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RESOURCE CHALLENGED AND ADAPTIVE INSTRUCTIONAL STRATEGIES OF ELEMENTARY SCHOOLS

Maribeth B. Binunag[1]
[1]*Apayao State College*
[1]*San Isidro Sur, Luna, Apayao*
maribethtbbinunag@gmail.com1

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ABSTRACT

This study investigated the adaptive instructional strategies employed by public elementary school teachers in resource-challenged settings with limited electricity and no internet access in the Lower Calanasan District during the School Year 2025–2026. It examined the availability of energy resources, identified instructional and learner-related challenges, described adaptive strategies, assessed their effectiveness and sustainability, and determined the relationship between energy availability and strategy use using a descriptive-correlational design. Findings revealed that most schools experience unstable or no electricity and lack internet access, relying mainly on solar energy. Teachers consistently faced instructional disruptions and learner-related challenges. Despite these constraints, adaptive strategies such as the use of low-tech resources, differentiated instruction, and learner engagement activities were always practiced. These strategies were perceived as very effective in enhancing student engagement, participation, and learning outcomes. Teachers also expressed confidence in the sustainability of these practices, although challenges such as workload, limited resources, and professional isolation persisted. No significant relationship was found between energy availability and the type of strategies employed. The study concludes that adaptive instructional strategies are essential and effective in sustaining instruction in resource-constrained environments.

Keywords: *adaptive instructional strategies, resource-challenged schools, low-tech teaching, multigrade instruction, instructional effectiveness, sustainability*

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I. INTRODUCTION

Access to quality education is a fundamental human right and a pillar of sustainable development [1]. However, stark educational inequities persist in rural, remote, and resource-challenged communities. In the Philippines, public schools in geographically isolated areas struggle with severe infrastructure deficits, particularly limited or absent electricity and internet connectivity. These limitations present significant barriers to effective instruction, forcing educators to operate under highly demanding conditions with minimal institutional support [2].

In response to these constraints, teachers must rely on adaptive instructional strategies. In this study, these are defined as context-responsive, low-tech, and improvised pedagogical methods such as localized materials, flexible scheduling, differentiated learner grouping, and contextual storytelling tailored for environments lacking digital infrastructure [3,4]. Global education agencies and recent local studies affirm that in remote, multigrade classrooms, teaching effectiveness depends not on technological sophistication, but on an educator's resilience, contextual awareness, and improvisational capacity [2,5,6].

This reliance on teacher resourcefulness aligns with Department of Education policies (e.g., DO No. 76, s. 2009; DO No. 012, s. 2020), which mandate flexible, offline, and multigrade-sensitive modalities to promote learning equity [4]. In the Lower Calanasan District of Apayao—specifically within the underserved communities of Salongsong, Don Roque, and Naguilian Norte—this policy reality is lived daily. Teachers here navigate absent internet, intermittent solar power, and multigrade setups. They must travel to town centers to download materials, ration lessons according to daylight availability, manage erratic student attendance linked to agricultural cycles, and personally fund printed modules.

Despite these compounding adversities, educators exhibit exceptional adaptability through hand-crafted visual aids, peer tutoring, and contextualized learning. There is a critical need to systematically investigate how these environmental constraints and teacher profiles interact to shape classroom practice.

Therefore, this study aimed to investigate the resource-challenged learning environments and adaptive instructional strategies of elementary school teachers in the Lower Calanasan District for the school year 2025–2026. Specifically, it sought to determine how constraints in electricity and internet availability affect teaching approaches across four key domains: low-tech resource utilization, instructional flexibility, differentiated instruction, and learner engagement. Ultimately, this study intends to propose a context-appropriate support plan to strengthen instructional resilience and delivery in resource-limited educational settings.

Statement of the Problem

This study aimed to identify the adaptive instructional strategies employed by teachers in schools with limited or intermittent electricity and internet access. It also aimed to determine how such environmental factors affect teaching effectiveness, and propose a support plan for teachers in resource-challenged settings among Public School Teachers in Lower Calanasan District for the school year 2025-2026.

Specifically, the study sought to answer the following questions:

1. What is the availability of energy and internet in the school?
2. What challenges do teachers face in delivering instruction in resource-challenged elementary schools?
3. What are the adaptive instructional strategies employed by teachers in terms of:
   a. Use of low-tech or offline learning resources;
   b. Instructional flexibility and time management;
   c. Differentiated instruction for multigrade learners and
   d. Learner engagement with limited media?
4. What is the perceived effectiveness of the adaptive instructional strategies in terms of student engagement, participation, and learning outcomes?
5. What factors hinder the implementation of adaptive instructional strategies?
6. What is the perceived sustainability and long-term impact of these adaptive instructional strategies?
7. Is there a significant relationship between energy/internet availability and the type of adaptive

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strategies employed?

II. METHODOLOGY

Research Design

This study utilized a descriptive–correlational research design to investigate the adaptive instructional strategies of public elementary school teachers facing resource-challenged environments during the School Year 2025–2026. This specific design was selected to comprehensively map out existing institutional conditions while simultaneously examining the structural relationships between environmental constraints and actual classroom practices.

The **descriptive component** of the framework systematically documented school infrastructure, focusing specifically on electricity and internet availability, while identifying the immediate teaching challenges encountered in the field. Furthermore, it profiled specific adaptive practices—such as the use of low-tech or offline resources, instructional flexibility, differentiated multigrade instruction, and limited-media engagement while utilizing frequency, percentage, mean, and standard deviation to assess teachers' perceptions of their effectiveness and sustainability.

The **correlational component** of the design evaluated the direct relationship between these environmental constraints and adaptive teaching practices. To achieve this, a non-parametric **Kendall's tau-b correlation** was applied to determine whether a significant relationship existed between a school's energy availability and the specific types of instructional strategies teachers ultimately employed to survive the resource deficit.

Locale of the Study

This study was conducted across six public elementary schools in the Lower Calanasan District, Apayao, which were purposively selected due to their status as Geographically Isolated and Disadvantaged Areas (GIDAs). Characterized by persistent power interruptions, poor connectivity, and logistical barriers, these schools provided an authentic setting to investigate how rural educators deployed adaptive, low-tech pedagogical strategies amidst severe environmental and infrastructural constraints.

Respondents of the Study

The study utilized a total enumeration sampling technique, involving all twenty (20) public elementary school teachers deployed in the Lower Calanasan District during the School Year 2025–2026. As frontline educators facing persistent power and connectivity limitations, their full participation ensured a comprehensive representation of how instructional challenges and adaptive strategies were managed across these isolated school locations.

Research Instruments

The primary tool was a researcher-made structured survey questionnaire developed from literature on low-resource and multigrade instruction. Aligned with the conceptual framework, it gathered quantitative data on school infrastructure, teaching challenges, adaptive strategies, and teachers' perceptions of their effectiveness and sustainability.

Data Gathering Procedure

Formal authorization was secured from DepEd officials and school heads to ensure policy compliance and ethical standards. Following an orientation on voluntary participation and data privacy, printed questionnaires were personally distributed and collected without disrupting classes. The complete data were encoded and analyzed using descriptive statistics to profile challenges and strategies, while inferential statistics examined the comparative and correlational relationships.

Statistical Analysis

The collected data were analyzed using descriptive and inferential statistical methods via SPSS and Microsoft Excel. Descriptive statistics summarized teacher characteristics, instructional practices, and challenges, while inferential statistics were employed to test hypotheses concerning the relationships among the variables..

III. RESULTS AND DISCUSSION

Electricity and Internet Availability and Energy Source of Elementary Schools in Calanasan

Table 1: Electricity and internet availability and energy source

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Indicator	Frequency	Percentage (%)
Availability of Electricity		
Intermittent but usually available	2	10
Frequently interrupted	10	50
No electricity available	8	40
Availability of Internet Connectivity		
No internet access	20	100
Most Commonly Used Energy Source for Instruction		
Solar panels	20	100

Table 1 presents that 90% of the schools lacked reliable power, with 50% facing frequent interruptions and 40% having no electricity. This severe constraint restricted basic tools like lighting, printing, and digital media, compelling teachers to rely on manual, print-based approaches. Ultimately, these findings prove that the teachers' adaptive strategies were necessary structural survival responses to power deficits rather than optional pedagogical choices.

Challenges in Resource-Challenged Elementary Schools

Table 2: Instructional, resource and support, and learner-related challenges

Challenge Domain	Key Focus of Indicators	Weighted Mean	Descriptive Value
Instructional Challenges	Lesson delivery disruptions, lack of electricity and internet, workload due to printed materials, scheduling difficulties, and pacing issues	4.21	Always
Resource and Support Challenges	Access to learning resources, training, administrative support, financial burden, professional isolation, incentives, and teacher well-being	3.24	Sometimes
Learner-related Challenges	Learner absenteeism, home support, focus without multimedia, multigrade demands, and basic literacy and numeracy gaps	4.17	Often

Table 2 presents that instructional challenges ranked highest 4.21, always, closely followed by learner-related barriers 4.17, (often), while resource and support issues were lower 3.24 sometimes. This indicated that power deficits, manual printing workloads, and multigrade learner demands were persistent classroom fixtures, whereas institutional support deficits were only intermittent. Consistent with global literature, these findings demonstrate that infrastructure and learner readiness imposed the heaviest constraints on educational continuity, reinforcing that teachers' adaptive, low-tech strategies served as vital survival mechanisms.

Adaptive Instructional Strategies in Resource-Challenged Elementary School

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Table 3: Adaptive instructional strategies inrResource-shallenged Settings of elementary schools in Calanasan

Strategy Domain	Key Focus of Indicators	Weighted Mean	Descriptive Value
Use of Low-Tech or Offline Learning Resources	Use of printed modules, locally available materials, storytelling, textbooks, visual aids, and DepEd-issued offline resources to support instruction	4.43	Always
Instructional Flexibility and Time Management	Adjustment of schedules, lesson pacing, subject integration, home-based tasks, and continuity of instruction despite limited facilities	3.90	Often
Differentiated Instruction for Multigrade Learners	Learner grouping, varied tasks per grade level, leveled activities, scaffolding, and monitoring learner progress across multiple grades	4.94	Always
Learner Engagement with Limited Media	Hands-on activities, peer teaching, dramatization, creative outputs, oral expression, and sustaining engagement without multimedia tools	4.88	Always
Overall Adaptive Instructional Strategies	Integrated use of low-tech resources, flexible instruction, differentiation, and engagement strategies in constrained elementary schools	4.54	Always

Table 3 presents that teachers consistently implemented adaptive practices, yielding a high grand weighted mean of 4.54 (Always). Multigrade differentiated instruction ranked highest 4.94, followed by limited-media learner engagement 4.88 and the use of low-tech, offline resources 4.43, while instructional flexibility and time management scored the lowest 3.90, Often due to rigid institutional schedules. Supported by global literature, these findings demonstrated that despite systemic constraints limiting temporal flexibility, teachers exhibited exceptional pedagogical adaptability relying on differentiation, interactive tasks, and printed materials to maintain educational quality amidst severe power deficits.

Perceived Effectiveness of Adaptive Instructional Strategies

Table 4. Perceived effectiveness of adaptive instructional strategies in resource-challenged elementary schools of Calanasan District

Statements	Mean	Descriptive Value
Adjusting lesson pace based on learner responses enhances overall engagement	5.00	Very Effective
Flexible groupings (e.g., peer-teaching) reduce knowledge gaps among learners	5.00	Very Effective
Scaffolding (e.g., step-by-step modeling) with printed materials improves comprehension.	4.45	Very Effective
Use of storytelling, songs, and games fosters better understanding of concepts.	5.00	Very Effective
Offline visual aids (flashcards, charts) help learners retain key content.	5.00	Very Effective
Combining subjects during resource interruptions improves instructional continuity.	5.00	Very Effective
Hands-on tasks and manipulatives increase learner motivation.	5.00	Very Effective
Real-time formative assessment and adaptation raise learning outcomes.	5.00	Very Effective
Printed modules enable independent learner work when online resources are unavailable.	5.00	Very Effective
Role-play or dramatization enhances learner participation and confidence.	5.00	Very Effective
Total	4.95	Very Effective

Table 4 presents that teachers rated their adaptive strategies as highly productive, yielding a total mean of 4.95 (Very Effective). Top-rated indicators such as flexible groupings, hands-on tasks, and printed modules demonstrated that teachers viewed these low-tech practices as robust, learner-centered pedagogy rather than mere temporary coping mechanisms. Supported by global literature, these findings proved that combining peer collaboration, visual aids, and contextualized materials successfully sustained student motivation and instructional continuity despite severe power deficit

Facilitating or Hindering Factors in the Implementation of Adaptive Instructional Strategies

Table 5. Facilitating or hindering factors in the implementation of adaptive instructional strategies

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Statements	Mean	Descriptive Value
A. Facilitating Factors		
I receive adequate training for adaptive/low-tech Instructional strategies.	3.55	Agree
School leadership supports my use of printed and improvised materials.	4.65	Strongly Agree
Collaboration with peers aids planning and execution of adaptive lessons.	4.60	Strongly Agree
B. Hindering Factors		
Frequent electricity or internet outages hamper adaptive instruction.	4.10	Agree
Preparing printed modules adds significantly to my workload.	3.45	Agree
Limited access to grade-level materials affects multigrade instruction.	3.50	Agree
Lack of administrative/logistical support hinders adaptive teaching.	2.75	Neutral
Use of real-time assessment is restricted by large class sizes or resources.	3.85	Agree
Professional isolation makes it difficult to refine my teaching methods.	4.60	Strongly Agree
Financial burden of producing offline materials limits effective strategy use.	3.95	Agree
Total	**3.90**	**Agree**

Table 5 presents that teachers agreed on the factors affecting adaptive instruction, yielding an overall mean of 3.90 (Agree). Leadership support and peer collaboration served as key facilitators, whereas professional isolation, power deficits, heavy print workloads, and financial burdens acted as major hindrances. Supported by global literature, these findings demonstrated that while internal teamwork bolstered instructional resilience, the long-term sustainability of low-tech adaptive strategies depends heavily on systemic institutional support to mitigate teacher burnout.

Perceived Sustainability and Long-term Impact of Adaptive Instructional Strategies

Table 6. Perceived sustainability and long-term impact of adaptive instructional strategies of elementary schools in Calanasan

Statements	Mean	Descriptive Value
I believe these strategies can be maintained long-term despite limited resources.		Agree
I plan to continue using printed and locally improvised materials in future years.	4.20	Agree
Flexible instruction (e.g., combining subjects) remains practical over time.	3.55	Agree
Peer facilitation and group work will continue to engage students effectively.	3.70	Agree
Real-time adaptation based on student cues can be sustained routinely.	3.80	Agree
Printed modules will remain useful even if digital access improves.	4.75	Strongly Agree
Unlocking long-term growth, these strategies foster learner independence.	4.00	Agree
With continued training, the quality and impact of these strategies will increase.	4.75	Strongly Agree
School or community support will help sustain adaptive teaching methods.	4.00	Agree
I feel confident maintaining these adaptive strategies in upcoming teaching assignments.	3.70	Agree
Total	**4.11**	**Agree**

Table 6 presents that teachers viewed their adaptive practices as durable solutions, yielding a total mean of 4.11 (Agree). Strong agreement was reached on the enduring value of printed modules and the necessity of professional development. Supported by global literature, these findings demonstrated that teachers considered low-tech, flexible strategies to be sustainable components of a resilient learning system rather than temporary fixes, provided they receive continuous institutional support.

Correlation Tests Between Energy Availability and the Type of Adaptive Instructional Strategies Employed

Table 7. Significant correlation between energy availability and the type of adaptive instructional strategies employed

Variables	Correlation Coefficient	p-value	Interpretation
Use of low-tech or offline learning resources	0.248	0.292	Not Significant
Instructional flexibility and time management	0.334	0.150	Not Significant
Differentiated instruction for multigrade learners	0.344	0.138	Not Significant
Learner engagement with limited media	0.057	0.813	Not Significant

Table 7 presents that correlations between energy

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availability and the four adaptive strategy domains were weak, moderate, and statistically non-significant 0.057 to 0.344, $p > 0.05$. This indicated that variations in power access did not alter how teachers utilized low-tech resources, differentiated instruction, or engaged learners. Supported by UNESCO and OECD literature, these findings demonstrated that adaptive strategies were normalized district-wide as routine pedagogical necessities rather than optional responses to electricity levels, proving that strategy use was driven by pervasive multigrade demands and systemic resource scarcity rather than power availability alone.

IV. CONCLUSION

The conclusions of the study are drawn from the findings in response to the statement of the problem and are presented as follows:

Teachers in the Lower Calanasan District operate in learning environments characterized by unstable electricity and lack of internet access, making digital-dependent instruction impractical.

These infrastructural limitations result in recurring instructional disruptions, increased teacher workload, and heightened challenges in learner engagement and multigrade instruction.

Teachers consistently employ adaptive, low-tech, and learner-centered instructional strategies to sustain teaching and learning despite resource constraints.

The adaptive strategies implemented are perceived as effective and generally sustainable, particularly when supported by school leadership, peer collaboration, and relevant professional training.

Energy availability does not significantly influence the type of adaptive strategies used, indicating that such strategies have become a standard instructional practice across the district rather than a situational response.

Recommendations

The recommendations below are grounded on the actual findings of the study and reflect the realities experienced by teachers in resource-challenged public elementary schools in the Lower Calanasan District.

1. Develop a school-based, district-coordinated repository of ready-to-reproduce offline instructional materials and multigrade task banks.
2. Establish structured weekly printing schedules and shared resource allocation to reduce material preparation bottlenecks.
3. Conduct localized, demonstration-based Learning Action Cell (LAC) sessions focused on strengthening existing low-tech and adaptive teaching practices.
4. Organize mentoring systems and school clusters for teachers to share sustainable, context-appropriate improvised strategies.
5. Enhance structured grouping, leveled tasks, and scaffolding to effectively manage diverse multigrade learner needs.
6. Design clear, independent home-based tasks to mitigate limited parental support and the absence of digital platforms.
7. Sustain active learner participation through hands-on activities, storytelling, role-play, and oral assessments.
8. Encourage parents to establish consistent home study routines and basic supervision to complement offline learning.
9. Mobilize barangay officials and local stakeholders to provide essential supplies like paper, writing tools, and raw materials.
10. Future studies should compare schools with varying access levels to further isolate the impact of resource constraints on adaptive strategies.
11. Future researchers should integrate classroom observations and interviews to deeply validate the impact of adaptive methods on student outcomes.

Ethical Considerations:

This study strictly adhered to institutional ethical standards and Republic Act No. 10173 (Data Privacy Act of 2012). Formal authorization was secured from division, district, and school heads in Apayao, and participating teachers provided voluntary informed consent. To ensure complete

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anonymity and confidentiality, all individual and school identifiers were replaced with codes, and data were securely stored solely for academic purposes. The entire process maintained absolute academic honesty, ensuring all findings were reported truthfully and objectively.

v. REFERENCES

[1] Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., ... & Network, C. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, *15*(1), 1–126.

[2] Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.

[3] Cusi, A., & Dizon, R. (2021). Stories from the field: Teaching in resource-deprived schools in Mindanao. *Educational Review of the Philippines*, *13*(2), 45–61.

[4] Cusi, A., & Dizon, R. (2022). Challenges and opportunities in multigrade teaching in the Philippines. *Asia Pacific Education Review*, *23*(2), 345–359.

[5] Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2017). Implications for educational practice of the science of learning and development. *Applied Developmental Science*, *21*(3), 97–140.

[6] Department of Education. (2009). *Multigrade Education Program Guidelines* (DO No. 76, s. 2009). DepEd.

[7] Dumlao, R. A. (2017). Pedagogical strategies of teachers in multigrade schools in isolated rural areas. *Journal of Education and Human Development*, *6*(3), 128–137.

[8] Ehsan, M., & Saeed, R. (2021). Teaching with resilience: Adapting pedagogy in electricity-deprived rural schools in South Asia. *International Journal of Educational Development*, *87*, Article 102500. https://doi.org/10.1016/j.ijedudev.2021.102500

[9] Gay, L. R., Mills, G. E., & Airasian, P. W. (2012). *Educational research: Competencies for analysis and applications* (10th ed.). Pearson.

[10] Gu, Q., & Day, C. (2007). Teachers' resilience: A necessary condition for effectiveness. *Teaching and Teacher Education*, *23*(8), 1302–1316.

[11] Mayer, R. E. (2017). Using multimedia for e-learning. *Journal of Computer Assisted Learning*, *33*(5), 403–423.

[12] OECD. (2020a). *Education in the digital age: Healthy and happy children*. OECD Publishing.

[13] OECD. (2020b). *Resilient education systems*. OECD Publishing.

[14] OECD. (2020c). *Statistical challenges in education research*. OECD Publishing.

[15] Piaget, J. (1952). *The origins of intelligence in children*. International Universities Press.

[16] SEAMEO INNOTECH. (2019). *Teaching in remote schools in Southeast Asia: Contexts and practices*. SEAMEO INNOTECH.

[17] SEAMEO INNOTECH. (2022). *Flexible learning strategies in Southeast Asia*. SEAMEO INNOTECH.

[18] Trucano, M. (2016a). *Barriers to ICT integration in education*. World Bank.

[19] Trucano, M. (2016b). *Knowledge maps: ICT in education*. World Bank.

[20] UNESCO. (2017a). *Education for sustainable development goals: Learning objectives*. UNESCO.

[21] UNESCO. (2017b). *Education infrastructure in rural areas*. UNESCO.

[22] UNESCO. (2019a). *Digital learning and transformation of education*. UNESCO.

[23] UNESCO. (2019b). *Education in emergencies and low-resource contexts*. UNESCO.

[24] UNESCO. (2019c). *Learning continuity in crises*. UNESCO.

[25] UNESCO. (2019d). *Sustainable teaching practices*. UNESCO.

[26] UNESCO. (2019e). *Teacher support in remote areas*. UNESCO.

[27] UNESCO. (2020). *Ensuring effective distance learning during COVID-19 disruption: Guidance for teachers*. UNESCO Publishing.

[28] UNESCO. (2021). *Reimagining our futures together: A new social contract for education*. UNESCO.

[29] UNICEF. (2021a). *Reimagining education: The role of technology in learning*. UNICEF.

[30] UNICEF. (2021b). *Remote learning and digital education strategies*. UNICEF.

[31] UNICEF. (2021c). *Teacher workload and support systems*. UNICEF.

[32] Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

[33] World Bank. (2018). *World development report 2018: Learning to realize education's promise*. World Bank.

[34] World Bank. (2021). *Remote learning during the global school closures: Lessons from 13 countries*. World Bank.

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