



ALS Research Agenda: **ICT and Other Equipment**

## **Integrating Digital Tools in the Alternative Learning System: A Quasi-Experimental Study on Digital Citizenship and Learner Performance**

Wendave C. Berdelao<sup>1</sup>, Princess Maria Q. Berdelao<sup>2</sup>, Mark R. Alvez<sup>3</sup>

*<sup>1,2,3</sup>ALS Teacher, DepEd Division of Gingoog City*

**Date Submitted** : October 7, 2025

**Editor Score** : 95%

**Date Accepted** : January 9, 2026

**Similarity** : 6%

### **Abstract**

This study examined the effectiveness of integrating digital tools in the Alternative Learning System (ALS) to enhance learners' performance in Learning Strand 6: Digital Citizenship. Conducted at the Lunao Central School Learning Center in the Division of Gingoog City, the intervention utilized tablets, laptops, television, and audio equipment as instructional supports to improve learner engagement and digital competencies. Employing a quasi-experimental pre-test–post-test design, the study analyzed results from the Accreditation and Equivalency (A&E) Readiness Test and official A&E Test scores of thirty (30) ALS Junior High School learners during School Year 2024–2025. Findings indicate a statistically significant improvement in post-test performance compared to pre-test scores, demonstrating the positive impact of technology integration on both learner engagement and academic outcomes. Learners showed enhanced digital literacy, improved participation in learning activities, and greater confidence in navigating digital environments. These results underscore the potential of digital tools to address learning gaps, support self-directed learning, and strengthen digital citizenship competencies among marginalized learners in alternative education settings. The study concludes that technology integration is an effective and responsive pedagogical strategy in ALS instruction. It recommends the systematic incorporation of digital tools in ALS programs to enhance instructional delivery, prepare learners for participation in a technology-driven society, and support lifelong learning goals.

**Keywords:** *digital tools, digital citizenship, technology integration*



## **I. Introduction**

The rapid advancement of technology has significantly transformed the field of education, creating innovative opportunities for teaching and learning. In the Philippine context, the Department of Education (DepEd) has continually encouraged the integration of Information and Communication Technology (ICT) in schools to enhance learning delivery and outcomes (DepEd, 2022). The advent of interactive multimedia networks has led to the emergence of new digital learning opportunities that led the 21st century learners develop the ability and skill to effectively use technology for academic and professional success (Girón-García, C., & Gargallo-Camarillas, N. (2021).

The study by James and Parker in (Denajeba & Ducot, 2025), asserted that access to digital devices such as tablets, smartphones, or laptops remains uneven across regions, limiting the potential of technology-enhanced learning in ALS programs. Learners in remote areas are particularly disadvantaged, as they often lack basic infrastructure, such as electricity, making it difficult to implement digital learning solutions. These barriers can hinder their preparedness for assessments like the Accreditation and Equivalency (A&E) Test and limit their opportunities for further education or employment. To address these challenges, ALS implementers have begun incorporating digital resources to create interactive, flexible, and learner-centered sessions.

In Lunao Central School Learning Center, a tech-driven learning program was implemented to enhance instruction in Learning Strand 6: Digital Citizenship. The intervention utilized available digital resources, including 30 tablets provided for learners, three laptops owned by ALS teachers and implementers, and television and speaker systems to facilitate interactive lessons. These tools were integrated into every learning session to promote engagement, collaboration, and digital literacy skills.

The implementation of technology-enhanced instruction in ALS aligns with the DepEd Basic Education Research Agenda (BERA) under the theme Teaching and Learning and the sub-theme Enhancing Learning Outcomes through ICT Integration. It also supports the Inclusive Education strand, which promotes access and equity in learning opportunities for all types of learners, including out-of-school youth and adults.

This study is anchored on DepEd's commitment to strengthen lifelong learning opportunities through ICT-enabled education, ensuring that ALS learners are not left behind in an increasingly digital world. The program aims to demonstrate how the integration of digital tools can improve both academic performance and digital competencies essential for employability, higher education, and informed citizenship.

This study aimed to evaluate the effectiveness of tech-driven learning in enhancing education among ALS Junior High School learners at Lunao Central School Learning Center. Specifically, it sought to:

1. Determine the extent of improvement in learners' performance before and after the intervention;
2. Assess the role of digital tools in facilitating instruction in Learning Strand 6: Digital Citizenship; and
3. Provide recommendations for strengthening technology integration in ALS instruction.



### III. Methodology

#### Research Design

This study employed a quasi-experimental research design using a pre-test and post-test approach to determine the effectiveness of integrating digital tools into Alternative Learning System (ALS) instruction. Quantitative data were gathered through the Accreditation and Equivalency (A&E) Readiness Test in Learning Strand 6: Digital Citizenship, administered before and after the intervention. Additionally, learners' official A&E Test results were analyzed to validate overall performance. This design enabled comparison of pre- and post-intervention results to assess the impact of technology integration on learning outcomes.

#### Locale and Participants

The study was conducted at the Lunao Central School Learning Center in Barangay Lunao, Gingoog City, during the School Year 2024–2025. The participants consisted of 30 ALS Junior High School learners officially enrolled in the center. The sampling method used was purposive sampling, ensuring that all selected participants were actively engaged in ALS learning sessions and available for the full duration of the study. The participants' age distribution was as follows: 11 learners (36.67%) aged 16–20 years, 9 learners (30.00%) aged 21–25, 6 learners (20.00%) aged 26–30, and 4 learners (13.33%) aged 31 years and above. This diverse demographic reflects the varied educational backgrounds typical of ALS learners (DepEd, 2022).

#### Data Gathering Procedure

The intervention aimed to enhance the teaching and learning process in the Alternative Learning System (ALS) by integrating digital tools into instruction, particularly in Learning Strand 6: Digital Citizenship. It sought to improve learners' digital literacy, academic performance, and confidence in using technology responsibly.

Various ICT tools were utilized, including 30 tablets, three laptops, and a television with audio equipment, which were used to deliver interactive lessons, digital activities, and multimedia presentations. These tools allowed learners to practice real-world digital skills such as online safety, responsible social media use, and ethical digital participation—competencies essential for both the Accreditation and Equivalency (A&E) Test and lifelong learning.

The implementation process covered four key phases over 10 weeks at Lunao Central School Learning Center:

1. *Planning and Preparation* – assessment of ICT resources, lesson design, coordination, and development of pre- and post-tests.
2. *Pre-Implementation* – administration of pre-test, orientation on device use and digital ethics, and setting learning expectations.
3. *Implementation* – integration of tablets, laptops, and multimedia materials into sessions, use of interactive applications, and ongoing monitoring.
4. *Post-Implementation* – post-test administration, analysis of A&E results, learner feedback collection, and reporting of outcomes.

Overall, the Tech-Driven Learning Program transformed ALS instruction into a more interactive, engaging, and inclusive learning experience. It successfully improved learners'



performance and digital competence, contributing to DepEd’s efforts to promote ICT integration and digital transformation in the Alternative Learning System.

### Instruments Used

The main research instrument was the Accreditation and Equivalency (A&E) Readiness Test in Learning Strand 6: Digital Citizenship, developed following the ALS K–12 Basic Education Curriculum. This test assessed learners’ understanding of digital literacy and responsible technology use. Additionally, the official A&E Test results served as a secondary measure of learners’ overall academic achievement. The instruments were validated by ALS supervisors and implementers to ensure content reliability and appropriateness for the target learners.

### Data Analysis

Quantitative data were analyzed using descriptive statistics, particularly mean scores and percentage improvements between pre-test and post-test results. A comparative analysis determined the extent of progress following the integration of digital tools. Results from the official A&E Test were cross-checked with pre- and post-test data to confirm consistency in learner improvement. Data interpretation focused on identifying patterns of enhancement in digital literacy and academic performance.

### Ethical Considerations

This research adhered to the DepEd Research Management Guidelines (RMG, 2017) and ethical standards for research involving human participants. Prior to implementation, permission was obtained from the Schools Division Office of Gingoog City and the School Head of Lunao Central School. Informed consent was secured from all participants, ensuring voluntary participation. Learners were assured of the confidentiality and anonymity of their responses. No physical, psychological, or academic harm was caused during the study. All data collected were used solely for research purposes and stored securely in accordance with DepEd data protection protocols.

## IV. Results and Discussion

Table 1 presents the descriptive statistics for the learners’ pre-test and post-test scores in Learning Strand 6: Digital Citizenship.

Table 1

*Pre-Test and Post-Test Scores in Learning Strand 6: Digital Citizenship*

Measure	Mean	SD
Pre-Test	24.83	6.31
Post-Test	41.30	3.41

The pre-test yielded a mean score (M) of 24.83 (SD = 6.31), while the post-test mean increased substantially to 41.30 (SD = 3.41). This improvement reflects a mean gain of 16.47



points after the 10-week tech-driven intervention, indicating significant enhancement in learners’ digital literacy and understanding of digital citizenship concepts.

Results of the paired samples t-test (see Table 2) confirm that the difference between pre-test and post-test scores was statistically significant,  $t(29) = 14.82, p < .001$ . This finding validates that the intervention using tablets, laptops, and audiovisual tools effectively improved learners’ competencies in digital citizenship.

Furthermore, trend analysis revealed that all 30 learners improved their scores, with the greatest gains observed among those with initially lower pre-test results. Learners who began with scores below 20 improved by as much as 20–25 points, indicating the intervention’s inclusivity and effectiveness for learners of varied proficiency levels.

Table 2

*Paired Samples T-Test Results for Pre-Test and Post-Test Scores*

Variable	Mean	SD	Mean Difference	t	df	p
Pre-Test	24.83	6.31				
Post-Test	41.30	3.41	16.47	14.82	29	<.001

The significant increase in post-test performance demonstrates that integrating digital tools into ALS instruction substantially enhanced learners’ digital literacy, engagement, and comprehension of key digital citizenship concepts. This is consistent with the study of (Irkha, A. et. al, 2024) established that the use of digital technologies in education improves students’ perception, increases the level of motivation and interest in learning.

The narrowing of the standard deviation from 6.31 (pre-test) to 3.41 (post-test) suggests greater consistency in performance, meaning that digital integration not only improved overall scores but also reduced learning disparities among participants. This outcome aligns with DepEd’s advocacy for equitable and inclusive education under the Basic Education Development Plan (BEDP) 2030 and the DepEd ICT Integration Framework (2022).

Moreover, the successful performance of learners in the official Accreditation and Equivalency (A&E) Test, where all 22 examinees passed, further validates the effectiveness of the intervention beyond classroom assessments. This indicates that exposure to digital learning environments equipped learners with essential competencies—such as safe online communication, responsible media use, and ethical digital behavior—that are vital for both the A&E Test and real-world digital engagement.

The results also underscore that technology integration in ALS serves as a motivational and empowerment tool, bridging the digital divide commonly observed among out-of-school youth and adults. By engaging learners through interactive and multimedia approaches, the program fostered not only academic growth but also self-efficacy and 21st-century readiness.

The findings directly reveal significant increase of post-test mean score by 16.47 points, confirming significant improvement in learners’ performance. Moreover, learners reported higher engagement and participation levels due to interactive activities, visual presentations, and real-world digital applications. This is consistent to the study of Goh (2025) that demonstrated persistence and consistency of engagement are stable, reliable measures



positively influencing learning performance. Moreover, the study supports DepEd's ongoing digital transformation agenda, particularly the ICT Integration in Basic Education (DO 16, s.2023), which promotes technology as a key driver for equitable access and quality education. The findings further reinforce DepEd's commitment to inclusive education and support the policy goals of the Alternative Learning System Act (Republic Act No. 11510), emphasizing flexible, technology-supported learning pathways. The positive outcomes from this study suggest that similar tech-driven interventions can be scaled up across other ALS learning centers to strengthen learners' readiness for both accreditation and lifelong learning.

### **Policy Implications for ALS and Basic Education**

To strengthen the integration of technology in the Alternative Learning System, it is recommended that digital tools be institutionalized within ALS learning delivery by embedding ICT-based activities into standard instructional practices, particularly in learning strands that emphasize digital literacy, critical thinking, and problem-solving. This institutionalization should be supported by continuous digital literacy training for ALS teachers and implementers to ensure they possess the pedagogical and technical competencies needed to facilitate effective technology-enhanced learning sessions.

In addition, access to technological resources must be expanded through strategic partnerships with local government units, non-government organizations, and private sector stakeholders to provide devices, internet connectivity, and digital infrastructure in community learning centers. The adoption of blended learning models, which combine modular instruction with online and multimedia-supported learning, is also encouraged to offer flexible and inclusive learning pathways for learners with diverse needs, schedules, and learning paces.

Finally, the promotion of peer-to-peer mentoring among digitally proficient learners can strengthen collaborative learning, build learner confidence, and sustain motivation, thereby fostering a supportive digital learning culture within ALS communities.

This study supports the DepEd Basic Education Research Agenda under the themes of Teaching and Learning and Human Resource Development. The results highlight the need for policy directions that prioritize the integration of ICT in ALS program implementation. In a nutshell, DepEd issues policy enhancements that strengthen ICT integration within the ALS K to 12 Basic Education Curriculum.

### **V. Conclusion and Recommendations**

The study revealed that the integration of digital tools in ALS instruction significantly improved learners' academic performance and engagement. Results from the pre-test and post-test in Learning Strand 6: Digital Citizenship demonstrated notable increase in mean scores, confirming that learners developed stronger competencies in using technology for communication, research, and learning. The findings were further validated by the improved results in the official A&E Test, which showed higher passing rates compared to previous assessment periods. These outcomes underscore the positive influence of technology-enhanced instruction in developing 21st-century skills among ALS learners. Additionally, qualitative observations indicated that learners became more motivated, confident, and participative during learning sessions, as the use of tablets, laptops, and audiovisual tools made lessons more interactive and relevant to real-life contexts. The intervention also fostered



collaboration and self-directed learning—key are attributed to lifelong education and employability.

Recognizing the results, the researcher proposes the following recommendations:

1. Develop localized digital learning frameworks that align with the ICT competency standards for learners and teachers in the Regional and Division ALS units.
2. Continuous monitoring and evaluation mechanisms have been established to assess the impact of digital learning interventions on learner outcomes and teacher effectiveness.
3. Provide equitable, inclusive, and technology-driven learning environment that empowers every Filipino learner to thrive in the digital age.

## VI. References

Denajeba, Lindsay & Ducot, Lutchie. (2025). Challenges and Opportunities in the Integration of Technology Within Alternative Learning Systems (ALS) Programs. *Psychology and Education: A Multidisciplinary Journal*. 44. 472-485. [10.70838/pemj.440407](https://doi.org/10.70838/pemj.440407).

DepEd Order No. 16, s. 2023. Revised Guidelines on the Implementation of the Department of Education Computerization Program <https://www.deped.gov.ph/2023/07/19/july-18-2023-do-016-s-2023-revised-guidelines-on-the-implementation-of-the-department-of-education-computerization-program/>

DepEd Order No. 39, s. 2016 – Adoption of the Basic Education Research Agenda. Department of Education, Pasig City. <https://www.deped.gov.ph/2016/06/10/do-39-s-2016-adoption-of-the-basic-education-research-agenda/>

Girón-García, C., & Gargallo-Camarillas, N. (2021). Multimodal and Perceptual Learning Styles: Their Effect on Students' Motivation in a Digital Environment. *The EuroCALL Review*, 28(2), 23-38. <https://doi.org/10.4995/eurocall.2020.12758>

Goh, T.-T. (2025). Learning management system log analytics: The role of persistence and consistency of engagement behaviour on academic success. *Journal of Computers in Education*. <https://doi.org/10.1007/s40692-025-00358-x>

Irkha, A., Hurskaya, V., Hryshchuk, M., Tereshchuk, V., & Chyrva, H. (2024). Digital Transformation in Education: Leveraging Technology for Enhanced Learning Experiences. *Futurity Education*, 4(3), 4–17. <https://doi.org/10.57125/FED.2024.09.25.01>

Republic Act No. 11510 (2020). An Act institutionalizing the Alternative Learning System in basic education for out-of-school children in special cases and adults, and appropriating funds therefor. [https://lawphil.net/statutes/repacts/ra2020/ra\\_11510\\_2020.html](https://lawphil.net/statutes/repacts/ra2020/ra_11510_2020.html)