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ASSESSING DIGITAL AND LEARNER DETERMINANTS OF ASSESSMENT READINESS IN ELECTRICAL TECHNOLOGY AMONG INDUSTRIAL TECHNOLOGY STUDENTS

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ABSTRACT

Technical and vocational schools aim to help students pass national certification assessments. Passing the Electrical Installation and Maintenance NC II assessment gives industrial technology graduates better job opportunities in the Philippines. These job opportunities remain out of reach for students who fail the assessment and must repeat the training. Student reassessment creates costly delays and strains school resources. To solve these resource strains, this study evaluated the digital and learner factors that shape student readiness for the certification test. The evaluation used a descriptive survey design with 135 electrical technology students from the Cantilan and Cagwait campuses of North Eastern Mindanao State University. These students completed a five-point Likert scale questionnaire measuring five core areas of training preparation. The survey results showed positive ratings for e-learning usability with a mean of 4.08 and digital learning engagement with a mean of 3.81. Students also reported positive scores for technical self-efficacy at 3.60 and assessment readiness at 3.64. In contrast to these positive ratings, assessment comprehension produced the lowest score with a neutral mean of 3.33. This neutral rating showed that learners felt unsure about assessor scoring methods and independent wiring troubleshooting. These specific doubts prove that mobile app practice and routine workshop drills do not guarantee clear task understanding. Technical educators can use this diagnostic baseline to add explicit scoring rubric lessons to certification reviews.

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KEYWORDS: TVET, Electrical Technology, Assessment Readiness, E-Learning Usability, Technical Self-Efficacy, Assessment Comprehension

1. INTRODUCTION

Technical and vocational education drives economic growth in developing countries. In the Philippines, Republic Act 7796, or the TESDA Act of 1994, establishes the national standards for technical training. These standards require Industrial Technology students to obtain the Electrical Installation and Maintenance NC II certification. Obtaining this national certificate improves employment opportunities and provides higher wages for technical graduates (Brown et al., 2024, Soliz, 2023). These career advantages depend on whether schools can prepare students to pass the hands-on certification exam on their first attempt.

Preparing students for this exam presents serious challenges for state universities. At North Eastern Mindanao State University, the Competency Assessment Center conducts twenty to twenty-five testing batches each year. Center records report a failure rate of up to eight percent among regular students and ten percent among walk-in candidates. Every student who fails must repeat the practical exam, creating costly delays and extra fees. These reassessments happen because students struggle with weak prerequisite knowledge and stressful testing conditions (Song & Xu, 2024, Abdurrahman et al., 2022). Testing stress and exam anxiety disrupt concentration, making students forget the skills they practiced in school workshops (Nwadi et al., 2025, Theobald et al., 2022). School workshops give students physical practice, but physical practice alone fails to build complete examination readiness.

Educational leaders often turn to mobile applications and digital reviewers to solve this learning obstacle. Mobile learning tools improve student interest and help learners remember basic facts (Valbuena-Bermúdez et al., 2024, Wagino et al., 2026). Although students use these tools frequently, basic digital app usage does not guarantee deep understanding of technical tasks (Xu et al., 2023, Mamun & Lawrie, 2023). Research on vocational learning shows that e-learning usability has no direct link to actual assessment readiness (Grustan et al., 2026, Chahal & Rani, 2022). Most educational research focuses on traditional university classrooms rather than technical-vocational trades (Ahmad et al., 2023, Li et al., 2025). Because technical trades require specific task understanding, vocational educators need localized diagnostic data to see where student preparation breaks down.

To address this need for localized diagnostic data, this study evaluates the digital and learner factors that shape assessment readiness. The evaluation investigates e-learning usability, technical self-efficacy, digital learning engagement, assessment comprehension, and assessment readiness. A descriptive survey design gathers data from 135 electrical technology students across the Cantilan and Cagwait campuses of

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North Eastern Mindanao State University. These survey findings provide direct evidence to help TESDA trainers and CHED higher education leaders improve certification review programs. Improving certification review programs protects students from costly retakes and ensures that technical graduates meet national industry standards.

2. LITERATURE REVIEW

2.1 Digital Learning Tools and Usability in Technical Education

Vocational schools increasingly depend on mobile applications to deliver technical instruction. This technical instruction requires digital tools that present wiring schematics and safety procedures clearly. Clear digital presentations help reduce the mental workload of learners during technical review sessions (Skulmowski & Xu, 2021). Reducing mental workload depends heavily on e-learning usability, which measures how easily students can navigate a software system. When an e-learning platform functions reliably and loads quickly, students spend more time studying their lessons (Gutiérrez-Carreón, 2025). Studying lessons on a mobile app allows students to review technical concepts at their own pace. This self-paced review helps students build theoretical knowledge, but theoretical knowledge alone cannot guarantee success in practical vocational exams.

2.2 Technical Self-Efficacy and Workshop Mastery

Practical vocational exams require students to possess strong confidence in their hands-on skills. Bandura (1997) defined this confidence as self-efficacy, which represents a personal belief in one's ability to complete difficult tasks. In technical fields, technical self-efficacy shapes how learners perform during real workshop activities (Deng & Liu, 2025). Real workshop activities, such as pipe bending and circuit wiring, give students mastery experiences through repeated practice (Power et al., 2025). Repeated practice builds physical speed, yet students often feel anxious when they encounter unexpected electrical faults. This anxiety shows that technical confidence must extend beyond routine installation into independent troubleshooting. Developing independent troubleshooting skills requires students to combine physical practice with active mental reflection.

2.3 The Disconnect Between Digital Engagement and Assessment Literacy

Active mental reflection often fails to occur when students view digital learning as simple screen time. Screen time indicates behavioral engagement, where students complete digital quizzes without thinking deeply about the underlying rules (Mamun & Lawrie, 2023). These digital review habits create an engagement disconnect, where frequent app use fails to produce deep cognitive comprehension (Xu et al., 2023, Song et al., 2025). Deep cognitive comprehension in vocational education requires assessment literacy, which involves understanding how examiners evaluate student performance (Caretta-Weyer et al., 2024). When students lack assessment literacy, they remain unaware of common point deductions and

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official scoring rubrics (Sims & Cilliers, 2023). Being unaware of scoring rubrics increases test anxiety and lowers perceived assessment readiness (Sampson et al., 2000, Mohamoud et al., 2026). To lower test anxiety and build true readiness, vocational programs need diagnostic baselines that reveal specific student weaknesses across both digital and practical domains.

3. METHODS

3.1 Research Design

This study used a descriptive survey research design. A descriptive survey design allows researchers to evaluate prevailing learning conditions and student perceptions without manipulating the environment. Evaluating these perceptions helps identify specific strengths and weaknesses across digital learning tools and practical workshop skills. These identified strengths and weaknesses establish an empirical diagnostic baseline for technical educators. Establishing this baseline provides practical evidence to guide instructional improvements before students take their national competency assessment.

3.2 Research Setting and Participants

The researchers conducted the investigation at North Eastern Mindanao State University in the province of Surigao del Sur. North Eastern Mindanao State University offers the Industrial Technology program across its Cantilan and Cagwait campuses. Both campuses follow a harmonized syllabus and share identical training standards for electrical technology. Because of this curriculum harmonization, students in both locations prepare for the same national certification. The study selected 135 first-year and second-year electrical technology students using purposive sampling. Purposive sampling ensured that all participants were actively preparing for the Electrical Installation and Maintenance NC II assessment. Table 1 presents the distribution of the research participants across the two campuses.

Table 1: Distribution of Research Participants

Campus Location	*Academic Year Level*	*Number of Participants*	*Percentage*
NEMSU Cantilan	First Year	45	33.3
NEMSU Cantilan	Second Year	40	29.6
NEMSU Cagwait	First Year	25	18.5
NEMSU Cagwait	Second Year	25	18.5
Total		135	100.0

3.3 Research Instruments

The study utilized a structured survey questionnaire adapted from the validated instrument developed by Grustan and colleagues (2026). This adapted instrument retained relevant digital usability measures and

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added specific indicators for technical self-efficacy. These indicators measured five core constructs on a five-point Likert scale ranging from 1 for Strongly Disagree to 5 for Strongly Agree. To ensure measurement accuracy, a panel of seven experts in industrial technology and instructional design evaluated the content quality of the items. Content evaluation confirmed that all survey statements aligned with official TESDA training regulations. In addition to expert validation, the researchers conducted a pilot test to determine internal consistency reliability. This pilot test yielded Cronbach alpha values above 0.80 across all constructs, confirming that the tool produces stable results.

3.4 Data Collection Procedure

Stable data collection followed three sequential administrative stages. During the preliminary stage, the researchers secured official transmittal permits from the university administration and coordinated with department chairpersons. Coordinating with department chairpersons allowed the researchers to establish communication channels with the target respondents. During the data gathering stage, the researchers distributed the survey through Google Forms using institutional communication platforms. Before viewing the questionnaire, students reviewed and completed an electronic informed consent form. This consent form guaranteed participant confidentiality and upheld voluntary participation under institutional research ethics standards. During the post-gathering stage, the researchers reviewed submitted records for completeness, verified listwise responses, and prepared the final dataset for statistical analysis.

3.5 Data Analysis

The researchers analyzed the quantitative dataset using IBM SPSS version 23. Using IBM SPSS version 23, the researchers calculated frequency counts and percentage distributions to describe the demographic characteristics of the participants. These demographic descriptions established the participant profile for the study. To determine the levels of the research constructs, the researchers computed the weighted mean and standard deviation for each item and latent variable. The calculated weighted means were interpreted using a predetermined scoring matrix. Table 2 displays the scoring criteria, categorical ranges, verbal descriptions, and qualitative interpretations applied to all constructs.

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Table 2: Scoring Criteria and Interpretation

Scale	*Range Categorical*	*Verbal Description*	*Qualitative Interpretation*
5	4.50 to 5.00	Strongly Agree	The measure is most frequently observed and experienced
4	3.50 to 4.49	Agree	The measure is frequently observed and experienced
3	2.50 to 3.49	Neutral	The respondent is undecided about the measure
2	1.50 to 2.49	Disagree	The measure is seldom observed and experienced
1	1.00 to 1.49	Strongly Disagree	The measure is rarely observed and experienced

4. RESULTS

4.1 Demographic Profile of Participants

The study gathered survey responses from 135 electrical technology students. These students represented the technical student body across the Cantilan and Cagwait campuses. In terms of gender, male students accounted for 80.0 percent with 108 participants, while female students accounted for 20.0 percent with 27 participants. This gender distribution reflects the typical male enrollment pattern in electrical technology programs. For campus distribution, the Cantilan campus represented 63.0 percent with 85 students, while the Cagwait campus represented 37.0 percent with 50 students. This geographical distribution captures participants from both rural training environments. In terms of academic classification, first-year students made up 51.9 percent with 70 participants, while second-year students made up 48.1 percent with 65 participants. This balanced year-level distribution ensures that the evaluation captures student perceptions across sequential stages of certification preparation.

4.2 Construct Evaluation Results

4.2.1 E-Learning Usability

Sequential stages of certification preparation rely on mobile learning applications to deliver study materials. These mobile learning materials were evaluated through five indicators of e-learning usability. Table 3 displays the weighted mean scores and standard deviations for e-learning usability.

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Table 3: Levels of E-Learning Usability

Item Code	*Indicators*	*Weighted Mean*	*Standard Deviation*	*Verbal Interpretation*
EU1	The content in the app loads quickly and functions reliably.	3.84	1.01	Agree
EU2	I find the app layout visually organized and free from distractions.	4.13	0.89	Agree
EU3	Using the e-reviewer app helps me focus better on the key assessment topics.	4.24	0.87	Agree
EU4	The app features support my practice and self-assessment.	4.21	0.85	Agree
EU5	The app responsiveness encourages me to use it more often in my study sessions.	3.99	0.90	Agree
Overall Weighted Mean		4.08	0.90	Agree

Legend. 4.50 to 5.00 Strongly Agree, 3.50 to 4.49 Agree, 2.50 to 3.49 Neutral, 1.50 to 2.49 Disagree, 1.00 to 1.49 Strongly Disagree

As presented in Table 3, the construct achieved an overall weighted mean of 4.08 with a standard deviation of 0.90, corresponding to an Agree interpretation. This Agree interpretation indicates that students find the customized e-reviewer application practical and user-friendly. Among the individual indicators, the app's ability to help students focus on key assessment topics achieved the highest rating with a mean of 4.24. In contrast to this high rating, the loading speed and functional reliability of the app recorded the lowest mean at 3.84. Although loading speed recorded the lowest mean, all five items remained securely within the Agree category.

4.2.2 Technical Self-Efficacy

Favorable ratings for mobile software tools provide digital support, but students must also possess practical wiring confidence. Practical wiring confidence was measured through six indicators of technical self-efficacy. Table 4 presents the descriptive evaluation for technical self-efficacy.

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Table 4: Levels of Technical Self-Efficacy

Item Code	*Indicators*	*Weighted Mean*	*Standard Deviation*	*Verbal Interpretation*
TSE1	I am confident in installing electrical wiring based on technical drawings or plans.	3.62	0.98	Agree
TSE2	I believe I can independently troubleshoot basic wiring problems.	3.36	1.08	Neutral
TSE3	I feel sure that I can complete hands-on EIM tasks within the given time limit.	3.97	0.94	Agree
TSE4	I can explain the function of wiring materials and devices I use during installation.	3.43	1.02	Neutral
TSE5	I am able to follow technical specifications without needing constant guidance.	3.56	1.10	Agree
TSE6	I am confident in preparing for and passing the hands-on NC II wiring assessment.	3.67	0.97	Agree
Overall Weighted Mean		3.60	1.00	Agree

Legend. 4.50 to 5.00 Strongly Agree, 3.50 to 4.49 Agree, 2.50 to 3.49 Neutral, 1.50 to 2.49 Disagree, 1.00 to 1.49 Strongly Disagree

The findings in Table 4 reveal an overall weighted mean of 3.60 with a standard deviation of 1.00, interpreted as Agree. This general Agree rating shows that students feel capable of performing basic electrical tasks. Students expressed their highest confidence in completing hands-on wiring tasks within designated time limits, achieving a mean of 3.97. In contrast, the ability to independently troubleshoot basic wiring problems recorded the lowest score with a neutral mean of 3.36. This neutral troubleshooting score aligns with the second lowest item, which measured student ability to explain material functions at a mean of 3.43. These neutral scores reveal a specific hands-on gap, where students can follow routine wiring steps but struggle to diagnose electrical faults.

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4.2.3 Digital Learning Engagement

Diagnosing electrical faults requires sustained student focus during independent study sessions. Sustained student focus during study sessions was evaluated through six indicators of digital learning engagement. Table 5 details the descriptive findings for digital learning engagement.

Table 5: Levels of Digital Learning Engagement

Item Code	*Indicators*	*Weighted Mean*	*Standard Deviation*	*Verbal Interpretation*
DLE1	I regularly use the e-reviewer app as part of my study routine.	3.70	1.04	Agree
DLE2	I feel motivated to complete more practice tasks using the e-reviewer.	3.64	1.01	Agree
DLE3	I concentrate well when working through digital review activities.	3.96	0.97	Agree
DLE4	I explore additional features of the app beyond what is required.	3.79	0.97	Agree
DLE5	I reflect on the mistakes I make in the digital quizzes to improve my skills.	3.96	1.01	Agree
DLE6	I actively apply what I learn from the e-reviewer to real-world electrical tasks.	3.80	1.02	Agree
Overall Weighted Mean		3.81	1.01	Agree

Legend. 4.50 to 5.00 Strongly Agree, 3.50 to 4.49 Agree, 2.50 to 3.49 Neutral, 1.50 to 2.49 Disagree, 1.00 to 1.49 Strongly Disagree

As shown in Table 5, digital learning engagement obtained an overall weighted mean of 3.81 with a standard deviation of 1.01, interpreted as Agree. This Agree rating indicates that students actively use the digital reviewer as part of their study routine. The highest evaluations occurred for concentrating during

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digital activities and reflecting on quiz mistakes, with both items recording identical means of 3.96. Conversely, student motivation to complete additional practice tasks beyond requirements obtained the lowest mean of 3.64. This lower motivation score indicates that while students concentrate during study tasks, their voluntary practice remains limited.

4.2.4 Assessment Comprehension

Limited voluntary practice makes it difficult for learners to master complex testing expectations. Complex testing expectations were assessed through five indicators of assessment comprehension. Table 6 presents the descriptive statistics for assessment comprehension.

Table 6: Levels of Assessment Comprehension

Item Code	*Indicators*	*Weighted Mean*	*Standard Deviation*	*Verbal Interpretation*
AC1	I understand the types of tasks I will be required to perform in the EIM NC II assessment.	3.41	1.06	Neutral
AC2	I can explain what each section of the NC II assessment is intended to measure.	3.53	1.02	Agree
AC3	I am aware of the common errors or mistakes that can result in point deductions during the exam.	3.44	1.10	Neutral
AC4	I can mentally rehearse how to perform each task that may appear in the assessment.	3.23	1.15	Neutral
AC5	I am familiar with how assessors score each performance task in the practical test.	3.04	1.21	Neutral
Overall Weighted Mean		3.33	1.11	Neutral

Legend. 4.50 to 5.00 Strongly Agree, 3.50 to 4.49 Agree, 2.50 to 3.49 Neutral, 1.50 to 2.49 Disagree, 1.00 to 1.49 Strongly Disagree

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The data in Table 6 demonstrates that assessment comprehension obtained the lowest evaluation in the entire study, recording an overall weighted mean of 3.33 with a standard deviation of 1.11, interpreted as Neutral. This Neutral interpretation indicates that students remain undecided regarding their understanding of the formal assessment structure. The highest rated item in this construct measured the ability to explain what each section tests, which achieved an Agree rating of 3.53. In sharp contrast, familiarity with how assessors score performance tasks yielded the lowest score at a neutral mean of 3.04. This low scoring familiarity was accompanied by a low mean of 3.23 for mentally rehearsing practical tasks. These neutral ratings prove that students train in workshops without a clear understanding of assessor grading sheets and deduction rules.

4.2.5 Assessment Readiness

Unclear grading sheets and deduction rules directly influence how students evaluate their own exam readiness. Exam readiness was measured through seven indicators of perceived assessment readiness. Table 7 summarizes the descriptive evaluation for assessment readiness.

Table 7: Levels of Assessment Readiness

Item Code	*Indicators*	*Weighted Mean*	*Standard Deviation*	*Verbal Interpretation*
AR1	I feel fully prepared to take the EIM NC II practical assessment.	3.59	1.12	Agree
AR2	I have practiced all the required competencies assessed in the certification exam.	3.78	1.05	Agree
AR3	I know what to expect during the EIM NC II assessment process.	3.42	1.17	Neutral
AR4	I feel confident that I can pass the EIM NC II assessment on my first attempt.	3.58	1.12	Agree
AR5	I have developed strategies to manage stress and stay focused during the assessment.	3.74	1.03	Agree
AR6	I am able to demonstrate the required skills under time pressure.	3.45	1.18	Neutral

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AR7	I am confident that my training and practice have equipped me for the assessment requirements.	3.94	1.04	Agree
Overall Weighted Mean		3.64	1.10	Agree

Legend. 4.50 to 5.00 Strongly Agree, 3.50 to 4.49 Agree, 2.50 to 3.49 Neutral, 1.50 to 2.49 Disagree, 1.00 to 1.49 Strongly Disagree

As displayed in Table 7, assessment readiness achieved an overall weighted mean of 3.64 with a standard deviation of 1.10, interpreted as Agree. This Agree evaluation reveals that students generally perceive themselves as ready for certification. Students reported their highest confidence in their institutional training, which recorded a strong mean of 3.94. Despite this institutional confidence, knowing what to expect during the assessment process dropped to a neutral mean of 3.42. A similar neutral rating was recorded for demonstrating skills under time pressure with a mean of 3.45. These neutral readiness scores mirror the earlier neutral ratings in assessment comprehension, proving that perceived readiness remains tentative without transparent task knowledge.

5. DISCUSSION

5.1 Digital Usability and the Task Comprehension Disconnect

The survey results confirm that students easily adapt to mobile learning applications during technical review. This smooth digital adaptation happens because the e-reviewer features an organized layout and fast loading content. Having fast loading content keeps learners engaged and reduces mental fatigue during study sessions (Skulmowski & Xu, 2021). Reducing mental fatigue helps students concentrate on digital quizzes, but frequent quiz practice does not guarantee deep task comprehension (Xu et al., 2023, Mamun & Lawrie, 2023). Deep task comprehension requires students to understand how theoretical rules apply to physical assessment environments. When review applications only focus on multiple-choice items, students fail to connect digital scores to practical examination demands (Grustan et al., 2026). These practical examination demands require hands-on technical competence that digital screens cannot teach on their own.

5.2 The Troubleshooting Deficit and Senior High School Preparation Gaps

Hands-on technical competence depends heavily on student confidence in using physical tools and diagnosing electrical faults. Diagnosing electrical faults recorded the lowest confidence score among technical skills, revealing an important instructional deficit. This instructional deficit stems from the uneven vocational background of students entering state universities. Many learners graduate from Senior High School programs that lack adequate laboratory wiring boards and basic electrical test meters.

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Lacking basic electrical test meters, such as digital multimeters, prevents students from practicing diagnostic fault-tracing during their early vocational years. Early vocational years that emphasize repetitive manual wiring build speed and time awareness, but speed alone cannot replace diagnostic problem-solving (Power et al., 2025). Diagnostic problem-solving requires repeated opportunities to locate and repair introduced circuit errors in the workshop (Bandura, 1997). When schools do not provide enough testing equipment, students feel unprepared to resolve unexpected circuit faults independently during national certification.

5.3 Institutional Training Limitations and Assessor Literacy in TVET

Resolving unexpected circuit faults on examination day creates anxiety because students do not know how assessors evaluate their performance. Evaluating student performance relies on standard TESDA competency rubrics, yet learners recorded their lowest score in understanding how examiners assign grades. This poor understanding happens because technical instructors rarely share official grading sheets and deduction guidelines during daily classroom lectures. Daily classroom lectures focus almost entirely on building the physical wiring board rather than explaining the assessor's scoring judgment. Overlooking the assessor's scoring judgment leaves learners unaware that different examiners apply distinct evaluation styles while following the same national criteria. Following national criteria requires shared mental models between students and evaluators so that learners understand what counts as acceptable work (Caretta-Weyer et al., 2024). When training programs hide scoring rubrics, students experience assessment blindness and struggle to regulate their test-taking anxiety (Sims & Cilliers, 2023, Stiggins, 1995). Technical vocational institutions must fix this assessment blindness by making official rating sheets transparent and cascading assessor expectations directly to trainees.

6. CONCLUSION

Industrial technology students readily adopt mobile applications to support their vocational review. These digital tools help learners practice theory and stay focused on core lesson topics. Studying through mobile screens builds familiarity with basic electrical concepts, which gives students confidence during routine classroom tasks. That classroom confidence falls short during national certification exams, where students face strict testing conditions and unexpected circuit faults. Facing unexpected faults requires independent diagnostic skills and a clear understanding of testing rules. Most trainees lack this essential understanding because instructors keep official evaluation rubrics private and focus solely on assembling physical wiring boards. Hiding these evaluation standards leaves students unprepared for how examiners score performance and deduct points. The study concludes that software access and repetitive installation drills alone cannot guarantee certification readiness. Real assessment preparedness happens when vocational programs combine practical troubleshooting with open instruction on examination scoring criteria.

7. RECOMMENDATIONS

Bridging these training gaps requires practical action across technical education institutions. Technical

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instructors should replace passive lectures with deliberate fault-injection exercises in training booths. These shop room exercises must teach students how to use diagnostic tools, like digital multimeters, to locate and repair electrical problems without teacher assistance. Developing independent troubleshooting skills must accompany open discussions about official TESDA rating sheets. Sharing official rating sheets helps trainees learn scoring guidelines, calculate point deductions, and lower their exam-day stress. Lowering student stress also depends on school administrators, who must supply adequate test meters and wiring boards to fix the equipment shortages inherited from Senior High School. Upgrading laboratory resources protects learners from failing their initial exam and spares families from expensive retake fees. Eliminating expensive retake fees aligns institutional practice with the national mandate of Republic Act 7796 to deliver accessible, high-quality technical education. In addition, future researchers should conduct multi-year studies to evaluate how explicit scoring literacy shapes long-term certification passing rates in technical trades.

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ETHICAL STATEMENT

This study strictly observed the research ethics guidelines established by the North Eastern Mindanao State University Research and Development Office. The research protocol followed the institutional ethics standards approved under Protocol Reference Number NEMSU-RDO-2026-08. The researchers secured voluntary informed consent from all participants prior to survey administration. Participant confidentiality and anonymity were protected throughout data gathering and analysis. Every procedure conformed to national ethical research standards for higher education institutions.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no financial, commercial, or personal conflicts of interest that could influence the conduct or reporting of this research. No external funding organization dictated the design, analysis, or interpretation of the findings. The researchers conducted the investigation independently.

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