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# The Teachers' Competencies in the Utilization of the Information and Communication Technology (ICT) Resources in Teaching Technology and Livelihood Education (TLE) In Libmanan South District, Division of Camarines Sur

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ABSTRACT

This study described information and communication technology (ICT) resources, teacher-perceived effectiveness, and competencies for teaching Technology and Livelihood Education (TLE) in Libmanan South District, Division of Camarines Sur, during School Year 2023–2024. A descriptive-evaluative-correlational survey purposively selected the locale and used total enumeration across big, medium, and small schools. The verified resource table represented 77 cases (12 big-school, 36 medium-school, and 29 small-school entries); a narrative summary reported 16 rather than 12 for big schools, so the table value is retained and the discrepancy disclosed. Weighted means and ranks summarized three effectiveness and five competency domains; Kendall's W and chi-square examined concordance. Perceived effectiveness was Much Evident overall (M=4.24): technological skills ranked first (M=4.47), followed by pedagogical knowledge (M=4.27) and content knowledge (M=4.12). Teachers were Much Competent overall (M=4.22), with pedagogical competency highest (M=4.35) and professional competency lowest (M=3.98). All concordance tests for effectiveness and competency domains were reported non-significant. Resource acquisition combined personal devices with the DepEd Computerization Program, DepEd provision, fundraising, and donations. The findings indicate a favorable digital-integration baseline but expose sustainability, equity, technical-support, content-design, and professional-learning needs. Self-report competence and equipment counts do not establish instructional quality or learner gains; resource functionality, actual use, security, accessibility, and outcomes require independent verification.

## 1. Introduction

Technology and Livelihood Education is inherently practical. Learners must understand concepts, observe procedures, plan and create products, practice safely, document work, receive feedback, and apply skills to authentic situations. ICT can enrich these processes through demonstration, simulation, design, assessment, collaboration, and access to current information.

Technology does not improve instruction by its presence alone. The technological pedagogical content knowledge framework positions effective integration at the intersection of subject matter, pedagogy, and technology (Mishra & Koehler, 2006). A teacher must judge whether a tool represents the skill accurately, supports practice and feedback, fits available infrastructure, and protects learner safety and privacy.

Digital competence includes operational skill but extends to communication, collaboration, content creation, assessment, inclusion, ethics, data protection, troubleshooting, professional learning, and critical selection of tools. The Philippine Professional Standards for Teachers situate ICT within broader expectations for content knowledge, pedagogy, learning environments, diversity, assessment, community linkages, and professional growth (Department of Education, 2017).

The DepEd Computerization Program seeks to provide appropriate ICT that can improve teaching and learning and raise ICT literacy (Department of Education, 2018). Hardware provision is only one part of a sustainable system: connectivity, electricity, maintenance, technical assistance, licensing, replacement, scheduling, security, and teacher learning determine usable access.

Personal acquisition can close an immediate gap, but dependence on teacher-owned devices transfers public-service costs and risks to individuals. It can also create unequal classroom opportunity when schools or teachers have different purchasing power. An equity analysis should therefore distinguish availability from dependable institutional access.

Self-reported competence provides valuable information about confidence and perceived practice, yet it may differ from demonstrated performance. A teacher can feel confident using presentation software while needing support in designing authentic tasks, accessible materials, valid digital assessment, or secure data routines.

The present study brings together resource inventories and teacher ratings across school size categories. The journal analysis treats this as an implementation baseline and asks how resource provision, pedagogical purpose, competence, professional learning, and governance can be integrated into a coherent district digital-learning strategy.

### *1.1 Research Purpose and Analytical Focus*

The study aimed to describe ICT resources used for TLE; assess teacher-perceived effectiveness in technological skills, pedagogical knowledge, and content knowledge; test concordance in effectiveness rankings; determine competency in technology operations, social, ethical, pedagogical, and professional domains; and test concordance in competency rankings.
The analytical purpose was to identify the difference between equipment availability and meaningful instructional use, and to formulate sustainable, equitable, evidence-informed ICT integration priorities for TLE.

*1.2 Conceptual and Empirical Synthesis*
The analysis uses a resource-to-outcome chain: functional and accessible infrastructure enables use; teacher TPACK supports appropriate selection and task design; ethical and social competence governs participation; professional learning sustains adaptation; and learner evidence determines educational value.
Breaks can occur at any link. A device may be listed but nonfunctional, available but oversubscribed, used but pedagogically weak, instructionally useful but inaccessible, or effective initially but unsustainable without maintenance and replacement.
Concordance statistics identify shared ordering across school categories but do not measure digital equity or effect. Equity requires per-learner access, functionality, scheduling, accessibility, connectivity, and quality-of-use evidence.

## 2. Methodology

A descriptive-evaluative-correlational survey was conducted in Libmanan South District during School Year 2023–2024. The locale was purposively selected and total enumeration was reported for teachers in big, medium, and small schools.
The verified resource table listed 12 big-school, 36 medium-school, and 29 small-school entries, totaling 77 for each of six resource categories. A prose summary elsewhere reported 16 for the big-school group. The table value is used because it produces the displayed total, and the inconsistency is disclosed.
A researcher-made, five-point questionnaire assessed three perceived-effectiveness domains and five competency domains. Weighted means and ranks were computed; Kendall's W and corresponding chi-square assessed agreement in rankings across school categories.
The analysis did not independently test devices, observe lessons, audit access, or measure learner outcomes. Effectiveness and competence therefore refer to teacher perceptions.

Table 1. Research Design, Participants, Measures, and Analysis

| Component | Specification |
|---|---|
| Design and locale | Descriptive-evaluative-correlational survey; Libmanan South District; SY 2023–2024 |
| Coverage | Total enumeration; verified resource table contains 77 cases: 12 big, 36 medium, 29 small |
| Resources | Cell phone, desktop, printer, laptop, multimedia projector, and wide-screen television |
| Measures | Researcher-made five-point effectiveness and competency questionnaire |
| Analysis | Frequency, weighted mean, rank, Kendall's W, and chi-square |

*2.1 Analytical Rigor and Boundaries*
Triangulating resource inventories with competency ratings is a strength because it recognizes that access and expertise are distinct. Separate reporting by school size can reveal context that an overall district mean would conceal.
The resource count discrepancy, reliance on self-report, and absence of functionality, user-to-device ratios, connectivity, maintenance, classroom observation, scale reliability, and learner outcomes limit interpretation. All tables should be reconciled with the raw inventory before journal submission.
Future work should use a standardized asset audit, direct performance tasks, TPACK measures with validity evidence, lesson observations, platform or device-use logs, accessibility checks, digital-safety audits, and subject-specific learner outcomes.

## 3. Results and Discussion

*3.1 ICT Resource Profile and Acquisition*
The verified table recorded six resource categories across 77 cases and multiple acquisition pathways.

Table 2. Verified ICT Resource Entries by School Category

| Resource | Big Schools | Medium Schools | Small Schools | Reported Total |
|---|---|---|---|---|
| Cell phone | 12; personal | 36; personal | 29; personal | 77 |
| Desktop | 12; DCP | 36; DCP/DepEd | 29; DepEd/DCP | 77 |
| Printer | 12; personal | 36; mixed sources | 29; mixed sources | 77 |
| Laptop | 12; mixed sources | 36; mixed sources | 29; mixed sources | 77 |
| Multimedia projector | 12; DepEd | 36; mixed sources | 29; mixed sources | 77 |
| Wide-screen television | 12; mixed sources | 36; mixed sources | 29; mixed sources | 77 |

The profile indicates broad access to common ICT categories, but it also shows substantial reliance on personal devices and mixed acquisition through DCP, DepEd provision, fundraising, and donations. Such diversity can increase availability while complicating standardization, support, licensing, security, and replacement.

A count of one resource per case does not reveal whether it works, is available when needed, can display TLE procedures accurately, has internet access, or is accessible to learners with disabilities. Resource planning should move from nominal counts to functional access and instructional readiness.

The prose-table discrepancy for big schools demonstrates why asset data require validation. Unique asset identifiers, condition, custodian, location, acquisition source, warranty, maintenance history, utilization, and disposal status should be reconciled in a single register.

*3.2 Teacher-Perceived Effectiveness of ICT Use*

Technological skills led the effectiveness profile; content knowledge ranked lowest.

Table 3. Perceived Effectiveness of ICT Use in TLE

| Domain | Mean | Interpretation | Rank |
|---|---|---|---|
| Technological skills | 4.47 | Much Evident | 1 |
| Pedagogical knowledge | 4.27 | Much Evident | 2 |
| Content knowledge | 4.12 | Much Evident | 3 |
| Overall | 4.24 | Much Evident | — |

Operational confidence was the strongest perceived contribution. This can support lesson preparation, multimedia use, communication, and digital assessment, but operational fluency should be treated as a foundation rather than the endpoint of integration.

Pedagogical and content knowledge were favorable but lower. TLE tools and procedures require accurate, safe, and current representation. Teachers need time and support to evaluate sources, model processes, align digital activities with performance standards, and determine when physical practice is indispensable.

The mean differences are modest, so the profile indicates refinement rather than wholesale remediation. Professional learning should focus on the intersection of domains: selecting tools for a precise TLE objective, designing authentic learner activity, giving feedback, and verifying transfer to practical performance.

*3.3 Concordance in Perceived Effectiveness*

No effectiveness domain showed significant concordance across school categories.

Table 4. Kendall Concordance for Perceived Effectiveness

| Domain | W | $\chi^2$ | Reported Decision |
|---|---|---|---|
| Technological skills | .157 | 4.32 | Not significant |
| Pedagogical knowledge | .555 | 14.85 | Not significant |
| Content knowledge | .346 | 9.45 | Not significant |

The school categories did not consistently order the specific indicators within the three domains. Differences in resource reliability, subject specialization, connectivity, class size, and professional-learning access may shape local priorities.

Non-significant concordance is not evidence that school categories are equivalent. The analysis should be supplemented by functionality and access metrics, observed TLE tasks, and effect-size reporting.

*3.4 Teacher ICT Competencies*

Pedagogical competence ranked first, while professional competence ranked last.

Table 5. Teacher Competencies for ICT-Integrated TLE

| Competency Domain | Mean | Interpretation | Rank |
|---|---|---|---|
| Pedagogical | 4.35 | Much Competent | 1 |
| Social | 4.27 | Much Competent | 2 |
| Ethical | 4.26 | Much Competent | 3 |
| Technology operations and concepts | 4.10 | Much Competent | 4 |
| Professional | 3.98 | Much Competent | 5 |
| Overall | 4.22 | Much Competent | — |

The leading pedagogical rating suggests that teachers perceived themselves as able to integrate technology into lesson design and assessment. Independent review should determine whether tasks promote authentic TLE problem solving and creation rather than passive viewing.

Social and ethical competencies were strong but require continuous updating. Digital citizenship in TLE includes respectful collaboration, copyright and attribution, privacy, secure handling of learner records, safe online sourcing, and critical evaluation of technical information.

Professional competence ranked last. Sustainable integration requires peer learning, experimentation, reflection, sharing of resources, mentoring, and adaptation to changing tools. A district professional-learning community can reduce isolation and dependence on informal troubleshooting.

*3.5 Concordance in ICT Competency Rankings*

All five competency domains were reported non-significant.

Table 6. Kendall Concordance for Teacher ICT Competencies

| Competency Domain | W | $\chi^2$ | Reported Decision |
|---|---|---|---|
| Technology operations and concepts | .316 | 8.53 | Not significant |
| Social | .329 | 8.87 | Not significant |
| Ethical | .288 | 7.76 | Not significant |
| Pedagogical | .110 | 2.96 | Not significant |
| Professional | .277 | 7.47 | Not significant |

The absence of significant concordance indicates context-dependent ranking of competency indicators. Pedagogical competence had the lowest W despite the highest mean, illustrating again that a favorable average can coexist with disagreement about which practices are strongest.

District development should establish a common minimum digital-competence framework while differentiating technical assistance by school conditions. Evidence should include demonstrated tasks, lesson artifacts, peer review, and learner work rather than self-rating alone.

*3.6 Integrated Interpretation of the Findings*

The district has a favorable base of resources and perceived competence, but nominal availability is sustained through a patchwork of institutional and personal acquisition. The system needs a lifecycle approach to access, maintenance, security, replacement, and equitable allocation.

Technological skills led perceived effectiveness, while pedagogical competence led the competency profile. Content knowledge and professional competence were relatively lower, indicating a need to deepen discipline-specific design and continuous learning.

Non-significant concordance across every effectiveness and competency domain suggests that implementation priorities vary by school category. Common standards should therefore be accompanied by differentiated technical assistance and verified local needs.

The central policy shift is from equipment provision to meaningful use. Each ICT investment should be tied to a TLE learning objective, a feasible classroom task, accessibility and safety requirements, teacher support, maintenance, and evidence of learner performance.

**4. Conclusions and Implications**

*4.1 Conclusions*

The verified resource table represented 77 cases across six ICT categories, with substantial personal and mixed-source acquisition. A conflicting big-school count requires reconciliation.

Perceived effectiveness was Much Evident overall (M=4.24), led by technological skills. None of the three domains showed significant concordance.

Teachers were Much Competent overall (M=4.22), with pedagogical competence highest and professional competence lowest. All five competency concordance tests were non-significant.

The findings support sustained TPACK-oriented professional learning, functional access audits, and stronger governance. They do not demonstrate that ICT use caused improved TLE achievement.

*4.2 Study Limitations*

The cross-sectional design describes conditions during the stated school year and cannot establish temporal or causal effects. Ratings of effectiveness, competence, or implementation are therefore interpreted as respondent perceptions rather than independently verified improvements in learner performance.

The principal measures were researcher-made, self-report scales. Social desirability, recall, common-method variance, and differences in interpretation of the response anchors may have influenced the estimates. Classroom observation, document review, learning-resource audits, and learner-level outcome data were not incorporated into the principal analyses.

Kendall's W evaluates concordance in the ordering of indicators. It does not test a respondent-level causal relationship between program implementation and competence, nor does it show that a higher-rated practice produced a learner outcome.

The resource inventory contained a discrepancy between a narrative big-school count and the verified table, and it did not document device functionality, sharing ratios, connectivity, accessibility, security, maintenance, actual use, or total cost of ownership.

*4.3 Implications for Practice and Policy*

Maintain a validated asset lifecycle register covering functionality, user access, location, custodian, warranty, maintenance, utilization, replacement, and disposal.

Reduce inequitable dependence on teacher-owned devices through school-provided minimum packages and transparent needs-based allocation.

Use TPACK-oriented lesson study to connect TLE content, authentic pedagogy, digital tools, assessment, and practical performance.

Provide continuing support for troubleshooting, digital safety, privacy, copyright, accessibility, and critical evaluation of online technical information.

Evaluate ICT investments through observed use and learner artifacts, not only procurement counts or favorable perception ratings.

## 5. Policy and Implementation Priorities

Table 7. Sustainable ICT Integration Framework for TLE

| Priority Area | Recommended Direction | Expected Evidence |
|---|---|---|
| Functional access | Audit condition, connectivity, scheduling, accessibility, and user-to-device availability. | Validated asset and access dashboard |
| Equity | Allocate institutional equipment from documented need and reduce personal-device dependence. | Needs index; allocation and reach report |
| TPACK | Run content-specific lesson study on authentic TLE tasks and performance assessment. | Lesson artifact; observation; learner product |
| Technical support | Establish fault reporting, response time, preventive maintenance, and replacement cycles. | Ticket log; uptime; maintenance record |
| Digital governance | Standardize privacy, security, attribution, licensing, and safe-use procedures. | Audit checklist; incident and remediation log |
| Evaluation | Connect resource use with engagement, task quality, practical skill, and achievement. | Usage evidence; rubric scores; outcome trend |

## 6. Directions for Future Research

Use standardized functionality and access audits, including per-learner ratios, uptime, connectivity, accessibility, and total cost of ownership.

Validate teacher digital-competence and TPACK measures and compare self-ratings with demonstrated performance and classroom observation.

Test specific ICT-supported TLE lessons using objective performance rubrics, retention, transfer, and implementation-fidelity evidence.

Investigate how school size, infrastructure, specialization, and technical support explain differences in resource use and competency priorities.

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