

Teaching Strategies and Learning Satisfaction among Adult Learners in a Photovoltaic Systems Installation NC II Community-Based Technical-Vocational Training Extension Program: A Survey Study

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ABSTRACT

Community-Based Technical-Vocational Training (CBTVT) extension programs play a significant role in equipping adult learners with practical competencies that enhance employability, entrepreneurship, and sustainable livelihood opportunities. The effectiveness of these programs is influenced by the teaching strategies employed by instructors to address the diverse learning needs and experiences of adult learners. This study examined the relationship between teaching strategies and learning satisfaction among adult learners participating in the Photovoltaic Systems Installation NC II Community-Based Technical-Vocational Training Extension Program held in Barangay Tambidao, Bacarra, Ilocos Norte, with the assistance of TESDA Ilocos Norte and La Union Tek-Bok Training Provider, Inc. Specifically, it determined the level of implementation of teaching strategies, assessed the level of learning satisfaction among adult learners, and examined the relationship between these variables. The study employed a quantitative cross-sectional survey research design involving 50 adult learners aged 18 years and above who were selected through total enumeration sampling. Data were gathered using a researcher-developed questionnaire that underwent expert validation and reliability testing. The data were analyzed using weighted mean, standard deviation, and Pearson Product-Moment Correlation. The findings indicated that the teaching strategies employed by the instructors were rated as very highly implemented ($M = 4.54$, $SD = 0.45$), with hands-on practical activities and demonstration methods receiving the highest ratings. Likewise, the respondents reported a very high level of learning satisfaction ($M = 4.53$, $SD = 0.44$). Furthermore, a statistically significant positive relationship was found between teaching strategies and learning satisfaction ($r = 0.71$, $p = 0.001$). This finding indicates that higher levels of perceived implementation of teaching strategies were associated with higher levels of learning satisfaction among adult learners. The findings underscore the importance of strengthening competency-based and experiential instructional practices in community-based technical-vocational training extension programs.

Keywords: *Adult learners, community-based extension programs, teaching strategies, learning satisfaction, technical-vocational education, Photovoltaic Systems Installation NC II.*

INTRODUCTION

Community-Based Technical-Vocational Training (CBTVT) extension programs have become an essential strategy for promoting lifelong learning, workforce development, and community empowerment. In the Philippines, higher education institutions are mandated under Republic Act No. 7722 to implement extension

services that address the educational and socio-economic needs of communities. Through technical-vocational extension programs, adult learners acquire practical competencies that improve their employability, entrepreneurial capabilities, and overall quality of life. Among these initiatives, the Photovoltaic Systems Installation NC II program has gained increasing importance due to the growing demand for skilled workers in the renewable energy sector and the country's commitment to sustainable energy development.

Adult learners differ significantly from traditional students in terms of their learning characteristics, motivations, and educational needs. Knowles (1984) proposed the Theory of Andragogy, which explains that adults are self-directed learners who bring rich personal and professional experiences into the learning environment. They prefer learning experiences that are immediately relevant, problem-centered, and applicable to real-life situations. Consequently, instructors facilitating community-based technical-vocational education programs are expected to employ learner-centered and competency-based teaching strategies that promote active participation and meaningful learning.

Teaching strategies play a vital role in determining the effectiveness of technical-vocational education. Experiential approaches such as demonstration, hands-on practical activities, project-based learning, cooperative learning, and problem-based learning have consistently been recognized as effective instructional methods for developing technical competencies (Kolb, 2015). These strategies encourage learners to actively participate in the learning process while enhancing critical thinking, technical proficiency, and workplace readiness. Likewise, Biggs and Tang (2018) emphasized that effective instruction occurs when teaching strategies, learning activities, and assessment methods are constructively aligned with the intended learning outcomes.

Learning satisfaction is an important indicator of educational quality and program effectiveness. It reflects learners' perceptions of instructional quality, relevance of learning experiences, classroom environment, and achievement of learning outcomes (Elliott & Healy, 2001). Previous studies have shown that learner-centered instructional practices positively influence student engagement, motivation, and satisfaction (Fredricks et al., 2019). In technical-vocational education, high levels of learning satisfaction contribute to greater competency development, program completion, and continued participation in lifelong learning initiatives.

Recent studies further support the importance of effective instructional practices in technical and vocational education. UNESCO (2021) emphasized that Technical and Vocational Education and Training (TVET) institutions should adopt flexible, competency-based, and learner-centered pedagogies that respond to the changing needs of industries and communities. Similarly, the Organisation for Economic Co-operation and Development (OECD, 2021) highlighted that adult education programs become more effective when instructional strategies encourage active learning, collaboration, and practical application of knowledge. In addition, the International Labour Organization (ILO, 2022) reported that competency-based training significantly improves employability and workforce adaptability among adult learners, particularly in technical skills development programs.

Within the context of renewable energy education, the delivery of Photovoltaic Systems Installation NC II training requires instructional approaches that integrate theoretical concepts with extensive practical application. Since photovoltaic installation involves electrical safety, system design, equipment handling, and field installation, adult learners benefit more from experiential and hands-on learning activities than from traditional lecture-based instruction. Effective teaching strategies not only facilitate competency acquisition but also enhance learners' confidence and satisfaction throughout the training process.

Despite the growing implementation of community-based technical-vocational extension programs by higher education institutions, empirical studies examining the relationship between teaching strategies and learning satisfaction among adult learners remain limited, particularly within photovoltaic systems installation training. Most existing studies focus on senior high school students, college students, or formal technical-vocational education settings, with relatively little attention given to adult learners participating in university-led community extension programs. Furthermore, limited local evidence exists regarding how instructional practices influence learning satisfaction in renewable energy skills training conducted at the community level.

Recognizing this gap, the present study seeks to examine the relationship between teaching strategies and learning satisfaction among adult learners enrolled in the Photovoltaic Systems Installation NC II Extension Program conducted by TESDA Ilocos Norte in Barangay Tambidao, Bacarra, Ilocos Norte. The findings are expected to provide empirical evidence that can guide instructors, extension coordinators, and higher education institutions in enhancing instructional practices and improving the quality of community-based technical-vocational education extension programs.

Research Questions

This study sought to answer the following questions:

1. What teaching strategies are employed in the Photovoltaic Systems Installation NC II Community-Based Technical-Vocational Education Extension Program?
 - 1.1 Hands-on Practical Activities;
 - 1.2 Demonstration Method;
 - 1.3 Cooperative Learning;
 - 1.4 Problem-Based Learning; and
 - 1.5 Immediate Feedback?
2. What is the level of learning satisfaction among adult learners in the Community-Based Technical-Vocational Education Extension Program?
 - 2.1 Instructional Satisfaction;
 - 2.2 Learning Activities;
 - 2.3 Learning Environment; and
 - 2.4 Skill Development?
3. Is there a significant relationship between the teaching strategies employed and the learning satisfaction of adult learners in the Community-Based Technical-Vocational Education Extension Program?

Hypothesis

H₀: There is no significant relationship between the teaching strategies employed and the learning satisfaction of adult learners in the Community-Based Technical-Vocational Training Extension Program.

Significance of the Study

This study provides empirical evidence to enhance instructional practices in Community-Based Technical-Vocational Training (CBTVT) Extension Programs by examining the teaching strategies employed by instructors and their relationship with the learning satisfaction of adult learners. The findings are expected to contribute to the continuous improvement of instructional delivery, extension services, and competency-based technical-vocational education programs.

For extension instructors and trainers, the study provides evidence-based insights into effective learner-centered and experiential teaching strategies that promote active participation, competency development, and learner satisfaction among adult participants. The findings may assist instructors in selecting instructional approaches that address the unique learning needs and experiences of adult learners while improving the effectiveness of community-based technical-vocational training.

For extension program coordinators and curriculum developers, the findings may serve as a basis for improving extension curricula, instructional materials, competency-based learning activities, and assessment strategies that are responsive to community needs and aligned with industry standards. The study may also

support the enhancement of training modules for Photovoltaic Systems Installation NC II and similar technical-vocational extension programs.

For TESDA Ilocos Norte, the results of this study may provide valuable information for strengthening the planning, implementation, monitoring, and evaluation of community-based technical-vocational education extension programs. The findings may serve as a basis for improving instructional practices and enhancing the quality, relevance, and sustainability of TESDA's community-based training programs.

For community leaders and local government units, the study may provide useful information for developing collaborative extension initiatives that strengthen workforce development, promote sustainable livelihood opportunities, and address the technical skills needs of community members. The findings may also support evidence-based decision-making in planning future community-based technical-vocational training programs.

For adult learners, the study is expected to improve the quality of learning experience by encouraging instructors to adopt teaching strategies that are practical, engaging, and relevant to adult education. Enhanced instructional practices may contribute to greater learning satisfaction, improved technical competencies, increased employability, and better opportunities for entrepreneurship and lifelong learning.

Finally, the study contributes to the growing body of knowledge on Community-Based Technical-Vocational Training Extension Programs, particularly in the field of Photovoltaic Systems Installation NC II. It provides empirical evidence on the relationship between teaching strategies and learning satisfaction among adult learners and may serve as a valuable reference for future researchers conducting studies on adult education, technical-vocational training, extension services, and renewable energy education.

Scope and Limitations of the Study

This study focused on the teaching strategies and learning satisfaction of adult learners participating in the Photovoltaic Systems Installation NC II Community-Based Technical-Vocational Training Extension Program held in Barangay Tambidao, Bacarra, Ilocos Norte, with the assistance of TESDA Ilocos Norte and La Union Tek-Bok Training Provider, Inc. The study involved 50 adult learners aged 18 years and above who participated in the identified training program. Total enumeration sampling was employed, wherein all eligible participants in the accessible population were included as respondents.

The study specifically examined five teaching strategies employed during the training program: hands-on practical activities, demonstration method, cooperative learning, problem-based learning, and immediate feedback. It also assessed the learning satisfaction of adult learners in terms of instructional satisfaction, learning activities, learning environment, and skill development. The study employed a quantitative cross-sectional survey design, using descriptive statistics to determine the levels of teaching strategies and learning satisfaction and Pearson Product-Moment Correlation to examine the relationship between the two variables. These variables and dimensions correspond directly to the study's research questions.

The study is subject to certain limitations that should be considered when interpreting its findings. First, the sample consisted of 50 adult learners who represented the entire accessible population of the identified training program. Although total enumeration ensured the inclusion of all eligible participants, the relatively small and context-specific sample may limit statistical power and the generalizability of the findings to other populations. Therefore, the findings should be interpreted primarily within the context of the participating training program.

Second, the study was conducted in a single community-based technical-vocational training program in Barangay Tambidao, Bacarra, Ilocos Norte. The institutional and community characteristics of the program may differ from those of other training programs, qualifications, communities, and geographic regions. Consequently, the findings should not be assumed to represent adult learners in other technical-vocational training contexts.

Third, both teaching strategies and learning satisfaction were measured using self-report data obtained from the same respondents at a single point in time. This data collection approach may introduce common-method bias and may influence the strength of the observed correlation. Although the researcher-developed questionnaire underwent expert validation and pilot reliability testing, these procedures do not eliminate the possibility of common-method bias. The instrument was reviewed by three experts and pilot-tested with 20 adult learners, obtaining an overall Cronbach's alpha of 0.92, indicating excellent internal consistency.

Fourth, the study relied exclusively on quantitative survey data. This approach was appropriate for measuring the perceived implementation of teaching strategies, determining the level of learning satisfaction, and examining the statistical relationship between the variables. However, quantitative survey data do not provide a detailed account of the personal experiences, motivations, perceptions, and challenges encountered by adult learners during the training program.

Fifth, the cross-sectional correlational design does not permit the establishment of a causal relationship between teaching strategies and learning satisfaction. The statistically significant relationship identified in the study indicates an association between the variables but does not demonstrate that teaching strategies caused changes in learners' satisfaction. Other factors that were not examined in the study may also have influenced learners' satisfaction. This limitation is consistent with the study's research design, which examined naturally occurring relationships without manipulating or controlling conditions.

Sixth, the study collected limited participant demographic information. Although the respondents were described according to their general educational, occupational, and experiential backgrounds, the limited demographic information restricts the ability to examine whether participant characteristics were associated with perceptions of teaching strategies or learning satisfaction.

Finally, the use of self-reported measures of learning satisfaction may be susceptible to social desirability bias, whereby participants may provide more favorable responses than they would under completely independently conditions. The researcher attempted to minimize this possibility by informing participants that participation was voluntary, responses would be treated confidentially and anonymously, and the data would be used solely for academic purposes. Nevertheless, the possibility of response bias cannot be completely excluded. The study's ethical procedures specifically provided for voluntary participation, informed consent, anonymity, confidentiality, and aggregate reporting of results.

METHODS

Research Design

This study employed a quantitative cross-sectional survey research design to examine the relationship between teaching strategies and learning satisfaction among adult learners in the Community-Based Technical-Vocational Training Extension Program. The cross-sectional survey design was utilized to systematically describe the teaching strategies employed by instructors and assess the level of learning satisfaction among adult learners at a single point in time. Since the study aimed to investigate the naturally occurring relationship between the variables without manipulating or controlling any conditions, a quantitative cross-sectional survey design was considered the most appropriate research approach.

According to Creswell and Creswell (2018), a cross-sectional survey research design enables researchers to collect quantitative data from a defined population at a specific point in time to describe characteristics, perceptions, attitudes, and relationships among variables. This design provides a systematic and efficient means of obtaining data that can be analyzed using descriptive and inferential statistical techniques. In the context of this study, the design facilitated the assessment of teaching strategies employed during the implementation of the Photovoltaic Systems Installation NC II Extension Program and their relationship with the learning satisfaction of adult learners. The findings are expected to provide empirical evidence that may serve as a basis for improving instructional practices and enhancing the quality of Community-Based Technical-Vocational Education Extension Programs.

Participants and Sampling

The sample for the study was composed of 50 adult learners, aged 18 years and above, enrolled in the Photovoltaic Systems Installation NC II Community-Based Technical-Vocational Training Extension Program held in Barangay Tambidao, Bacarra, Ilocos Norte with the assistance of TESDA Ilocos Norte and La Union Tek-Bok Training Provider, Inc. The participants were adult learners from varied educational levels, occupations, and experience who chose to join the extension program to gain technical skills in photovoltaic systems installation.

Total enumeration sampling was used for the study since all the fifty (50) adult learners who have successfully enrolled in the extension program were included. Total enumeration sampling technique was considered most suitable since the target population is small enough for all participants to be included in the study.

Research Instrument

A researcher-developed questionnaire served as the primary instrument for data collection in this study. The instrument was developed based on a review of related literature and previous studies on teaching strategies, adult learning, and learning satisfaction in Community-Based Technical-Vocational Training. It was designed to gather information regarding the teaching strategies employed by instructors during the implementation of the Photovoltaic Systems Installation NC II Community-Based Technical-Vocational Education Extension Program and the corresponding level of learning satisfaction among adult learners.

The questionnaire consisted of two major sections. The first section assessed the teaching strategies employed by instructors through 15 questionnaire items grouped into five dimensions, namely: hands-on practical activities, demonstration method, cooperative learning, problem-based learning, and immediate feedback. These dimensions represent learner-centered and competency-oriented instructional approaches commonly applied in technical-vocational education. The items focused on the extent to which instructors provided opportunities for practical performance, demonstrated appropriate procedures, encouraged collaborative learning, presented real-life technical problems, and provided timely and constructive feedback to learners.

The second section measured the learning satisfaction of adult learners through 12 questionnaire items grouped into four dimensions, namely: instructional satisfaction, learning activities, learning environment, and skill development. These dimensions focused on learners' satisfaction with the quality of instruction, relevance and effectiveness of learning activities, conduciveness and safety of the training environment, and development of knowledge, skills, and confidence in performing photovoltaic system installation tasks.

Responses to all questionnaire items were measured using a five-point Likert scale, where 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, and 1 = Strongly Disagree. The scale enabled the respondents to indicate the extent of their agreement with each statement based on their actual experiences during the training program. The responses were quantified using descriptive statistics, particularly the mean and standard deviation, to determine the perceived implementation of teaching strategies and the level of learning satisfaction. Furthermore, the Pearson Product-Moment Correlation Coefficient was used to determine whether a significant relationship existed between teaching strategies and learning satisfaction among adult learners.

Validity and Reliability

To establish the content validity of the research instrument, the questionnaire was submitted to three experts specializing in Technical-Vocational Education, extension services, educational research, and instructional evaluation. The panel of experts evaluated the instrument based on content relevance, clarity of statements, appropriateness of language, organization of items, and alignment with the objectives and variables of the study. Their comments, suggestions, and recommendations were carefully incorporated to improve the overall quality, comprehensiveness, and content validity of the questionnaire before its administration.

Following the validation process, the instrument underwent pilot testing involving 20 adult learners who possessed characteristics like those of the target respondents but were not included in the actual study. The responses obtained during the pilot testing were analyzed using Cronbach's alpha to determine the internal consistency of the questionnaire. The instrument obtained an overall Cronbach's alpha coefficient of 0.92, indicating excellent internal consistency and demonstrating that the questionnaire reliably measured the intended constructs. This reliability coefficient confirmed that the instrument was appropriate for gathering data on teaching strategies and learning satisfaction among adult learners in Community-Based Technical-Vocational Education Extension Programs.

Data Collection Procedure

Prior to the conduct of the study, the researcher secured the necessary approval from TESDA Ilocos Norte and coordinated with the officials of Barangay Tambidao, Bacarra, Ilocos Norte, as well as the program facilitators, to conduct the research during the implementation of the Photovoltaic Systems Installation NC II Community-Based Technical-Vocational Education Extension Program. These arrangements facilitated the smooth administration of the survey questionnaire.

Before administering the questionnaire, the researcher explained the purpose, objectives, and significance of the study to the respondents. The participants were informed that their participation was entirely voluntary and that the information they would provide would be treated with utmost confidentiality and used solely for academic and research purposes. Written informed consent was obtained from all respondents before data collection commenced.

The researcher personally administered the questionnaires to the 50 adult learners to ensure consistency in the data collection process. Clear instructions were provided regarding the proper manner of answering each questionnaire item. During the administration, the researcher addressed participants' questions and clarified any ambiguities to minimize response errors and ensure the completeness and accuracy of the responses. After retrieval of the completed questionnaires, the responses were checked for completeness, encoded into a statistical database, verified for accuracy, and prepared for statistical analysis.

Data Analysis

The data collected in this study were analyzed using appropriate descriptive and inferential statistical techniques to address the research objectives.

The weighted mean and standard deviation were employed to determine the respondents' perceptions of the teaching strategies implemented during the Community-Based Technical-Vocational Education Extension Program and their level of learning satisfaction.

The weighted mean was used to determine the average rating for each indicator and the overall level of the measured variables, while the standard deviation measured the consistency or variability of the respondents' responses.

To determine whether a significant relationship existed between teaching strategies and learning satisfaction, the Pearson Product-Moment Correlation Coefficient (Pearson's r) was utilized. This inferential statistical tool measured the strength and direction of the linear relationship between the two continuous variables and determined whether the observed relationship was statistically significant.

All statistical analyses were performed using a 0.05 level of significance ($\alpha = 0.05$). The null hypothesis was rejected when the computed p-value was less than or equal to 0.05, indicating a statistically significant relationship between teaching strategies and learning satisfaction. Conversely, the null hypothesis was retained when the computed p-value exceeded 0.05, indicating that no statistically significant relationship existed between the variables. The selected level of significance provided a 95% confidence level for interpreting the results and drawing conclusions from the study.

Ethical Considerations

This study was conducted in accordance with established ethical principles governing educational research to ensure the protection of the rights, privacy, dignity, and welfare of all participants. Prior to the conduct of the study, the researcher secured the necessary permissions from the Technical Education and Skills Development Authority (TESDA) Provincial Office–Ilocos Norte, the concerned officials of Barangay Tambidao, Bacarra, Ilocos Norte, and the participants of the study, where the Photovoltaic Systems Installation NC II Community-Based Technical-Vocational Education Extension Program was implemented.

Before administering the questionnaire, the researcher explained the purpose, objectives, procedures, and significance of the study to the adult learners. The respondents were informed that their participation was entirely voluntary and that they had the right to decline participation or withdraw from the study at any time without penalty or prejudice. Written informed consent was obtained from all participants prior to data collection.

To protect the privacy and confidentiality of the respondents, the questionnaire did not require personally identifiable information, such as names or contact details. Instead, responses were coded and treated anonymously throughout the research process. All information collected was used solely for academic and research purposes and was reported only in aggregated form to prevent the identification of individual participants.

The researcher ensured that all accomplished questionnaires and electronic data files were stored securely and were accessible only to the researcher. The collected data was retained only for the period necessary to complete the study and were disposed of properly in accordance with applicable institutional research policies.

Throughout the conduct of the study, the researcher adhered to the principles of respect for people, beneficence, non-maleficence, justice, confidentiality, and research integrity. Furthermore, the data were analyzed, and the findings were reported objectively, accurately, and honestly, without fabrication, falsification, or misrepresentation, thereby upholding the ethical standards of academic and educational research.

RESULTS AND DISCUSSION

This section presents the findings of the study and discusses their implications in relation to the research objectives, relevant theories, and related literature.

Table 1. Teaching Strategies in Technical-Vocational Education

Indicator	Mean	SD	Interpretation
Hands-on Practical Activities	4.72	0.39	Very Highly Implemented
Demonstration Method	4.65	0.42	Very Highly Implemented
Cooperative Learning	4.4	0.47	Highly Implemented
Problem-Based Learning	4.36	0.5	Highly Implemented
Immediate Feedback	4.58	0.45	Very Highly Implemented
Overall Mean	4.54	0.45	Very Highly Implemented

Table 1 presents the respondents' assessment of the teaching strategies employed during the Photovoltaic Systems Installation NC II Community-Based Technical-Vocational Education Extension Program. The findings revealed an overall mean of 4.54 (SD = 0.45), interpreted as Very Highly Implemented, indicating that the instructors consistently employed learner-centered and competency-based teaching strategies throughout the training program.

Among the instructional strategies, Hands-on Practical Activities obtained the highest mean ($M = 4.72$, $SD = 0.39$), followed by the Demonstration Method ($M = 4.65$, $SD = 0.42$) and Immediate Feedback ($M = 4.58$, $SD = 0.45$), all interpreted as Very Highly Implemented. In contrast, Problem-Based Learning recorded the lowest mean ($M = 4.36$, $SD = 0.50$), although it remained within the Highly Implemented descriptive category.

These findings suggest that instructors prioritized experiential and competency-based teaching approaches that actively engaged adult learners in practical learning experiences. Since photovoltaic systems installation requires the development of technical competencies through actual practice, instructors emphasized demonstration and hands-on training to enhance learners' understanding and mastery of essential skills. These findings support Kolb's Experiential Learning Theory (2015), which emphasizes that meaningful learning occurs through concrete experiences followed by reflection and application. Likewise, the results are consistent with Knowles' Theory of Andragogy (1984), which asserts that adult learners acquire knowledge more effectively when learning activities are practical, relevant, and directly applicable to real-life situations.

Table 2. Learning Satisfaction among Adult Learners in the Community-Based Technical-Vocational Education Extension Program

Indicator	Mean	SD	Interpretation
Instructional Satisfaction	4.56	0.43	Very High
Learning Activities	4.48	0.46	High
Learning Environment	4.44	0.48	High
Skill Development	4.63	0.4	Very High
Overall Mean	4.53	0.44	Very High

Table 2 presents the respondents' level of learning satisfaction during the implementation of the Photovoltaic Systems Installation NC II Community-Based Technical-Vocational Education Extension Program. The overall mean of 4.53 (SD = 0.44) indicates a Very High level of learning satisfaction among the adult learners.

Among the indicators, Skill Development received the highest mean ($M = 4.63$, $SD = 0.40$), followed by Instructional Satisfaction ($M = 4.56$, $SD = 0.43$). Meanwhile, Learning Environment obtained the lowest mean ($M = 4.44$, $SD = 0.48$), although it remained within the High descriptive category.

The findings indicate that the extension program successfully met the learning expectations of the adult participants by providing relevant, engaging, and competency-based instructional experiences. The respondents expressed high satisfaction with the opportunities to develop practical skills necessary for photovoltaic systems installation, reflecting the effectiveness of the instructional approaches employed by the trainers. These findings support those of Fredricks et al. (2019), who emphasized that active and learner-centered instructional environments promote greater learner engagement, motivation, and satisfaction. Similarly, UNESCO (2021) emphasized that competency-based technical-vocational education enhances learner participation and contributes to improved learning outcomes, particularly among adult learners.

Table 3. Relationship between Teaching Strategies and Learning Satisfaction

Variables	r-value	p-value	Decision
Teaching Strategies and Learning Satisfaction	0.71	0.001	Reject H ₀

Table 3 presents the relationship between teaching strategies and learning satisfaction among adult learners participating in the Photovoltaic Systems Installation NC II Community-Based Technical-Vocational Education Extension Program. The analysis yielded a Pearson correlation coefficient (r) of 0.71 with a p -value of 0.001, which is lower than the 0.05 level of significance. Consequently, the null hypothesis was rejected, indicating a statistically significant positive relationship between teaching strategies and learning satisfaction.

The correlation coefficient indicates a strong positive relationship, suggesting that as the implementation of effective teaching strategies increases, the learning satisfaction of adult learners also improves. The findings demonstrate that learner-centered instructional approaches, particularly demonstration, hands-on practical activities, immediate feedback, and cooperative learning, contribute significantly to creating meaningful and satisfying learning experiences for adult participants.

These findings support Biggs and Tang's (2018) Constructive Alignment Theory, which posits that learning outcomes improve when teaching strategies, learning activities, and assessment methods are aligned with the intended learning objectives. The results likewise reinforce Knowles' Andragogy Theory, emphasizing that adults achieve higher levels of satisfaction when instructional strategies are relevant to their needs, build upon their prior experiences, and provide opportunities for immediate application of newly acquired knowledge and skills. Furthermore, the findings highlight the importance of continuously strengthening instructional practices within community-based technical-vocational extension programs to enhance learner satisfaction, competency development, and workforce readiness.

CONCLUSION

The findings of this study indicate that learner-centered, competency-based, and experiential teaching strategies were highly implemented in the Photovoltaic Systems Installation NC II Community-Based Technical-Vocational Education Extension Program. Among the teaching strategies assessed, hands-on practical activities, demonstration methods, and immediate feedback received the highest ratings. The adult learners also reported a very high level of learning satisfaction, indicating that they generally perceived the instructional experiences as relevant, engaging, and supportive of their learning needs.

Furthermore, the study revealed a statistically significant positive relationship between teaching strategies and learning satisfaction among the adult learners. This finding suggests that higher ratings of teaching strategy implementation were associated with higher levels of learning satisfaction. However, because the study employed a descriptive-correlational survey design, the relationship should not be interpreted as evidence that teaching strategies directly caused or increased learning satisfaction.

The findings also support the principles of Knowles' Andragogy Theory, which emphasizes the importance of relevant, practical, and experience-based learning for adults, as well as Kolb's Experiential Learning Theory, which highlights learning through concrete experience, reflection, and application. The findings suggest that experiential and adult-centered instructional approaches are particularly relevant in technical-vocational training where learners are expected to engage in practical and competency-based activities.

Overall, the study underscores the importance of sustaining and strengthening learner-centered, competency-based, and experiential instructional practices in Community-Based Technical-Vocational Education Extension Programs. Such practices may help provide learning experiences that are responsive to the needs of adult learners and appropriate to the practical nature of Photovoltaic Systems Installation NC II training. Future studies may further examine these relationships using larger samples, multiple training sites, or mixed-

method and longitudinal designs to provide a more comprehensive understanding of teaching practices, learning satisfaction, and competency development.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are offered:

First, instructors and trainers involved in Community-Based Technical-Vocational Education Extension Programs should continue to strengthen the implementation of learner-centered, competency-based, and experiential teaching strategies, particularly hands-on practical activities, demonstration methods, cooperative learning, problem-based learning, and immediate feedback. These approaches should be consistently integrated into training activities to support positive learning experiences and enhance learner satisfaction among adult participants.

Second, the Technical Education and Skills Development Authority (TESDA) Provincial Office–Ilocos Norte should continue to provide faculty and trainer development programs, capability-building seminars, and specialized training workshops that strengthen pedagogical competencies in adult learning, learner-centered instruction, and competency-based technical-vocational education and training (TVET).

Third, extension program coordinators and curriculum developers should regularly review and update training modules, instructional materials, learning activities, and assessment strategies to ensure that the Photovoltaic Systems Installation NC II Extension Program remains responsive to the learning needs of adult participants and consistent with relevant industry standards and technological developments.

Fourth, the University, in collaboration with local government units, industry partners, and community organizations, should strengthen support for community-based extension programs by ensuring the availability of appropriate training facilities, instructional equipment, photovoltaic installation tools, learning resources, and opportunities for practical learning activities.

Fifth, participant feedback should be regularly gathered and incorporated into program planning, implementation, and evaluation. Such feedback may be used to identify areas for improvement in teaching strategies, learning activities, training environment, and other aspects that may influence learners' satisfaction with the extension program.

Finally, future researchers are encouraged to conduct similar studies involving larger and more diverse groups of adult learners from different community-based technical-vocational education extension programs. Future studies may also employ mixed-methods or longitudinal research designs to examine additional factors associated with learning satisfaction and to gain a deeper understanding of learners' experiences in community-based technical-vocational education programs.

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