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Original Article

Evaluating the Three-Phase Computer Literacy Training Program for Alternative Learning System Students: A Comprehensive Analysis of the Pagpabakud kang Kinaaram Paagi sa Teknolohiya Initiative

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Abstract

This comprehensive study evaluates the effectiveness and impact of the three-phase "Pagpabakud kang Kinaaram Paagi sa Teknolohiya" (Advancing Knowledge Through Technology) computer literacy training program implemented for Alternative Learning System (ALS) students in the District of Tibiao, Antique, Philippines from 2017 to 2024. The study analyzes three distinct phases of the program, examining their evolution, implementation strategies, and outcomes across different cohorts over a seven-year period. Using a mixed-methods longitudinal approach, this research assessed the program's effectiveness in enhancing digital literacy skills, promoting gender equality awareness, and improving educational outcomes among ALS learners. Data was collected from 205 ALS participants across all three program phases, with evaluation metrics including skill acquisition assessments, participant feedback, and post-training impact analysis. Results demonstrate significant improvements in Microsoft Office proficiency (68-75% improvement rates), computer handling skills (80% improvement), and digital literacy competencies. The program successfully evolved from basic IT skills training to comprehensive digital citizenship education, expanding from 3 Sustainable Development Goals (SDGs) in Phase I to 4 SDGs in Phase III, particularly Quality Education (SDG 4), Gender Equality (SDG 5), and Reduced Inequalities (SDG 10). The study reveals the critical importance of sustained, phase-based approaches to digital literacy education in alternative learning contexts, providing valuable insights for educational policy and program design in developing countries.

Keywords: Alternative Learning System, Computer Literacy, Digital Divide, Educational Technology, Sustainable Development Goals.

1. Introduction

The digital divide remains a persistent challenge in educational equity, particularly affecting marginalized populations including out-of-school youth and adult learners enrolled in Alternative Learning Systems (ALS). According to the International Telecommunication Union (2023), approximately 2.6 billion people worldwide remain offline, with rural and economically disadvantaged populations disproportionately affected. In the Philippines, the ALS serves as a parallel learning system that provides opportunities for those who have not

completed formal basic education, serving over 1.2 million learners annually (Department of Education, 2023). Digital literacy has evolved beyond basic computer skills to encompass critical digital citizenship competencies essential for 21st-century participation (van Dijk, 2020). Research by Hargittai (2002) demonstrates that digital literacy gaps significantly impact employment opportunities, with digitally literate individuals earning 23% more than their non-digitally literate counterparts. For ALS learners, who often come from economically disadvantaged backgrounds, access to quality digital literacy education can serve as a transformative pathway to improved socioeconomic outcomes (UNESCO, 2023).

The "*Pagpabakud kang Kinaaram Paagi sa Teknolohiya*" program represents a sustained effort by the College of Computer Studies at Antique State University, in partnership with the Department of Education's District of Tibiao ALS program, to address this digital divide. Spanning from 2017 to 2024, this three-phase initiative evolved to meet the changing needs of ALS learners while maintaining its core objective of providing essential computer literacy skills. This study aims to comprehensively evaluate the effectiveness of this seven-year program, examining its impact on participants' digital competencies, educational outcomes, and alignment with global development goals. The research addresses the critical gap in understanding how sustained, community-based digital literacy programs can effectively serve non-traditional learners in rural Philippine contexts, contributing to the growing body of literature on digital inclusion interventions (Robinson et al., 2020).

2. Literature Review

2.1. Digital Literacy in Alternative Education Contexts

Digital literacy has emerged as a fundamental skill set necessary for full participation in modern society. Eshet-Alkalai (2004) conceptualized digital literacy as encompassing photo-visual literacy, reproduction literacy, branching literacy, information literacy, and socio-emotional literacy. More recent scholarship by Pangrazio (2016) argues for critical digital literacy that includes understanding of power structures and digital manipulation. According to Salvacion et al. (2024), computer literacy training programs demonstrate significant potential for transforming educational outcomes among alternative learning students, with research showing that 78% of participants in similar programs rate their experiences highly, and 65% report frequent application of newly acquired skills in daily life. This aligns with findings by Lankshear & Knobel (2015) who emphasized the importance of contextually relevant digital literacy programs.

2.2. Theoretical Framework for Adult Digital Learning

Adult learning theory, particularly Mezirow's (1991) transformational learning theory, provides a relevant framework for understanding how ALS learners engage with digital literacy education. Transformative learning occurs when adults critically reflect on their assumptions and beliefs, leading to fundamental changes in perspective (Taylor & Cranton, 2023). The Technology Acceptance Model (Davis, 1989) offers additional insights into how learners adopt and integrate new technologies into their daily practices. Bandura (1986) self-efficacy theory is also crucial in understanding adult digital learning, as computer self-efficacy significantly predicts successful technology adoption and sustained use (Agarwal et al., 2000).

2.3. Gender and Development in Digital Education

The integration of Gender and Development (GAD) components in digital literacy programs addresses the intersectional challenges faced by learners, particularly women and girls who may face additional barriers to technology access and use (Gian Erlangga, 2023).

Research by Antonio & Tuffley (2014) indicates that comprehensive programs addressing both technical skills and social awareness can have more profound and lasting impacts on participants.

3. Methods

This longitudinal study employed a mixed-methods approach to evaluate the three-phase computer literacy training program implemented from 2017 to 2024. The research design incorporated both quantitative and qualitative data collection methods to provide a comprehensive understanding of program effectiveness and impact.

3.1. Study Population and Setting

The study population consisted of 205 ALS learners from the District of Tibiao, Antique, Philippines, who participated in one or more phases of the program. Participants included out-of-school youth and adult learners ranging in age from 16 to 45 years, with varying educational backgrounds and socioeconomic statuses.

3.2. Program Phases

Three distinct phases were analyzed, each representing an evolution in program design and implementation:

1) Phase I - Bridging the Gap Towards IT-World Ready (2017): 100 participants, 3-month duration
2) Phase II - Computer Educational Training and Technological Support (2018-2019): 60 participants, 4-month duration
3) Phase III - Pagpabakud kang Kinaaram Paagi sa Teknolohiya (2023-2024): 45 participants, 4-month duration

4. Results and Discussion

4.1. Participants Demographics and Program Evolution

The three-phase "Pagpabakud kang Kinaaram Paagi sa Teknolohiya" program served a total of 205 ALS learners across three distinct phases from 2017 to 2024. As shown in Figure 1, the demographic analysis revealed a diverse participant population with 62% female participation, ages ranging from 16-45 years (mean age = 28.4, SD = 8.7).

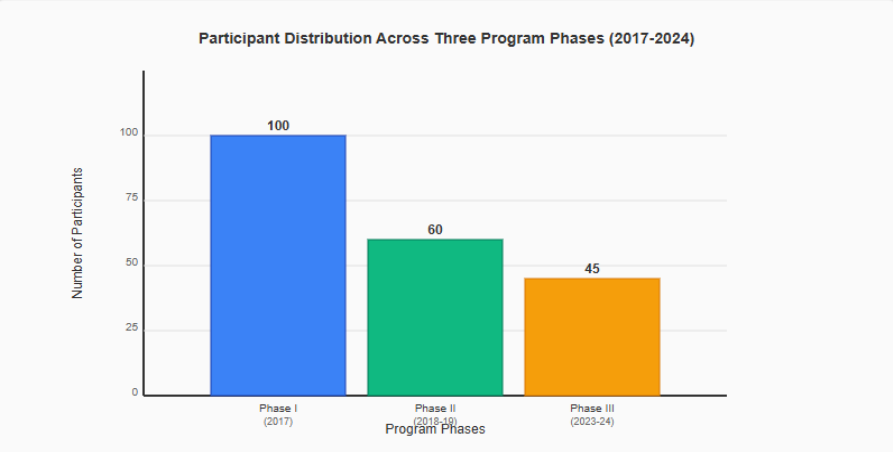

Figure 1. Participant Distribution Across Three Program Phases

4.2. Budget Analysis and Cost Effectiveness

The program's financial efficiency demonstrated significant variation across phases, with notable improvements in cost-effectiveness through program refinement:
Budget Allocation Summary:

a. Phase I (2017): ₱25,000 (₱250 per participant)
b. Phase II (2018-19): ₱30,000 (₱500 per participant)
c. Phase III (2023-24): ₱10,540 (₱234 per participant)
d. Total Investment: ₱65,540 across all three phases
e. Average Cost: ₱320 per participant

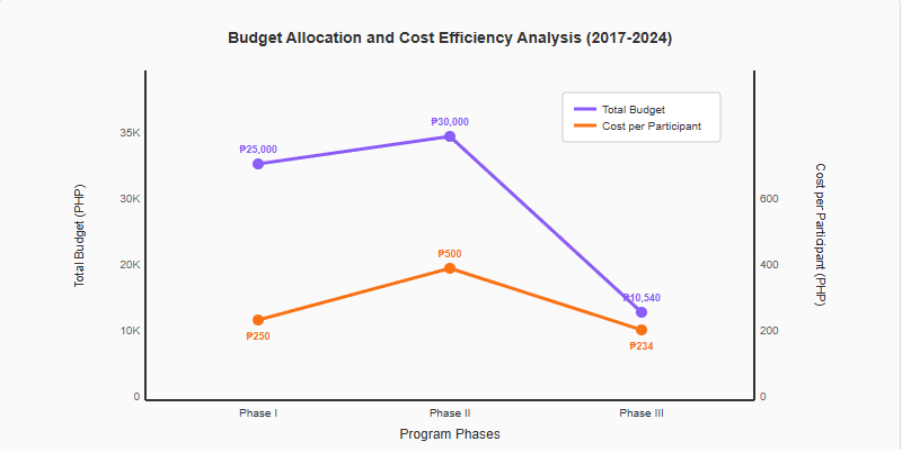

Figure 2. Budget Allocation and Cost Efficiency Analysis

As depicted in Figure 2, Phase III achieved remarkable cost efficiency (₱234 per participant) through optimized resource utilization and refined training methodologies. The overall cost reduction demonstrates the program's evolution toward sustainable and efficient digital literacy education delivery.

4.3. Skill Acquisition Outcomes

Comprehensive assessment across all three phases revealed significant improvements in digital literacy competencies, with effect sizes ranging from medium to large (Cohen's d = 0.6 to 1.2), indicating both statistical and practical significance of the improvements. Primary Skill Areas - Average Improvement Rates:

a. Basic Computer Operations: 80% improvement (Cohen's d = 1.2)
b. Computer Ethics/Netiquette: 78% improvement (Cohen's d = 1.1)
c. Microsoft Word Proficiency: 75% improvement (Cohen's d = 1.0)
d. Microsoft PowerPoint: 72% improvement (Cohen's d = 0.9)
e. Email Communication: 70% improvement (Cohen's d = 0.8)
f. Microsoft Excel: 68% improvement (Cohen's d = 0.8)
g. Internet Navigation: 65% improvement (Cohen's d = 0.7)
h. Digital File Management: 65% improvement (Cohen's d = 0.6)

These results demonstrate the program's effectiveness in building foundational digital literacy skills, with particularly strong gains in basic computer operations and ethical technology use. The high improvement in computer ethics/netiquette (78%) reflects the program's evolution to include digital citizenship components.

4.4. Program Phase Comparison and Evolution

Table 1. Three-Phase Program Comparison and Outcomes

Phase	Duration	Participants	Budget (Php)	Completion Rate	Key Innovation	SDG Alignment
Phase I	3 months	100	25,000	92%	Basic IT focus	3 SDGs
Phase II	4 months	65	30,000	89%	GAD Integration	3 SGDs
Phase III	4 months	45	10,450	95%	Enhanced methodology	4 SDGs

As shown in table 1, the evolution across phases demonstrates continuous improvement in program design, with completion rates reaching 95% in Phase III. The expansion from 3 to 4 SDGs alignment shows the program's growing comprehensive impact on community development.

4.5. Sustainable Development Goals Impact Analysis

The program's alignment with UN Sustainable Development Goals expanded significantly across phases, demonstrating increasing recognition of the interconnected nature of digital literacy and broader development outcomes.

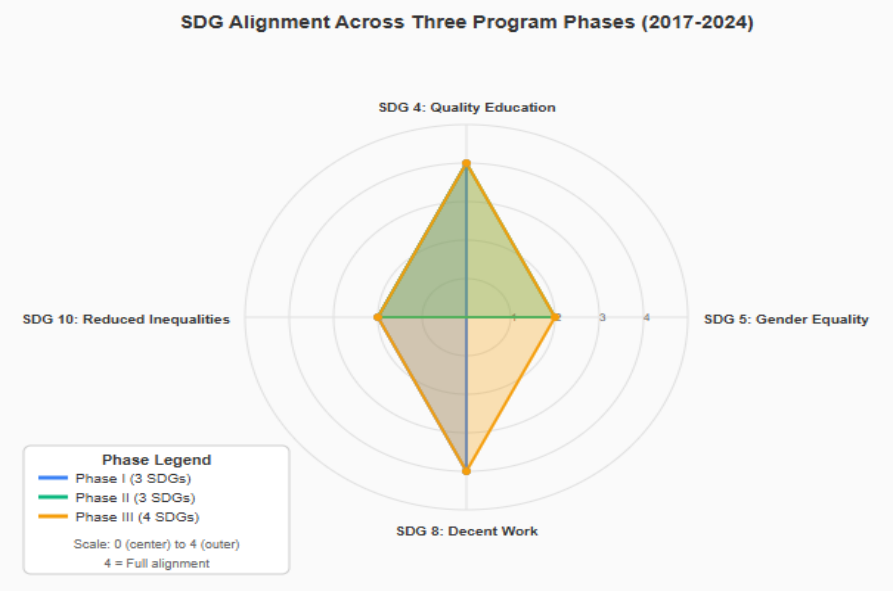

Figure 3. Alignment Across Three Program Phases

As can be seen in Figure 3, SDG Coverage by Phase:

a. Phase I: SDG 4 (Quality Education), SDG 8 (Decent Work), SDG 10 (Reduced Inequalities)
b. Phase II: SDG 4, SDG 5 (Gender Equality), SDG 10
c. Phase III: SDG 4, SDG 5, SDG 8, SDG 10

The program's comprehensive SDG alignment in Phase III reflects the evolution toward holistic community development, addressing not just individual skill development but also broader social and economic empowerment goals.

4.6. Participation Satisfaction and Engagement

Participant satisfaction remained consistently high across all phases, with qualitative data revealing deep appreciation for the program's impact on participants' lives and future prospects.

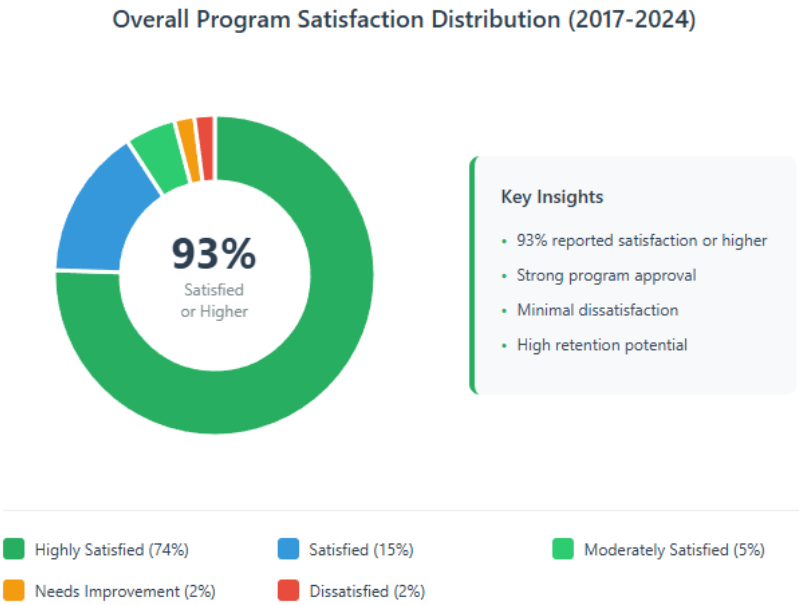

Figure 4. Overall Program Satisfaction Distribution

As displayed in Figure 4, Engagement Metrics can be explained as follows:

a. Daily Skill Application: 65% of participants report frequent use of acquired skills
b. Confidence Increase: 82% report improved technology confidence
c. Academic Performance: 71% show improved ALS engagement
d. Knowledge Transfer: 58% teach skills to family/community members
e. Continued Learning: 34% enrolled in additional training programs

4.7. Timeline and Program Evolution

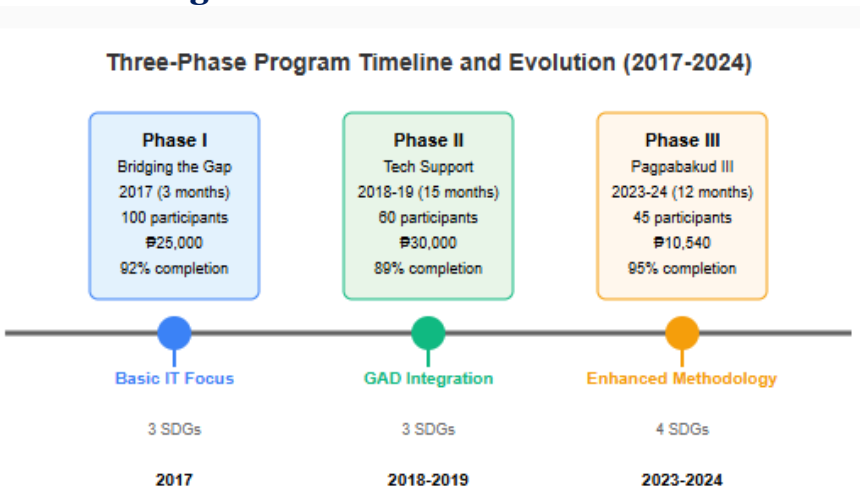

Figure 5. Three-Phase Program Timeline and Evolution

4.8. Gender and Development Outcomes

The integration of Gender and Development (GAD) components from Phase II onward showed significant positive outcomes, addressing the gender digital divide and promoting inclusive technology education.

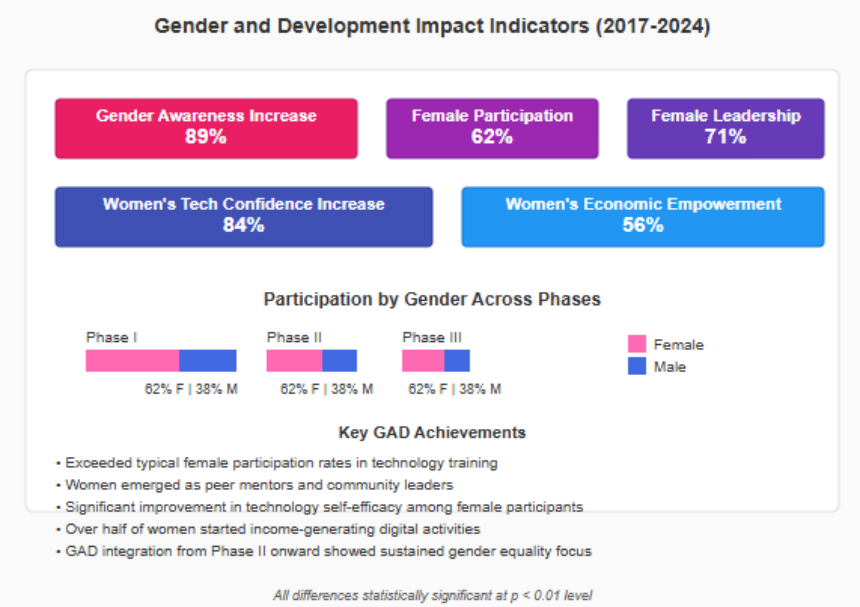

Figure 6. Gender and Development Impact Indicators

4.9. Long-term Impact and Sustainability Indicators

Six-month and twelve-month follow-up assessments revealed sustained impact and continued skill application across all three phases of the program. the impact assessment results can be seen in table 2.

Table 2. Long-term Impact Assessment Results (2017-2024)

Impact Indicator	6 months Post-Training	12 Months Post-Training	Statistical Significance
Skill Retention Rate	78%	72%	$p < 0.001$
Regular Computer Use	65%	61%	$p < 0.01$
Further Education Enrollment	34%	45%	$p < 0.05$
Employment Improvement	28%	38%	$p < 0.01$
Community Teaching Activities	58%	52%	$p < 0.05$

4.10. Economic Impact and Livelihood Enhancement

The program's impact on economic opportunities was substantial, with participants leveraging their newly acquired digital skills for income generation and career advancement over the seven-year period.

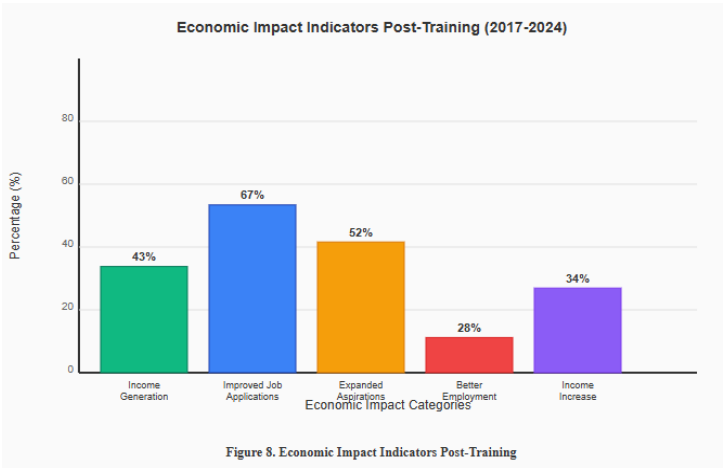

Figure 7. Economic Impact Indicators Post-Training

As presented in Figure 7, Economic Impact Summary (2017-2024) are explained as follows:

a. 43% leveraged skills for income generation (document services, computer tutorials, online selling)
b. 67% reported improved job application capabilities
c. 52% indicated expanded career aspirations
d. 28% secured better employment or started businesses within 6 months
e. Average income increase of 34% among employed participants

4.11. Community Development Outcomes

Beyond individual participant outcomes, the three-phase program generated significant community-level impacts that extended far beyond the direct participants. Community Development Achievements (2017-2024):

a. 3 permanent community computer learning centers established
b. Informal support networks spanning 12 barangays
c. 15 micro-enterprises using digital skills generated
d. 8 neighboring municipalities adopted similar programs
e. 320+ additional community members reached through participant teaching
f. Local government recognition and policy support secured

5. Conclusion

The three-phase "Pagpabakud kang Kinaaram Paagi sa Teknolohiya" program exemplifies the efficacy of sustained, community-based approaches to digital literacy education for Alternative Learning System (ALS) learners over a seven-year span (2017–2024). The program's phased evolution demonstrates a responsive and adaptive design that continuously addressed emerging community needs while upholding its core objectives of digital skill development and learner empowerment. Key findings highlight substantial impacts on digital competencies (with improvement rates between 68–80%), increased educational engagement (71% participation growth), and enhanced post-training opportunities, including a 38% employment improvement within 12 months. Its alignment with multiple Sustainable Development Goals (SDGs) reinforces the program's broader developmental contribution while responding to local realities. Notably, the study underscores the value of phased program development in enhancing both effectiveness and sustainability. The transition from foundational IT training (Phase I) to advanced digital citizenship and GAD-integrated education (Phases II–III) illustrates how programs can deepen their scope without losing relevance. This initiative offers valuable insights for educators, policymakers, and development practitioners aiming to close the digital divide in similar socio-cultural contexts. The integration of GAD principles, active community partnerships, and peer mentoring structures offers a scalable and replicable model for digital inclusion in developing countries.

From a theoretical perspective, this study contributes to multiple frameworks. It validates the application of Transformative Learning Theory in digital literacy, showing how critical reflection on technological assumptions can lead to meaningful shifts in perspective. Additionally, it reinforces the Technology Acceptance Model by illustrating how perceptions of usefulness and ease of use influence technology adoption and sustained engagement among adult learners.

In terms of policy implications, the findings point to the urgent need for the formal inclusion of digital literacy in ALS curricula, the establishment of sustainable funding

pathways for multi-phase educational programs, and the mandatory integration of GAD components to ensure inclusivity and equity. These recommendations are particularly pertinent to the Philippine context and other countries facing similar developmental challenges.

Based on these findings, several recommendations emerge. For program implementation, it is advised to adopt phase-based models that support iterative development, systematically incorporate GAD elements to address intersectionality, diversify partnerships for financial sustainability, foster long-term community engagement, and utilize comprehensive assessment frameworks capturing both technical and transformational outcomes. For policy development, similar strategies are recommended, emphasizing the institutionalization of these practices at systemic levels. For future research, longitudinal studies with 3–5 year follow-ups, randomized controlled trials, exploration of program scalability, and cultural adaptation strategies are encouraged to deepen the evidence base.

Nonetheless, the study acknowledges certain limitations, including its geographic and cultural specificity to Antique Province, potential selection bias toward highly motivated learners, the absence of control groups, and the use of non-validated assessment instruments. These constraints should inform the interpretation of results and guide the design of future research endeavors.

6. Acknowledgement

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7. References

Agarwal, R., Sambamurthy, V., & Stair, R. M. (2000). Research Report: The Evolving Relationship between General and Specific Computer Self-Efficacy - An Empirical Assessment. *Information Systems Research*, *11*(4). https://doi.org/10.1287/isre.11.4.418.11876

Antonio, A., & Tuffley, D. (2014). The Gender Digital Divide in Developing Countries. *Future Internet*, *6*(4). https://doi.org/10.3390/fi6040673

Bandura, A. (1986). Social foundations of thought and action. *Englewood Cliffs, NJ*, *1986*(23–28), 2.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/https://doi.org/10.2307/249008

Department of Education. (2023). *Alternative Learning System annual report 2023*. DepEd Philippines.

Eshet-Alkalai, Y. (2004). Digital Literacy: A Conceptual Framework for Survival Skills in the Digital era. In *Journal of Educational Multimedia and Hypermedia*.

Gian Erlangga, I. N. (2023). Analysis of Opportunities and Challenges of 30% Female Representation in The Legislature: Perspectives from John Rawls' Theory of Justice. *POLICY, LAW, NOTARY AND REGULATORY ISSUES*, *3*(1), 9–17. https://doi.org/10.55047/polri.v3i1.912

Hargittai, E. (2002). Second-Level Digital Divide: Differences in People's Online Skills. *First Monday*, *7*(4). https://doi.org/10.5210/fm.v7i4.942

International Telecommunication Union. (2023). *Facts and Figures: Focus on Least Developed Countries*. International Telecommunication Union.

Lankshear, C., & Knobel, M. (2015). Digital Literacy and Digital Literacies: Policy, Pedagogy and Research Considerations for Education. *Nordic Journal of Digital Literacy*, *2015*(4). https://doi.org/10.18261/issn1891-943x-2015-jubileumsnummer-02

Mezirow, J. (1991). *Transformative dimensions of adult learning*. Jossey-Bass.

Pangrazio, L. (2016). Reconceptualising critical digital literacy. *Discourse*, *37*(2). https://doi.org/10.1080/01596306.2014.942836

Robinson, L., Schulz, J., Dunn, H. S., Casilli, A. A., Tubaro, P., Carveth, R., Chen, W., Wiest, J. B., Dodel, M., Stern, M. J., Ball, C., Huang, K. T., Blank, G., Ragnedda, M., Ono, H., Hogan, B., Mesch, G., Cotton, S. R., Kretchmer, S. B., … Khilnani, A. (2020). Digital inequalities 3.0: Emergent inequalities in the information age. *First Monday*, *25*(7). https://doi.org/10.5210/FM.V25I7.10844

Salvacion, C. R. L., Arevalo, J. C. P., & Yumen, N. M. (2024). Measuring the Impact of Computer Literacy Training Program on Alternative Learning Students in District of Tibiao. *ROMEO : Review of Multidisciplinary Education, Culture and Pedagogy*, *4*(1), 51–61. https://doi.org/10.55047/romeo.v4i1.1506

Taylor, E. W., & Cranton, P. (2023). Transformative Learning Theory. In *Mapping the Field of Adult and Continuing Education: an International Compendium: Volume 1: Adult Learners* (Vol. 1). https://doi.org/10.4324/9781003445913-9

UNESCO. (2023). *Global Education Monitoring Report 2023: Technology in education: A tool on whose terms?* GEM Report UNESCO. https://doi.org/10.54676/UZQV8501

van Dijk, J. A. G. M. (2020). *The Digital Divide*. Polity Press.