a state university in the

Philippines, the Nueva Ecija University of Science and Technology (NEUST) through its Extension Services Department (ESD) committed to pursuing a culture of excellence and high ethical standards in the delivery of extension services to partner institutions, communities, and the general public to ensure the attainment of the goals and objectives of the University flagship extension program known as the Comprehensive Program for Empowerment and Development (CoPED).

As an academic unit of the University, the NEUST Graduate School has taken its own initiative in bringing positive change to the communities it is serving. Faculty members in each of its component departments have untiringly supported the adopted communities by sharing their expertise and knowledge that will empower every individual and family served. To achieve this end, the Graduate School (GS) Department in collaboration with the ESD, proposed a banner program known as the GS-TAGUMPAY Extension Program approved by the University President in 2018 and concluded in 2022.

The *TAGUMPAY* is an integrated program with the use of multidisciplinary and interdisciplinary approaches in the implementation phase. The program focuses on 8 components, the T.A.G.U.M.P.A.Y.: (1) Technology Transfer and Technical Assistance, (2) Adult Education, (3) Gender and Development, (4) Upcycling and Recycling, (5) Management of Business, (6) Productive and Inclusive Community Development, (7) Agribusiness, and (8) Youth Development. It is designed to operate through a multitude of programs and projects that require expertise in various domains. There are 9 domains that will work in this program: (1) Agriculture, (2) Business Administration, (3) Education Management, (4) Engineering Management (5) Industrial and Vocational Technology (6) Information Technology, (7) Applied Linguistics, (8) Public Administration, and (9) Teaching Education. Each of these disciplines plays a crucial role in the overall success of the program's objectives.

The *TAGUMPAY* Program stands out for its uniqueness and innovation in several key aspects, which contribute to its competitive advantage in the field of extension services and community development. Multidisciplinary and Holistic Approach is one of the assets of the program. *TAGUMPAY*'s integrated program approach, addressing eight diverse components, reflects its innovative and holistic perspective. This multidisciplinary approach allows *TAGUMPAY* to offer comprehensive solutions to communities, fostering synergy and inclusivity between different sectors and promoting a well-rounded development agenda. Accordint to previous article published by Dixon-Fyle, et al. [4] Competitor analysis reveals that while there may be other programs, there are few programs focusing on a diverse and holistic approach to community development. The innovation lies not just in individual technological products but also in the overarching strategy of addressing multiple dimensions of development. To maintain its competitive advantage, TAGUMPAY will continue to focus on innovation, staying attuned to evolving community needs, and collaborating with local stakeholders to ensure its solutions remain relevant and effective. By doing so, it can continue to stand out as a unique and valuable program in the field of community services and community development and inclusivity.

There is one goal of this program which is to empower and uplift local communities through the GS-TAGUMPAY program's holistic approach, fostering sustainable development, technological advancement, gender equality, environmental responsibility, skill enhancement, and inclusive growth across various sectors, thereby creating a prosperous and harmonious society for all.

The main objective of this paper was to assess the overall impact of the Community Extension Program *TAGUMPAY* of NEUST Graduate School. This study aimed to determine the number of program outputs; the impact of each output in terms of Satisfaction, Effectiveness, Relevance, and Impact (SERI) and its sustainability; to know the organizational, external, and individual impact; and propose recommendation to enhance the delivery of community extension program of the department. An *External Impact* refers to groups or entities external to the organization. An *Organizational Impact* refers to some aspect of the university that is affected by the extension program. An *Individual Impact* refers to how the extension program might affect individuals in the wider community.

2. Methodology

This study utilized a sequential explanatory mixed-method design, as outlined by Ivankova, et al. [5]. This approach involves two consecutive phases: initially collecting and analyzing quantitative data through a questionnaire survey, followed by qualitative data through narrative and content analysis. By integrating these methods, the study aims to achieve a comprehensive understanding of the research topic. The research aimed to assess the overall impact of the NEUST Graduate School's extension program based on four key criteria: satisfaction, effectiveness, relevance, and impact, each contributing equally to the overall evaluation. This holistic approach ensured a thorough assessment of the program's performance and outcomes. Quantitative surveys were conducted among participants, stakeholders, and beneficiaries to gather feedback on their experiences and perceptions of the extension activities. The data were analyzed to measure the levels of satisfaction, effectiveness, relevance, and impact achieved by the program. To assess the project's sustainability, the duration of community engagement and the continued use of services provided by NEUST Graduate School after project completion were examined. This was measured by calculating the number of months the community actively engaged with the program post-completion, indicating its long-term viability and impact. The study also evaluated the organizational, external, and individual impacts of the extension program by analyzing documents submitted to the Research, Extension, and Training (RET) office, conducting interviews with partner communities by independent individuals or institutions, and interviewing individual beneficiaries. This triangulation of data sources provided a comprehensive understanding of the program's broader implications and validated the results from the satisfaction, effectiveness, relevance, and impact assessments. A total of 150 participants from 15 extension projects were included in the study, selected based on data from the extension services department. Virtual interviews were conducted for clarification and validation of some data, and online questionnaires were distributed to different partner municipalities/communities. Statistical tools used in the study included the weighted mean and frequency count, with responses measured on a 4-point Likert scale.

2.1. Scoring Mode and its Indicator

Satisfaction, Effectiveness, Relevance, and Impact (SERI) are the criteria in computing the Overall Impact (OI) of the program weighted 25% each criterion. *Satisfaction* measures the degree to which the service provided by the NEUST Graduate School meets client expectation. *Effectiveness* measures the purpose of the project and attainment of its objectives set by the partner community and NEUST Graduate School. This will answer the question "Is the project doing the right thing?" *Relevance* measures how NEUST Graduate School addresses the needs of the partner community at the time when it is needed. *Impact* measures the declared outcome of the project agreed by the partner community and NEUST Graduate School.

Table 1.
Scoring mode and indicators of satisfaction.

Score	Verbal interpretation	Indicator
4	Very Satisfied	Significantly exceeds client expectations, demonstrating exceptional quality, timeliness, and delivery. Clients express high levels of appreciation and confidence in the services received.
3	Satisfied	Meets client expectations and fulfills their needs effectively. Clients express overall satisfaction with the quality and delivery of the services.
2	Dissatisfied	Falls short in some aspects, resulting in dissatisfaction with certain aspects of the service. Clients' express concerns or issues regarding the quality, timeliness, or delivery of the services received.
1	Very Dissatisfied	Significantly fails to meet client expectations, leading to profound dissatisfaction and disappointment. Clients express severe dissatisfaction with multiple aspects of the service, indicating a significant gap between expectations and actual delivery.

Table 2.
Scoring mode and indicators of effectiveness.

Score	Verbal Interpretation	Indicator
4	Highly Effective	Achieved 85% to 100% of the needs and objectives
3	Effective	Achieved 50% to 84% of the needs and objectives
2	Less Effective	Achieved 25% to 49% of the needs and objectives
1	Not Effective	Achieved 0% to 24% of the needs and objectives

Table 3.
Scoring mode and indicators of relevance.

Score	Verbal Interpretation	Indicator
4	High Relevance	Proposed a project, 1 to 2 weeks after receiving a request. Highly responsive to the needs
3	Relevance	Proposed a project, 3 to 4 weeks after receiving a request. Responsive to the needs
2	Irrelevant	Proposed a project, 1mo to 2 mos after receiving a request. Minimal response
1	Highly Irrelevant	Proposed a project, 3mos and above after receiving a request. Poor response

Table 4.
Scoring mode and indicators of impact.

Score	Verbal Interpretation	Indicator
4	Catastrophic Impact	Achieved 85% to 100% of the outcome
3	Major Impact	Achieved 50% to 84% of the outcome
2	Minor Impact	Achieved 25% to 49% of the outcome
1	Negligible	Achieved 0% to 24% of the outcome

2.2. Overall Impact (OI) and Sustainability of Adoption (SA)

Overall Impact (OI) represents the comprehensive evaluation of a project's impact to the community, encompassing various dimensions including client satisfaction, effectiveness, relevance, and impact. It provides a holistic assessment of the project's success in meeting its objectives, addressing the needs of stakeholders, and delivering meaningful outcomes. By considering multiple factors, Overall Impact offers a consolidated view of the project's overall performance, allowing stakeholders to gauge its overall effectiveness and contribution to the intended goals and outcomes.

Table 5.
Scale range of overall impact.

Range	Verbal interpretation	Indicator
3.50-4.00	High Evidence of Impact	Formula of Overall Impact
2.50-3.49	Some Evidence of Impact	
1.50-2.49	Low Evidence of Impact	OI = (Satisfaction WM + Effectiveness WM + Relevance WM + Impact
1.00-1.49	No Evidence of Impact	WM) / 4

Sustainability of Adoption (SA) refers to the capacity of a project to continue delivering value to its stakeholders and ensuring that its positive impact endures even after its completion. This encompasses the project's ability to maintain relevance, effectiveness, and beneficial outcomes over time, contributing to long-term success. To assess sustainability, document analysis and validation interviews conducted by an external group or/and individuals are crucial according to Bowen [6]. Document analysis involves reviewing project documentation, reports, and relevant materials to evaluate the project's structure, processes, and outcomes. Validation interviews provide insights from stakeholders and experts, allowing for a comprehensive assessment of the project's sustainability factors. Together, these methods help determine the project's ability to sustainably deliver value and maintain positive impacts beyond its initial implementation phase.

Table 6.
Scoring mode and indicators of relevance.

Score	Verbal Interpretation	Indicator
4	Long Term	The project gives a positive impact after its finished with more than 12mos.
3	Short Term	The project gives a positive impact after its finished within 6 to 11 mos.
2	Low	The project gives a positive impact after its finished within 1 to 5 mos.
1	Zero	After completion of the project, there's no track of sustainability

2.3. Validation

Validation of the data gathered and the results found in the extension projects was a crucial step in ensuring the credibility and reliability of the findings. This validation process involved both internal and external validation by various groups and individuals. The external validators led by *Aptissimi Development Innovations* and internal validators were led by University Extension Services Department with the help of *Graduate School RET Office* and *Data Analysis Center*. The validation process involving both external groups as well as internal stakeholders, will provide a multi-faceted evaluation of the extension projects, enhancing the credibility, and ensuring the effectiveness and impact on the target beneficiaries and communities.

3. Result and Discussion

This section presents the findings of the comprehensive study of the five objectives. Through this comprehensive discussion, a deeper understanding of the program's effectiveness, its alignment with community needs, and avenues for improvement were discussed, thereby informing strategic enhancements to foster even greater positive outcomes for the communities served.

3.1. Objective 1: Generated Projects from TAGUMPAY Program

The following table outlines the array of projects generated under the TAGUMPAY program, to address specific community needs and foster sustainable development. These projects undergo document analysis by the validators to identify their respective short names, defined objectives, outputs, and outcomes outlined in the approved extension proposal.

Table 7.
List of extension projects generated from TAGUMPAY program.

Project name	Short name	Problems	General objectives	Outcome
1. TubongPinoy: A Techno-Agri Project	TubongPinoy	Addressing the learning and engagement of farmer's children in farming Esteban [7]	To encourage the next generation of farmers to engage in farming Increase production, more buyers, and help them to make decisions in their farming activity. *Comprehensive approach to agricultural innovation and entrepreneurship*	Knowledgeable in actual farming and help their parents in the future Increase income, and have a tool to help them decide.
2. Digitalization of water billing and management	eWaterBill	Addressing concerns with manual water billing Challenges include inconsistency in data entry, potential for errors, time-consuming report generation, security vulnerabilities, and redundant data entry processes.	Assess their capability in managing information system Help the LGU to decide if they will buy a commercial software *The integration of technology and management principles in improving water resource management systems*	Use a functional and effective computer system for their Water Billing and Collection System
3. Development of contact tracing application	ContactTrace	Addressing Concerns with Manual Pen & Paper Contact Tracing Challenges include inconsistency in data entry, potential errors, miskeying information, time-consuming report generation, lack of security, and duplication of data entry. Moreover, using pens increases the risk of COVID transmission, necessitating alternative methods.	Assist the LGU Cabanatuan in designing and developing a contact tracing application *Showcasing the collaboration between technology, management, and governance to address public health challenges*	Use a functional and effective inhouse developed software for contact tracing within the Cabanatuan city
4. Development of technologies for private schools in aid of pandemic response	Tech4PrivateHEI	Addressing Challenges in Shifting to Online Learning Due to COVID Private schools face closures due to inadequate IT infrastructure, hindering the transition to online learning modalities. Esteban, et al. [8]	Assist them in the development and implementation of different technologies needed for online learning modality *Emphasize the management of resources of the institution, designing and implementing educational strategies, assess and enhance the technological infrastructure of the school, developing and deploying technological solutions, and developing engaging and effective teaching methodologies suitable for online learning environments.*	Continuation of the operation of Private School using technological tools during pandemic
5. Kompyudok: an online free assistance of computer problems and difficulties for teachers and students during pandemic	KompyuDok	Addressing Computer Optimization Needs Amid COVID Restrictions Given limitations on outdoor activities, both teachers and students require guidance on optimizing computer performance for effective remote learning during the COVID	Help teachers and students to optimized and maintain their computers Discuss the importance of optimizing and maintaining their computers Launch a Kompyudok: A Free Service Online Checkup and Inquiry for Computer Problems and Difficulties	They are knowledgeable in optimizing and maintain their computer

Project name	Short name	Problems	General objectives	Outcome
			Involves IT professionals offering assistance and guidance to address computer-related issues encountered during remote learning	No need to pay for consultancy in basic computer problems
6. Sustainable jobs, household and manpower productivity (SJHMP) program	SJHMP	Exploring Additional Sources of Income Amidst economic challenges, individuals seek alternative avenues to supplement their income. Karunambiga, et al. [9]	Facilitate opportunities for micro-enterprise development Facilitate the linkage to employment opportunities Link them to different support agencies/partners/financial institutions Promote community involvement *Emphasizes the intersection between agricultural practices and business principles to achieve economic empowerment and resilience.*	Produce their own products and able to sell it They are now employed Collaboration with other agencies Attendance to church
7. Project SULAT: Sustainable Undertaking of "On-Line-based Training in Action Research Writing & Innovation" among DepEd-Aurora Teachers	Project SULAT	Promoting Research Culture in Basic Education Amidst COVID-19 Despite the challenges posed by the COVID-19 pandemic, the Department of Education (DepEd) emphasizes the importance of cultivating a research culture in basic education. AP Esteban, et.al (2022)	Train the teachers in fundamental research writing, presentation, publication *Highlighting the program's focus on capacity building and professional development in the education sector*	Produced a completed paper, or presented their works in a fora, or published their work.
8. Free Digital Learning Webinar Series about Development, Excellence, and Leadership. An Annual Training and Seminar Program for Professionals	DEXCELL	Addressing the Cost of Webinars and Training for Continuing Professional Development The high expenses associated with webinars and training for continuing professional development pose a significant barrier to access and affordability for individuals seeking to enhance their skills and knowledge.	Provide free seminar/trainings to professionals To be effective in their chosen fiel Promote research and advanced studies. Encourage productivity, functional research in all fiends Provide leadership training in different fields To serve as a springboard for the enrichment, transmission of different innovation *Comprehensive approach signifies a commitment to fostering professional development and leadership skills across various sectors*	More knowledgeable and confident in their choses field without spending a money Can now conceptualize a research topic Can lead in a unit or even organization Present their research output
9. Reading enhancement: Reinforcing and Enhancing Reading Ability through Teachers and Parents' Involvement and Engagement	ReadingEnhancement	Addressing Elementary Students' Reading Challenges The prevalence of reading difficulties among elementary students poses a critical concern, warranting targeted interventions and support to improve literacy outcomes.	To help the school in formulating a program in Parental Involvement and engagement in the school *Emphasizing collaborative efforts to improve literacy outcomes among students through parental involvement*	Parents are now actively participating in school activities specially being a partner of teachers in educating their child.
10. Simplified and Guided Training for Research	Research4DepEd	Fostering a Research Culture in Basic Education: DepEd's Initiative	Train the teachers in fundamental research writing, presentation, publication	Produced a completed paper, or presented

Project name	Short name	Problems	General objectives	Outcome
Writing, Publication, and Utilizing Internet Applications in Research Methods		The Department of Education (DepEd) endeavors to cultivate a robust research culture within basic education, emphasizing the importance of evidence-based practices and continuous improvement in educational outcomes.	*Enhance research skills and utilization of technology for academic purposes*	their works in a fora, or published their work.
11. Design and Development of DSWD-Regional Home for the Girls Facilities	DSWD Facility	Providing Technical Assistance in Facility Design\n\nOffering expertise and support in designing facilities to ensure optimal functionality and alignment with project requirements and standards.	To help the partner to design the facility\n\n*Infrastructure development projects aimed at improving community facilities and accessibility*	Completed and approved designed was followed
12. Foot-Bridge Design and Construction in Talugtog Nueva Ecija	Foot Bridge	Offering Technical Assistance in Footbridge Design and Construction\n\nProviding expert guidance and support in the planning, design, and construction phases of footbridge projects to ensure safety, functionality, and adherence to engineering standards.	To help the partner to design and construct the foot bridge\n\n*Combining engineering expertise with administrative oversight, the project aims to facilitate safe and efficient transportation, thereby enhancing community connectivity and accessibility*	Completed and approved designed was constructed and utilize by the community
13. Assessment of Solar Energy Utilization for KASAMNE Cold Storage Plant	Solar Energy Utilization	Implementing a Plan for Solar Energy Integration in Cold Storage Plant\n\nDeveloping and executing a strategy to procure and install solar energy systems to power the operations of the cold storage plant, aiming to reduce energy costs and environmental impact.	To help the partner organization to compute how many solar panels are needed to fully operate the storage plant\n\n*Sustainable energy and infrastructure development initiatives in the agricultural sector*	Solar panels are installed in the plant and fully operational
14. Construction Management, Operation and Maintenance of Onion Cold Storage Plant	Project Management of Cold Storage	Commencing Operations at the Onion Cold Storage Plant\n\nInitiating the operational phase of the onion cold storage facility, marking a significant milestone in preserving produce quality and meeting market demands for agricultural storage solutions.	Help the partner to manage the construction of cold storage plant\n\n*Focusing on the construction and management of cold storage facilities. Ensures that agricultural produce, specifically onions, can be stored effectively, extending their shelf life and enhancing market access for farmers*	The plant was constructed according to the standards
15. Seminar Workshop in Occupational Safety and Health and Planning and Management	OHS Management	Addressing Concerns with Obtaining Government Permit for Occupational Safety and Health Workshop	Train the personnel in OHS to fully comply with the requirements of government permit\n\n*Emphasizing the importance of safety protocols and effective management practices in workplace environments*	Government permit issued and OHS knowledge is applied

TAGUMPAY Program stands out for generating 15 projects between 2018 to 2021 and extended up to 2023 because of pandemic, showcasing its significant contribution to addressing various challenges and needs within the community over the years.

The program encompasses 15 identified extension projects, each aligned with specific component targets within the program framework. The distribution of these projects across various components is as follows:

Table 8.
Extension Projects congruence with the TAGUMPAY components.

Project name	Component targets								Total no. of targeted components
	T	A	G	U	M	P	A	Y	
TubongPinoy	✓	✓				✓	✓	✓	5
eWaterBill	✓				✓	✓			3
ContactTrace	✓	✓				✓			3
Tech4PrivateHEI	✓				✓	✓			3
KompyuDok	✓	✓				✓		✓	4
SJHMP		✓		✓	✓	✓	✓	✓	6
Project SULAT	✓	✓						✓	3
DEXCELL		✓			✓	✓		✓	4
ReadingEnhancement	✓	✓						✓	3
Research4DepEd	✓	✓							2
DSWD Facility	✓								1
Foot Bridge	✓			✓					2
Solar energy utilization	✓						✓		2
Project management of cold storage	✓						✓		2
OHS management		✓							1
Total of extension projects per components	12	9	0	3	4	7	4	6	

*T.A.G.U.M.P.A.Y. stands for (1) **T**echnology Transfer and Technical Assistance, (2) **A**dult Education, (3) **G**ender and Development, (4) **U**pcycling and Recycling, (5) **M**anagement of Business, (6) **P**roductive and Inclusive Community Development, (7) **A**gribusiness, and (8) **Y**outh Development.*

Total of Extension Projects per Components: The table shows the number of extension projects under each component of the TAGUMPAY program. For example, there are 12 extension projects related to Technology Transfer and Technical Assistance, 9 projects related to Adult Education, and so on.

Total No. of Targeted Components: This column provides information on the number of components targeted by each extension project. For instance, the "TubongPinoy: A Techno-Agri Project" targets 5 components, "Digitalization of Water Billing and Management" targets 3 components, and so forth.

The most prevalent component among the extension projects is "Technology Transfer and Technical Assistance," with a total of 12 projects, highlighting a significant focus on technology and technical support. Conversely, "Gender and Development" has no projects, indicating a potential area for improvement in addressing gender-related issues and promoting gender equality. Projects like "SJHMP" cover six components, reflecting a comprehensive approach to community development and empowerment. Some projects, such as "DSWD Facility" and "Foot Bridge," focus on specific infrastructure development, while others have a broader scope covering multiple components.

The data underscores the strength of TAGUMPAY's multidisciplinary approach in addressing diverse community needs through various components like technology transfer, education, community development, and agribusiness. This holistic strategy empowers communities comprehensively. For

instance, "Technology Transfer and Technical Assistance" projects focus on technological support, while initiatives like "SJHMP" adopt a multifaceted approach to address livelihood challenges.

The inclusion of "Gender and Development" signifies TAGUMPAY's commitment to inclusivity and gender equality, despite the current lack of projects in this area. The combination of targeted components in projects like "TubongPinoy" and "eWaterBill" demonstrates the integration of technology with agricultural and administrative domains, showcasing the program's adaptability and versatility.

The following table presents the extension projects under TAGUMPAY Program congruence with various disciplines.

Table 9.
Extension Projects congruence with the TAGUMPAY disciplines.

Project name	Disciplines								
	Agri	BA	EM	EnM	IVT	IT	AL	PA	TE
TubongPinoy	✓	✓		✓	✓	✓			
eWaterBill		✓		✓		✓		✓	
ContactTrace				✓		✓		✓	
Tech4PrivateHEI		✓	✓	✓		✓			✓
KompyuDok						✓			
SJHMP	✓	✓							
Project SULAT			✓				✓		✓
DEXCELL		✓	✓	✓	✓	✓	✓	✓	✓
ReadingEnhancement			✓				✓		
Research4DepEd			✓			✓	✓		✓
DSWD facility				✓				✓	
Foot bridge				✓				✓	
Solar energy utilization	✓	✓		✓					
Project management of cold storage	✓			✓					
OHS management				✓	✓				
Total extension activities per discipline	4	6	5	10	3	7	4	5	4

The data highlights the diverse range of extension projects under the TAGUMPAY Extension Program and their alignment with multiple disciplines. Each extension project corresponds to specific areas of expertise, reflecting the program's multidisciplinary approach and its ability to address various aspects of community development.

In essence, TAGUMPAY's multidisciplinary approach amplifies its impact by addressing various facets of community development, fostering synergy between different disciplines, and maximizing the effectiveness of extension services in promoting holistic growth and empowerment.

3.2. Objective 2: Satisfaction, Effectiveness, Relevance and Impact (SERI)

This section serves as a comprehensive assessment framework aimed at evaluating the holistic impact of each extension project under the TAGUMPAY Extension Program. Within this section, each project is meticulously examined based on its alignment with community needs, the services provided, the measurement of its impact, and the result of evaluation in terms of satisfaction, effectiveness, relevance, and impact. By employing these criteria, this evaluation endeavors to capture the multifaceted dimensions of community development and empowerment facilitated by TAGUMPAY, providing insights into the effectiveness of its interventions and the tangible outcomes achieved. Through a rigorous analysis of SERI criteria, this section aimed to offer a nuanced understanding of the program's contributions to enhancing the well-being and prosperity of the communities it serves, ultimately informing strategic decision-making and programmatic enhancements to optimize its overall impact and effectiveness.

Table 10.
Summary of SERI evaluation and its overall impact and sustainability.

Projects	S	E	R	I	OI	SA	Verbal interpretation
TubongPinoy	2.99 S	2.72 E	3.60 HR	3.28 MI	3.15	2	Some Evidence of Impact with Low Sustainability *Validation Insight:* The knowledge gained from the app has been applied to real farming to date, yet its lack of additional features has resulted in its disuse thereafter.
eWaterBill	3.68 VS	3.76 HE	3.80 HR	3.88 CI	3.78	3	High Evidence of Impact with Short Term Sustainability *Validation Insight:* Despite the system being fully developed and utilized, its sustainability was hindered by a shortage of technology hardware.
ContactTrace	3.86 VS	3.80 HE	3.90 HR	3.84 CI	3.85	4	High Evidence of Impact with Long Term Sustainability *Validation Insight:* The mobile app was fully developed and utilized by all citizens and establishments of Cabanatuan during the pandemic, with data securely stored in a cloud enterprise as originally planned.
Tech4PrivateHEI	3.80 VS	3.90 HE	3.90 HR	3.80 CI	3.85	4	High Evidence of Impact with Long Term Sustainability *Validation Insight:* The Learning Management System (LMS) and enrollment system continue to be utilized, albeit with occasional errors that are monitored by the project leader, ensuring its sustained usage up to the present date.
KompyuDok	2.46 D	3.30 E	3.60 HR	2.44 mI	2.95	2	Some Evidence of Impact with Low Sustainability *Validation Insight:* Despite participants learning how to optimize and maintain their computers, the sustainability of the project was compromised by long waiting times for online consultations due to limited availability of IT consultants.
SJHMP	2.42 D	2.46 LE	3.70 HR	2.46 mI	2.76	1	Some Evidence of Impact with Zero Sustainability *Validation Insight:* Although the initiative began positively, with beneficiaries developing at least one calamansi product, its continuity was impeded by challenges in scheduling and participant commitment.
Project SULAT	3.28 S	3.60 HE	3.84 HR	3.28 MI	3.50	2	High Evidence of Impact with Low Sustainability *Validation Insight:* Although participants successfully completed research papers, presenting, and publishing them, sustainability was hindered by changes in administration.
DEXCELL	3.90 VS	3.96 HE	3.94 HR	3.28 MI	3.77	4	High Evidence of Impact with Long Term Sustainability *Validation Insight:* The project excelled in inviting reputable lecturers and presenting hot topics annually, allowing participants to effectively apply acquired knowledge in their portfolios.
Reading	2.72 S	2.72 E	3.84 HR	2.40 mI	2.92	2	Some Evidence of Impact with

Projects	S	E	R	I	OI	SA	Verbal interpretation
enhancement							Low Sustainability *Validation Insight:* While the project initially began well, it lacked monitoring and sustainability measures.
Research4DepEd	3.86 VS	3.76 E	3.88 HR	2.40 mI	3.48	2	Some Evidence of Impact with Low Sustainability *Validation Insight:* Teachers successfully applied the knowledge acquired during the training sessions. However, until now no presented and published paper was recorded.
DSWD facility	3.98 VS	3.96 HE	3.96 HR	3.98 CI	3.97	4	High Evidence of Impact with Long Term Sustainability *Validation Insight:* The proposed building design was effectively utilized.
Foot bridge	3.98 VS	3.98 HE	3.96 HR	3.98 CI	3.98	3	High Evidence of Impact with Short Term Sustainability *Validation Insight:* The construction of the footbridge was executed properly; however, there was a lack of monitoring for future improvement.
Solar energy utilization	3.98 VS	3.90 HE	3.96 HR	3.42 MI	3.82	4	High Evidence of Impact with Long Term Sustainability *Validation Insight:* The estimation of required solar power was conducted effectively, serving as a basis for purchasing materials.
Project management of cold storage	3.90 VS	3.90 HE	3.96 HR	3.40 MI	3.79	4	High Evidence of Impact with Long Term Sustainability *Validation Insight:* The construction of the cold storage was adequately monitored, but there was a deficiency in the documentation process.
OHS management	3.70 VS	3.66 HE	3.96 HR	3.80 CI	3.78	2	High Evidence of Impact with Low Sustainability *Validation Insight:* They successfully obtained a government permit by applying the knowledge acquired from the training.
TAGUMPAY program	3.28 S	3.34 E	3.61 HR	3.10 MI	3.33	2.69	Some Evidence of Impact with Short Term Sustainability

*SERI Legends: 3.50-4.00 – Very Satisfied/Highly Effective/Highly Relevance/ Catastrophic Impact;
2.50-3.49 – Satisfied/Effective/Relevance/ Major Impact;
1.50-2.49 – Dissatisfied/Less Effective/Irrelevant/ Minor Impact;
1.00-1.49 – Very Dissatisfied/Not Effective/ Highly Irrelevant/ Negligible
*Overall Impact: 3.50-4.00 – High Evidence of Impact;
2.50-3.49 – Some Evidence of Impact;
1.50-2.49 – Low Evidence of Impact;
1.00-1.49 – No Evidence of Impact
*Validation insights are the result of interview with the participants

Foot Bridge, Solar Energy Utilization, and *DSWD Facility* all recorded a highest client satisfaction score with 3.98 interpreted as Very Satisfied. This indicates the projects significantly exceed client expectations, demonstrating exceptional quality, timeliness, and delivery. Clients express high levels of appreciation and confidence in the services received. However, *SJHMP* and *KompyuDok* received rates of 2.42 and 2.46

respectively interpreted as Dissatisfied. This means that these projects fall short in some aspects, resulting in dissatisfaction with certain aspects of the service. Clients express concerns or issues regarding the quality, timeliness, or delivery of the services received. The reason behind this will be seen in validation insight in every projects.

DEXCELL has the highest effectiveness score with 3.96, interpreted as Highly Effective. This indicates that DEXCELL has achieved a high percentage of the needs and objectives set by the partner community and NEUST Graduate School. However, *SJHMP* received a rate of 2.46 interpreted as Less Effective. This means that the 25% to 49% of the needs and objectives were not achieved.

All the projects received a High Relevance ranging from 3.60 up to 3.96. This indicates that all the projects effectively address the needs of the partner community when they are needed.

DSWD Facility and *Foot Bridge* has the highest impact score of 3.98 interpreted as Catastrophic Impact. This suggests that *DSWD Facility* and *Foot Bridge* has achieved a high percentage of the declared outcome agreed upon by the partner community and NEUST Graduate School. However, *Reading Enhancement* and *Research4DepEd* only achieved 25% to 49% of declared outcomes receiving a rate of 2.40 interpreted as Minor Impact.

The highest overall impact is achieved by *Foot Bridge, DSWD Facility, ContactTrace,* and *Tech4PrivateHEI,* receiving a weighted mean of 3.98, 3.97, 3.85, and 3.85 respectively interpreted as High Evidence of Impact. Overall, 10 out of 15 projects received an interpreted result of High Evidence of Impact. However, *SJHMP, Reading Enhancement,* and *Kompyu Dok* received the lowest score of 2.76, 2.92, and 2.95 respectively interpreted as Some Evidence of Impact.

In sustainability, 6 out of 15 projects receive a Long-Term Sustainability mark, meaning the project has a positive impact after its completion for more than 12 months. However, *SJHMP* received zero-mark in sustainability.

Overall, the evaluation concluded that the Graduate School's TAGUMPAY program received a rating of Satisfied (3.28) in satisfaction criteria, Effective (3.34) in effectivity, High Relevance (3.61) in relevance criteria, Major Impact (3.10) in impact, contributed to overall rate of 3.33 which is interpreted as Some Evidence of Impact with Short Term Sustainability (2.69).

In qualitative aspects of the study using narrative analysis, the researcher identified several themes or codes that emerge from the narratives of the participants.

1.   Successful Implementation with Limited Continuity (SILC). Projects were successfully implemented and utilized, but their sustainability was hindered by various factors such as changes in administration or lack of monitoring and continuity measures.

2.   Hardware/Resource Limitation (HRL). Despite successful technological development, these projects faced challenges in sustainability due to shortages in technology hardware or limited availability of IT consultants.

3.   Execution Success with Monitoring Gaps (ESMG). Project initiatives achieved their initial objectives, but faced challenges due to gaps in monitoring and sustaining participant commitment.

4.   Documentation Deficiency (DD). While the projects were executed adequately, there was a deficiency in the documentation process, which might affect future improvements or assessments. Also, there were gaps in monitoring the documents for future improvements or effective utilization

5.   Knowledge Application (KA). Participants successfully applied the knowledge acquired from training programs, leading to tangible outcomes.

The qualitative analysis reveals a mixed picture of success and challenges in the implementation and sustainability of various projects. While some projects were successfully implemented and utilized, their continuity was hindered by factors such as changes in administration, lack of monitoring, or resource limitations. Other projects faced challenges related to documentation deficiencies or gaps in monitoring for future improvements. However, there were also instances of successful knowledge application, where participants effectively utilized the acquired knowledge in practical contexts. The interpretation underscores the importance of not only successful implementation but also sustained monitoring and resource allocation for long-term project success.

3.4. Objective 4: Organizational, External, and Individual Impact

This section presents the comprehensive evaluation of the TAGUMPAY program through narrative and content analysis, focusing on its organizational, external, and individual impact. Through document analysis, interviews, and validation of SERI (Satisfaction, Effectiveness, Relevance, and Impact) results, the researchers aim to gain insights into the multifaceted effects of the program. By examining how TAGUMPAY influences organizational dynamics, engages external stakeholders, and impacts individuals within the community, we seek to provide a nuanced understanding of its overall effectiveness and contributions to community development. Through this analysis, we aim to uncover key findings that inform strategic decision-making and program improvement efforts moving forward.

3.4.1. Organizational Impact

The TAGUMPAY program has significantly boosted faculty engagement in extension activities, with participation rates rising from 20% to 85%, thereby enhancing community engagement and service. It has also contributed 10% towards the university's Performance-Based Bonus (PBB) targets, demonstrating its efficacy in advancing strategic objectives. Additionally, the program's 15 extension projects have played a key role in achieving Level 3 and 4 accreditations for Graduate School programs, improving their quality and standards. Moreover, 10 faculty members have included TAGUMPAY participation in their ranking portfolios, contributing an average of 8 points towards their evaluations, aiding in career advancement. However, challenges in documentation processes have hindered budget utilization, with 95% of the approved P682,148 budget remaining unutilized. This highlights the need for streamlined documentation procedures to optimize resource allocation within the program.

3.4.2. External Impact

Various projects under the TAGUMPAY program exhibit differing levels of sustainability, with long-term engagement in some areas like LGU Cabanatuan, Private HEI, DSWD, and KASAMNE, and low sustainability in others like Bongabon, DepEd Nueva Ecija and Aurora, and SJHMP Community. Short-term sustainability was recorded for services provided to the LGU of Aurora. High client satisfaction was achieved in Dingalan Aurora's water services, with a 95% rating due to efficient transaction processes. Significant cost savings were realized by various institutions, such as P5,000,000 by a private school in Sta. Rosa through IT infrastructure, P3,000,000 by Dingalan, Aurora with a computerized water billing system, and P100,000 by the LGU of Cabanatuan City with an internally developed contact tracing application. The DSWD Nueva Ecija and Talugtog LGU saved P60,000 each by avoiding consultancy fees, and KASAMNE saved P100,000 through technical assistance for a solar panel project. Research productivity increased by 400% in DepEd Nueva Ecija and Aurora due to targeted initiatives. These findings highlight the program's impact on sustainability, client satisfaction, cost savings, operational efficiency, and research capacity within the communities it serves.

3.4.3. Individual Impact

The TAGUMPAY program has yielded numerous impactful outcomes across various projects. The TubongPinoy project, published by Esteban, A.P. (2019), enabled 10 out of 70% of participating out-of-school youth to assist their parents in farming through practical knowledge and skills gained from an application developed by faculty members. The computerized water billing system in Dingalan Aurora significantly increased staff productivity by 50%, reducing manual data entry and report generation times. A private school in Sta. Rosa maintained employment stability and enhanced remote work capability for all faculty members during the pandemic through the implementation of a Learning Management System (LMS). Cabanatuan City's contact tracing application improved citizens' convenience by replacing manual data entry with quick QR code scans, although it occasionally experienced minor lagging issues.

However, there were challenges as well. The Kompyudok program faced delays in providing timely technical assistance due to a lack of IT volunteers. The SJHMP project was discontinued due to scheduling and commitment issues among participants, and research initiatives in DepEd Aurora were

halted following a change in administration. Despite these setbacks, the Free Digital Learning Webinars contributed significantly to participants' professional development, with over 100 participants using webinar certificates for promotions. Additionally, training provided to DepEd teachers in Cabanatuan led to increased research activity and effective use of technological tools, enhancing their research capabilities and professional practice.

The projects discussed demonstrate significant impacts on skill development, community contribution, and operational efficiency across various domains. Implementation of technological solutions has led to notable gains in productivity and efficiency, ensuring continuity of operations and enhancing workforce capabilities. However, challenges such as budget utilization issues, sustainability concerns, and technical difficulties have emerged, highlighting areas that require attention for continued success. These findings underscore the importance of effective program implementation, efficient resource utilization, and proactive measures to address challenges,

Table 11.
Proposed strategies to enhance the community extension program.

Key result area	Strategies	Work unit responsible
Organization	1. Employ additional support staff in the Research, Extension, and Training (RET) office of each department to facilitate efficient documentation processes.	University extension and HRM Office
	2. Implement a structured scheduling system for Faculty Members and ensure adherence to the schedule to optimize productivity and resource allocation.	Office of the dean and program chairs
	3. Conduct comprehensive training sessions on Sustainability of extension projects to equip faculty with the necessary skills and knowledge for project longevity.	University extension and training office
	4. Streamline the disbursement of funds to expedite budget utilization.	Accounting and audit university extension and its unit
	5. Develop a robust risk management plan and policy to address unforeseen problems effectively, ensuring smooth project execution and mitigation of potential challenges.	
	6. Enhance interdisciplinary collaboration by incorporating discussions on the role of different disciplines in project conceptualization to foster a more holistic approach and maximize project effectiveness.	Project members
External	1. Foster partner community commitment by actively encouraging their engagement and participation in project activities, ensuring a sense of ownership and sustained collaboration.	Partner communities
	2. Implement a structured scheduling system and enforce adherence to the schedule rigorously to optimize resource allocation and project timelines.	Partner communities and project leader
	3. Maintain updated Memorandum of Agreements (MOA) and ensure their availability for reference, providing clarity and transparency in project partnerships and responsibilities.	Partner communities and university extension
Individual	1. Enhance participant awareness by conducting comprehensive informational sessions about the extension projects, providing detailed insights into project goals, methodologies, and expected outcomes to ensure informed participation.	Participants and project members
	2. Facilitate faculty members' engagement by encouraging their attendance at seminars and training sessions related to extension activities, fostering continuous learning and professional development in extension methodologies and best practices.	University extension office

3.4.4. Objective 5: Proposed Strategies to Enhance the Community Extension Program

Building upon the findings of the comprehensive study evaluating the TAGUMPAY program's impact and sustainability, proposed strategies have been formulated to bolster and refine the Community Extension Program. The study highlighted various aspects of the program's performance, including its achievements, challenges, and areas for improvement. By addressing these key findings and implementing strategic enhancements, the Community Extension Program aims to elevate its efficacy, sustainability,

and overall impact on the partner communities and stakeholders. The following table outlines the proposed strategies derived from the study's insights to foster continuous improvement and innovation in community engagement and development initiatives.

4. Conclusion

Based on the integrated qualitative and quantitative data, the TAGUMPAY program emerges as a multifaceted initiative with significant successes and identified areas for improvement. Quantitatively, the program has achieved high levels of client satisfaction, effectiveness, relevance, and impact across multiple projects despite encountering challenges during its implementation and amidst the pandemic. With 15 extension projects undertaken, TAGUMPAY has demonstrated a robust commitment to addressing community needs and promoting development, particularly through its Technology Transfer and Technical Assistance Component, which covered 80%, and Adult Education Component, covering 60%.

The program's impact, rated at 3.33 on the SERI criteria scale ("Some Evidence of Impact"), highlights its high relevance and short-term sustainability. However, weaknesses were identified in areas such as capacity building and knowledge transfer, indicating room for enhancement in these aspects of extension services. Qualitatively, the program's success varied under different frameworks: Successful Implementation with Limited Continuity (SILC) reflected projects that achieved utilization but faced sustainability challenges due to administrative changes or monitoring gaps. Cost Savings and Efficiency (CSE) initiatives generated substantial savings of approximately P8,260,000 ($150,181) through technological products and technical assistance, benefiting partner communities. Challenges such as Hardware/Resource Limitation (HRL) and Documentation Deficiency (DD) underscored the need to address resource constraints and improve documentation processes for long-term sustainability.

Execution Success with Monitoring Gaps (ESMG) and Knowledge Application (KA) demonstrated varying degrees of success in achieving project objectives and knowledge transfer, though with some challenges in sustaining participant commitment and ensuring comprehensive documentation. Notably, the program significantly contributed to faculty engagement in extension activities, institutional objectives, and accreditation efforts, playing a pivotal role in promoting professional growth and recognition among academic staff, thereby enhancing the university's educational quality and reputation.

Looking ahead, addressing challenges related to budget utilization, sustainability, and documentation processes will be critical for further enhancing the TAGUMPAY program's effectiveness and enduring impact. By continuing to innovate and adapt to evolving community needs, the program can build on its strengths and foster sustainable development across its diverse extension initiatives.

Transparency:
The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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