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Specialized and Non-Specialized Teaching Strategies on TVL Students' Technical Skill

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***Abstract*—** *This study investigates the relationship which exists between teachers teaching strategies and student practical skill development. The relationship between teaching strategies and TVL students' technical skills need systematic understanding to determine the best instructions that lead to qualified technical-vocational students. The connection between the teachers' profile, their teaching strategies, and the technical skills of TVL students was established using a descriptive correlational research approach. The study's respondents were the 100 Public Senior High School Teachers in the Division of Cabuyao, Calamba, and Laguna for the Academic Year 2024–2025. Frequency counts established the distribution patterns for demographic characteristics of TVL teachers according to their profiles. The percentage is used to represent the distribution pattern of subjects according to their demographic traits. The weighted mean technique measures the general teacher response about different TVL students' technical skills. The standard deviation serves to measure the distribution range of TVL teachers' ratings from the weighted mean. Pearson Product-Moment Correlation Coefficient (Pearson r) was applied to test the significant relationship between the independent variables (utilization of different teaching strategies such as Hands-on Learning and Project-Based Learning) and the dependent variables (students' technical skills such as technology proficiency, data literacy, hands-on skills, information and communication skills, and use of technology). Research findings show TVL teachers used an extensive range of teaching methods extensively. Most TVL teachers selected hands-on learning as their key instructional method by conducting experiential tasks that mirror professional tasks. According to teacher assessment student technical skills are mostly in the moderate to high range. The students applied information technology tools proficiently during academic assignments in their classroom environment. Student data literacy capability was emerging even though learners needed additional practice to master these skills. Statistical analysis show no significant link between teaching position, subject specialization, experience duration and training participation of TVL teachers and their students' technical skill development since the measured p-values went beyond 0.05. Student technical skill development does not seem to be directly affected by teacher professional background after considering the teacher growth derived from their experience. The research established that multiple teaching strategies led to substantial improvement in students' technical skills. The research confirms teaching strategies matter intensely in technical-vocational education since teacher classroom activities directly determine student success in technical competency development.*

***Keywords*—** *Instructional Strategies, Technical-Vocational Education, Practical Skill Development, Experiential Learning, Project-Based Instruction.*

I. INTRODUCTION

Graduates of K-12 schools mastered flexible skills and relevant attitudes which enable them to create innovative solutions for modern society needs. Using TVL track combined competencies of practical skills with social skills and knowledge enables self-sufficiency. The country will achieve sustainable economic growth through individual access to TVL training opportunities because these programs create economic productivity in communities (Paladio & Buayan, 2023).

Teachers in the TVL Senior High face challenges in selecting appropriate teaching methods and strategies due to the diverse subfields within Technical-Vocational-Livelihood Education. According to Okolie, et.al, (2021) teachers' technical expertise along with instructional methods directly impacts students' learning outcomes. There are many ways to categorize teachers in technical-vocational and livelihood education, such as by their personality traits, teaching methods, techniques, and classroom experience. Although some classifications are based on qualities that all teachers share, it is important to understand that "teaching style" is different from "approach" or "strategy." In Technical-Vocational-Livelihood (TVL) education, the instructional level is dependent on the combination of teachers' technical understanding and effective teaching strategies. By skillfully combining these teaching strategies with strong technical skills, TVL educators can provide high-quality instruction that prepares students for successful careers in their chosen fields through effective teaching strategies.

Senior High Schools under the Division of Cabuyao, Calamba, and Laguna are well known for their implementation of quality education differentiated through a complete Technical Vocational and Livelihood (TVL) track. Thus, it becomes the mission of the school to provide sufficient over-technical skills and develop the talent of young, talented students. Let them perform well in jobs in which they become interested.

The study considers TVL instructor teaching style, categorizing their approaches as either specialized or general, and their relationship to the technical skills required for the position. Specialized instructional approaches particularly developed to meet the demands of technical-vocational education include simulation activities, workplace immersion, and competency-based training.

1.1 Statement of the Problem

Problem/s which were addressed by the research

This study aimed to examine the relationship between specialized and non-specialized teaching strategies on TVL students' technical skills in the Division of Cabuyao,

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Calamba, and Laguna: Specifically, it sought to answer the following questions:

1. What is the of profile respondents in terms of:
   1.1. Position;
   1.2. Specialization/Major;
   1.3. Years in Teaching TVL subjects; and
   1.4. Trainings Attended?
2. To what extent do teachers utilize teaching strategies in terms of:
   2.1. Hands on Learning;
   2.2. Project-Based Learning;
   2.3. Real World Connection;
   2.4. Scaffolded Instruction; and
   2.5. Competency based Learning?
3. What is the level of TVL students' technical skill in term of:
   3.1. Technology Proficiency;
   3.2. Data Literacy;
   3.3. Hands-on Skills;
   3.4. Information and Communication Skills; and
   3.5. Use of Technology?
4. Is there a significant relationship between profile of the teachers and TVL Students' Technical Skills?
5. Is there a significant relationship between Utilizing different Teaching Strategies of the teachers and TVL Students' Technical Skills?

II. Methodology

A descriptive correlational research design was used to determine the relationship of profile of the teachers and Teachers Teaching Strategies and TVL Students' Technical Skills. The respondents of the study were the (100) Public Senior High School Teachers in the Division of Cabuyao, Calamba and Laguna for the Academic Year 2024-2025. Frequency counts established the distribution patterns for demographic characteristics of TVL teachers according to their profiles. The percentage is used to represent the distribution pattern of subjects according to their demographic traits. The weighted mean technique measures the general teacher response about different TVL students' technical skills. The standard deviation serves to measure the distribution range of TVL teachers' ratings from the weighted mean. Pearson Product-Moment Correlation Coefficient (Pearson r) was applied to test the significant relationship between the independent variables (utilization of different teaching strategies such as Hands-on Learning and Project-Based Learning) and the dependent variables (students' technical skills such as technology proficiency, data literacy, hands-on skills, information and communication skills, and use of technology).

III. Results and Discussion

This part deals with the presentation of the gathered data based on the research questions, the analysis and interpretation relative to the sub problem and hypothesis stated on the first chapter.

Profile of the Respondents

In this study, the profile of the respondents was described in terms of position, specialization, years in teaching Technical-Vocational-Livelihood (TVL) subject and trainings attended and was determined by frequency and percentage.

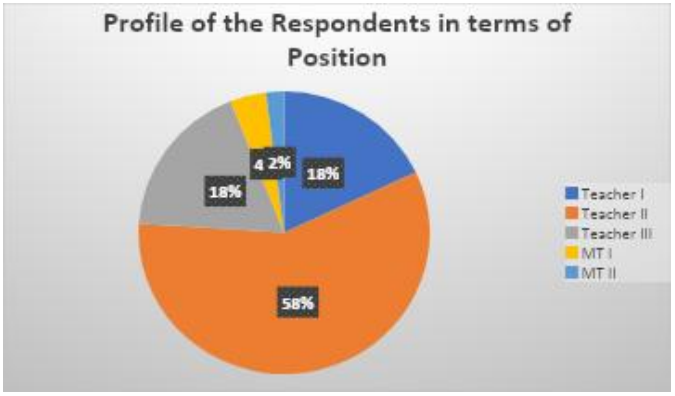

Figure 1. Respondent` profile in terms Positions

Figure 1. Shows the profile of the respondents in terms of teaching position which consists of teaching ranks such as Teacher I, Teacher, II, Teacher III, Master Teacher I and Master Teacher II.

As shown, the population was outnumbered by those in the Teaching II position which consists 58% of the one hundred (100) respondents. This gives implication that most respondents are in the mid-level position who are in the process of gaining more experiences and qualifications to be able to advance into Teacher III or Master Teacher ranks.

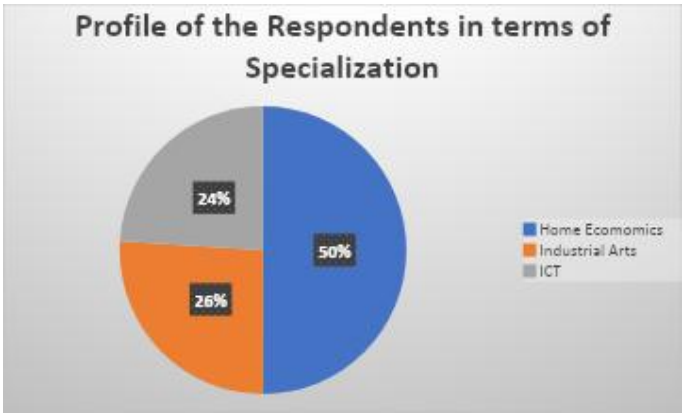

Figure 2. Respondent` profile in terms Specialization

Figure 2 displays the specialized categories of the respondents across different subject areas. Among the total respondents 50% teach Home Economics subjects because more than half the Technical-Vocational-Livelihood (TVL) teachers in this study specialize in household management and culinary arts fields.

The data shows Home Economics at 50% whereas Industrial Arts stands at 26% and Information and Communications Technology (ICT) occupies 24% of the total respondents. These teaching specializations demonstrate an even representation because the Technical-Vocational-Livelihood (TVL) strand has various disciplines yet Home Economics displays the most substantial staff representation.

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The instructional techniques and technical skills that educators utilize differ according to the different specialty areas possibly because of this teaching staff composition.

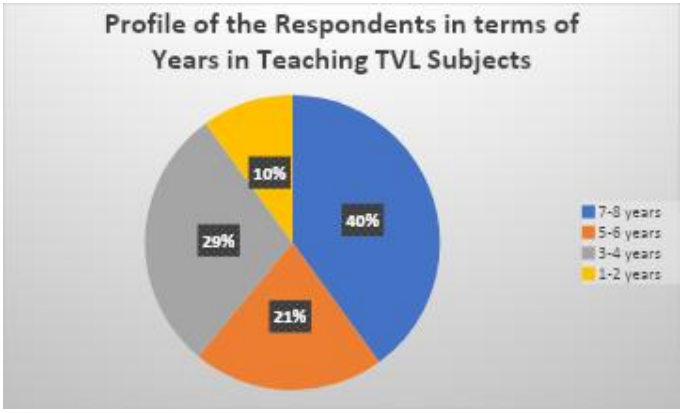

Figure 3. Respondent` profile in terms Years in Teaching TVL Subjects

Figure 3. Shows the profile of the respondents in terms of Years in Teaching TVL Subjects which consists of 1-2 years, 3-4 years, 5-6 years and 7-8 years.

According to the data, the majority of Technical-Vocational-Livelihood (TVL) subjects utilize teachers with seven to eight years of expertise. The substantial proportion of teachers who have been in their field for three to four years and five to six years lends credence to the observations. Since early-career teachers only make up 25% of the workforce, a professional mix of instructors with 1-2 years or more of experience supports workforce stability. Analysis must assess how experience levels of the teaching workforce impact curriculum implementation within Technical-Vocational-Livelihood (TVL) as well as teaching quality and student results.

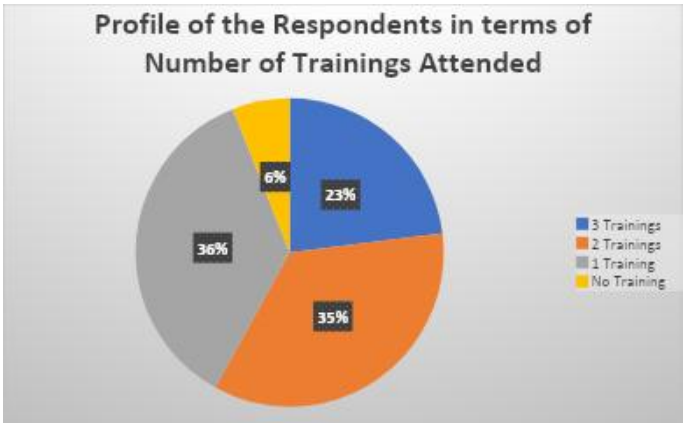

Figure 4. Respondent` profile in terms Number of Trainings Attended

Figure 4. Shows the profile of the respondents in terms of Years in Number of Trainings Attended which consists of No Training, 1 Training, 2 Training and 3 Training Attended.

The data shows one training attendance by 36% of respondents indicating that training exposure exists among a considerable portion of the surveyed population yet their training depth or frequency remains unknown. Engagement with training intensified for a substantial number of respondents as demonstrated by the people who underwent two trainings (35%). Twenty-three percent of respondents engaged in three trainings which established them as the most involved section according to training data. Among the surveyed participants a minority group (6%) stated no involvement in any training activities despite the study relevance. The survey indicates different amounts of training program engagement showing that most participants received training but their frequency of attendance differs from each other.

Extent of Teachers' Utilization of Teaching Strategies

In this study, the Extent of Teachers' Utilization of Teaching Strategies was described in terms of hands-on learning, project-based learning, real-world connection, scaffolded instruction and competency-based learning and was determined by the mean and standard deviation.

TABLE 1. Extent of Teachers' Utilization of Teaching Strategies in terms of Hands-on Learning

STATEMENT	Mean	SD	Remarks
I feel confident in using hands-on learning strategies to teach the assigned subject	4.15	0.48	Agree
I believe the students retain skills and knowledge better through concrete hands-on teaching methods	4.05	0.55	Agree
I believe hands-on learning prepares students for real-world applications	4.14	0.45	Agree
I believe incorporating more hands-on learning strategies into my teaching helps student to get a higher competency rating	4.15	0.43	Agree
I believe hands-on learning strategies should be further integrated into the TVL curriculum	4.21	0.48	Strongly Agree
Grand Mean		4.14	
SD		0.48	
Verbal Interpretation		High	

As presented in Table 1, the extent of teachers' utilization of teaching strategies in terms of hands-on learning was high obtaining a grand (M=4.14, SD=0.48). This indicates respondents' agreement that the hands-on experiences greatly enhance students learning.

The result showing high means proves that Teachers demonstrated a strong sense of confidence in implementing hands-on teaching methods since their responses averaged 4.15 with standard deviation at 0.48. Teachers exhibit strong agreement on the topic since the standard deviation value remains low. According to teacher perception (mean = 4.05, SD = 0.55) student academic retention improves better when education methods involve concrete hands-on learning activities because experiential learning techniques work best for student outcomes. The teachers strongly endorsed (mean = 4.14, SD = 0.45) the capability of hands-on learning to make students ready for real-world application because it effectively closes the gap between educational theory and practical implementation. The survey with teachers reveals that they agreed (mean = 4.15, SD = 0.43) that student performance improves when hands-on teaching methods receive additional implementation in the classroom.

This finding demonstrates how student achievement is positively affected by interactive forms of learning activities. The statement regarding integrating hands-on learning more

deeply into the Technical-Vocational-Livelihood (TVL) curriculum received the most agreement (4.21, SD = 0.48) from teachers which demonstrates their strong commitment to hands-on education in the curriculum. The strong belief of teachers in hands-on teaching strategies along with their educational success and readiness outcomes is shown through a grand mean of 4.14 and standard deviation of 0.48. The Technical-Vocational-Livelihood (TVL) curriculum should incorporate more hands-on learning resources since teachers expressly endorse this instructional method.

As stated in the study of Ekwueme et. Al. 2015 titled The Impact of Hands-On-Approach on Student Academic Performance in Basic Science and Mathematics Hands-on-approach has been proposed as a means to increase students' academic achievement and understanding of scientific concepts by manipulating objects which may make abstract knowledge more concrete and clearer.

TABLE 2. Extent of Teachers' Utilization of Teaching Strategies in terms of Project-based Learning

STATEMENT	Mean	SD	Remarks
I employ project-based learning as a teaching approach within my classroom every day	3.82	0.41	Agree
Project based learning encourage active students' engagement and participation	3.89	0.40	Agree
I feel confident in implementing project-based activities in my subject area	3.65	0.52	Agree
I feel that students demonstrate a deeper understanding of concepts through the completion of projects	3.98	0.32	Agree
I use rubrics or clear criteria to assess student performance during project-based learning	3.89	0.44	Agree
Grand Mean		3.85	
SD		0.44	
Verbal Interpretation		High	

As presented in Table 2, the extent of teachers' utilization of teaching strategies in terms of Project-based Learning was high obtaining a grand (M=3.85, SD=0.44). Most teachers confirm (M = 3.82, SD = 0.41) their regular usage of project-based learning (PBL) for daily instruction which demonstrates widespread PBL implementation across classrooms.

The data distribution with low standard deviation shows that teachers answered uniformly regarding this topic. Teachers strongly agreed (mean = 3.89, SD = 0.40) that PBL promotes active student participation which makes it effective for creating an interactive learning setting. A substantial number of teachers reported being confident about PBL implementation with a rating of mean 3.65 and SD of 0.52 but the measurement variances compared to other statements suggest varying levels of trust in practical PBL delivery. The teachers' belief in PBL effectiveness for improving student concept comprehension is demonstrated as they strongly agreed (mean = 3.98, SD = 0.32) about students achieving better conceptual understanding after completing projects. A powerful agreement exists between teachers about the newsletter benefit as shown by the small standard deviation measurement. The assessment process during PBL relies on rubrics or clear criteria as teachers confirmed their use through an agreement (mean=3.89, SD=0.44).

The grand mean of 3.85 with standard deviation of 0.44 indicates that teachers extensively use PBL while maintaining positive assessments regarding student engagement and understanding and evaluation processes. The structured application of PBL strategies receives support from consistent rubric use even though implementation confidence shows moderate variations.

As stated by Almulla, (2020) in the study, The Effectiveness of the Project-Based Learning (PBL) Approach as a Way to Engage Students in Learning", examined how educational literature needs a shift from curriculum development to teaching practices. Teacher educators conducted research to demonstrate the requirement for pedagogies that create authentic learning experiences especially for students who have experienced historical disparities. The teaching method known as Project-Based Learning (PBL) stands out as a researched method that enhances educational quality through active student participation and teacher development of student-focused teaching approaches. Academic researchers view PBL as a revolutionary teaching method because it strengthens student learning and prepares them to use knowledge in authentic situations.

TABLE 3. Extent of Teachers' Utilization of Teaching Strategies in terms of Real-World Connection

STATEMENT	Mean	SD	Remarks
I regularly integrate real world examples and scenarios into my lessons	3.88	0.43	Agree
I encourage students to explore career pathways related to their field of study through real world connections.	4.06	0.42	Agree
I make conscious effort to connect classroom learning with real world challenge problems, or situations	4.05	0.38	Agree
Incorporating real world connections into my lessons helps students understand the relevance of their studies to future employment.	4.06	0.40	Agree
I believe more collaboration with local industries and business would help strengthen the real-world connections in my teaching	3.99	0.48	Agree
Grand Mean		4.01	
SD		0.43	
Verbal Interpretation		High	

Table 3, Shows the extent of teachers' utilization of teaching strategies in terms of Real-world Connection was high obtaining a grand (M=4.01, SD=0.43). Most teachers showed confirmation (mean = 3.88, SD = 0.43) about their regular usage of real-world scenarios throughout their teaching practices because they find such examples helpful for classroom content connection to practical settings. The teachers made it clear (mean = 4.06, SD = 0.42) that they promote their students to find connections for exploring career pathways which align with their academic subjects and real-world learning. Educational professionals committed to linking classroom education to real-world problems to make learning valuable through practical issue engagement with 4.05 points on average among teachers and standard deviation of 0.38. Real-world connections receive solid agreement from teachers (mean = 4.06, SD = 0.40) because they enable students to see the career connections in their academic curriculum. Most teachers indicated their support (mean =

3.99, SD = 0.48) for business and industry partnerships which would enhance real-world connections in their classroom teaching because they understand the value of external collaboration.

Teacher connection efforts to real-world contexts show a high distribution level with a grand mean of 4.01 alongside a standard deviation of 0.43. Teachers who took part specified their active efforts to link educational content with practical settings while promoting career development together with industrial partnerships to increase the real-world educational value.

This indicates respondents' agreement that Real-World Connection teaching strategy enhances student learning by linking academic concepts to real-life situations. It ensures that education is meaningful, engaging, and applicable, helping students see the relevance of what they learn.

As stated by Genovia, (2024) in the study, Effects of Mathematics Relating to Real-World Connection to the Performance of Grade IX Students of MSU- Buug Laboratory High School, Buug, Philippines, the real-life connections into classroom instruction to enhance student learning outcomes and engagement. Highly rated teacher uses real- life connections in the classroom to make the learning experience fun, engaging, and meaningful to optimize engagement and learning. This involves moving away from lecture – based lessons and making lessons interesting and interactive. Students need to be shown concrete examples and see how academic topics relate to them; thus, making the concepts less abstract and scary. The teacher can talk about their experiences, bring up current events or ask students to talk about family values or beliefs. The teacher must bring a face to the subject and demonstrate how students can apply what they have learned in the classroom to real- life or potential future career.

TABLE 4. Extent of Teachers' Utilization of Teaching Strategies in terms of Scaffolded Instruction

STATEMENT	Mean	SD	Remarks
I used scaffolded instruction to gradually supports students as they develop new skills and concepts.	3.97	0.50	Agree
I provide students with clear and explicit instructions during the initial stages of learning new skills or concepts.	3.64	0.56	Agree
I provide opportunities for students to practice new skills with guidance before expecting them to perform independently	3.76	0.53	Agree
I use questioning techniques to guide students thinking and help them solve problems as they learn	3.84	0.50	Agree
I provide feedback to students during the learning process to help them improve their performance.	3.41	0.58	Agree
Grand Mean	3.72		
SD	0.57		
Verbal Interpretation	High		

Table 4, shows the extent of teachers' utilization of teaching strategies in terms of Scaffolded Instruction is high obtaining a grand (M=3.72, SD=0.57). Most teachers indicated their agreement with scaffolded instruction through supporting students during their skill and concept development (mean = 3.97, SD = 0.50). This demonstrates that teachers show coherence in employing scaffolded methods for student learning support. The study participants demonstrated agreement (mean = 3.64, SD = 0.56) concerning their use of explicit instructions in setting clear guidelines for new skill acquisition during the learning onset. The mean score stands slightly lower than the first statement but the larger standard deviation indicates inconsistent execution of this practice. Teaching professionals agreed (mean = 3.76, SD = 0.53) that they let students practice new skills under guidance before expecting independent work showing recognition of essential support before students achieve independent competency. Most of the teachers (mean = 3.84, SD = 0.50) use questioning methods for student thinking guidance that promotes problem-solving as well as deeper understanding through scaffolding.

Results indicate teachers expressed the lowest level of consensus (mean = 3.41) concerning feedback provision while displaying the widest range of opinions (SD = 0.58) about this practice during student learning. The observed high utilization level of scaffolded instructional approaches can be summarized by the grand mean value of 3.72 together with its standard deviation of 0.57.

The data indicates that most teachers actively support student learning by providing progressive help and clear directions and guided practice as well as feedback but feedback practices show some variation between educators.

Audu and Abuh, (2024) in their study entitled Effect of Scaffolding Teaching Strategy on Students' Academic Achievement in Science Education in Kogi emphasized the use of scaffolding as a teaching strategy helps to boost the overall achievement of students in the class, it aids meaningful learning of science education concepts and finally helps boost the average performance of students in the class.

TABLE 5. Extent of Teachers' Utilization of Teaching Strategies in terms of Competency-Based Learning

STATEMENT	Mean	SD	Remarks
I use competency-based learning to focus on students' mastery of specific skill or competency	4.18	0.48	Agree
I regularly assess students' progress based on their ability to demonstrate competency in specific tasks.	3.96	0.68	Agree
I provide students with opportunities to demonstrate their competencies through practical tasks or projects.	4.08	0.58	Agree
I provide clear criteria or rubrics for students to understand how their competencies will be assessed.	4.08	0.59	Agree
I adjust my teaching method to ensure students can achieve the required competencies, regardless of their learning pace.	3.69	0.81	Agree
Grand Mean	4.00		
SD	0.66		
Verbal Interpretation	High		

Table 5, shows the extent of teachers' utilization of teaching strategies in terms of Competency based Learning was high obtaining a grand (M=4.00, SD=0.66). The teachers gave strong agreement (mean = 4.18, SD = 0.48) to the use of competency-based learning for focusing on specific skill mastery which supports the fundamental principles of this educational method. Educators revealed their agreement (mean = 3.96, SD = 0.68) regarding the practice of assessing progress through demonstrated competencies although there was some observed variation. The participants strongly

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supported two key components which are enabling students to practice competencies through hands-on tasks (mean = 4.08) and providing students with clear assessment criteria (mean = 4.08). The measured level of variability in teacher practice regarding teaching methods that adapt to unique student learning speeds was 3.69 with a standard deviation of 0.81.

The overall 4.00 grand mean demonstrates teachers embrace competency-based methods strongly yet indicates they can improve their ability to teach students according to their wants.

As stated by, Alkhurayyif (2023), in the study Students' Perceptions of Competency-Based Learning Environment During COVID-19: A Mixed-Methods Approach, Students are more inclined to adopt a system if they feel it offers the appropriate features. Users, on the other hand, will turn to other systems to meet their needs if the system fails to offer the necessary capability. This means that school IT professionals must make sure that the CBL's functionality satisfies the needs of the students. The teacher or other professionals who lead students to utilize the CBL environment have a significant impact on their attitudes and utilization. The effectiveness of CBL systems depends on users experiencing positive interactions with supported platforms that are easy to use together with proactive instructional guidance. Making user-centered systems alongside delivering ongoing professional development for educators serves as a critical requirement to maintain student engagement as well as achievement success in CBL settings.

Level of TVL Students' Technical Skills

In this study, level of students' technical skills when engaging different teaching strategies was described in terms of technology proficiency, data literacy, hands-on skills, information and communication skills, and use of technology and was determined by the mean and standard deviation.

TABLE 6. Level of Students' Technical Skills in terms of Technology Proficiency

STATEMENT	Mean	SD	Remarks
I believe the students are confident in using basic computer programs (e.g., word processors, spreadsheets, and presentation software) while actively participating in different teaching strategies.	3.37	0.64	Moderately Agree
I believe the students regularly use educational technology tools (e.g., simulations, learning management systems, virtual labs) to enhance their learning in my classroom.	3.80	0.57	Agree
I believe the students are comfortable engaging with multimedia resources (e.g., videos, interactive websites, apps) as part of my lessons.	3.52	0.62	Agree
I have observed that students engage better when technology is used to differentiate instruction and address their diverse learning needs.	3.84	0.54	Agree
I have observed that students actively use technology to enhance their learning and project work when encouraged.	3.95	0.46	Agree
Grand Mean		3.70	
SD		0.61	
Verbal Interpretation		High	

Table 6, shows the level of student technical skills when engaging different teaching strategy in terms of Technology Proficiency was high obtaining a grand (M=3.70, SD=0.61). The data showed that teachers believed students demonstrated proficient technological abilities for learning purposes (grand mean 3.70 & standard deviation 0.61). Teachers reported that students effectively utilize technology under supportive circumstances for learning purposes (mean = 3.95, SD = 0.46) as well as for project work (mean = 3.95, SD = 0.46). They also acknowledged improved student engagement from differentiated instruction using technology (mean = 3.84, SD = 0.54). The usage of educational simulation tools and virtual laboratory resources by students was reported at a mean of 3.80 with standard deviation 0.57. Furthermore, the average teacher's comfort level with multimedia materials was 3.52, with a standard deviation of 0.62. Students demonstrated lower confidence in handling basic computer programs since the mean evaluation reached 3.37 while the standard deviation amounted to 0.64.

This aspect indicates a weakness in their technological aptitude. According to teachers' perspective their students demonstrate solid technological capabilities however support for basic digital competence is required.

According to Hamari and Nousiainen (2015) explores teacher use of Game-Based Learning Technologies in their study Why Do Teachers Use Game-Based Learning Technologies? The Role of Individual and Institutional ICT Readiness. Various elements influence how educational institutions implement and use new educational tools according to "The Role of Individual and Institutional ICT Readiness". Teachers' ICT-related understanding and teaching compatibility, their technological self-confidence and organizational technological backing, open-mindedness and value perception of technological educational resources drive their instructional technology integration. The various elements strongly influence how much teachers bring digital tools into their classroom instruction plans.

TABLE 7. Level of TVL Students' Technical Skills in terms of Data Literacy

STATEMENT	Mean	SD	Remarks
I believe the students are comfortable using data to assess their practical skills when engaging with different teaching strategies.	3.86	0.53	Agree
I believe the students demonstrate their practical skills, performance, and learning outcomes more effectively when I regularly collect and analyze data based on their participation in different teaching strategies	3.73	0.56	Agree
I have observed that students are able to use feedback from various assessments (e.g., quizzes, projects, exams) to improve their learning and performance.	3.56	0.59	Agree
I have observed that recognizing trends or patterns in assessment results helps students improve their learning.	3.75	0.55	Agree
I believe that student using data and feedback can help improve their engagement and participation in learning.	3.93	0.45	Agree
Grand Mean		3.77	
SD		0.55	
Verbal Interpretation		High	

Table 7, shows the level of student technical skills when engaging different teaching strategy in terms of Data Literacy was high obtaining a grand (M=3.77, SD=0.55). Most teachers endorsed the notion that students possess capabilities for data-based learning as indicated by a grand mean value of 3.77 and

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standard deviation of 0.55. The research participants noted that students utilize data combined with feedback to enhance their participation levels (mean = 3.93, SD = 0.45) and display comfort when conducting practical skill assessments through data (mean = 3.86, SD = 0.53). The collection of assessment information enables students to notice patterns in results (mean = 3.75, SD = 0.55) and the regular data collection process results in better student achievements (mean = 3.73, SD = 0.56). Teachers rated teaching as the core capability related to feedback usage for development with a modest mean score of 3.56 (SD = 0.59) indicating this aspect needs future improvement focus. Student data literacy abilities demonstrate strength through promoting both their educational achievement and their classroom involvement.

According to Suryadi. et. al. (2020) data literacy is a life skill that must be developed because current problems are often related to data. Individuals are often faced with the problem of evaluating and assessing a phenomenon and making decisions using data. The skills and knowledge necessary for school education are referred to as data literacy. Students need data literacy in order to explore real-world challenges. For students to demonstrate and explain scientific reasoning, they need data literacy. Students who are familiar with data processing activities have learned to solve problems Several research results show that students who are used to collecting, analyzing, and interpreting data can construct evidence-based scientific explanation and reasoning. Data literacy also provides benefits for teachers, both in school administration management and in the learning process. Data literacy helps teachers carry out a consistent and systematic assessment process and supports the decision-making process to provide an overview of student learning outcomes. The quality of education can be enhanced by enhancing the teacher's evaluation approach. Teachers can use data literacy in their teaching methods to enhance learning goals and encourage more student feedback, which can have a positive impact on the learning process and raise student achievement

TABLE 8. Level of TVL Students' Technical Skills in terms of Hands-on Skills

STATEMENT	Mean	SD	Remarks
I believe that incorporating hands-on activities into lessons enhances student engagement and helps develop practical skills.	3.82	0.57	Agree
I believe that providing students with opportunities to practice the skills they learn in real-world contexts through hands-on activities enhances their learning and engagement.	3.81	0.54	Agree
I have observed that practical, hands-on activities help students learn complex skills and concepts based on their participation in different teaching strategies	3.80	0.53	Agree
I believe that student that being assessed through practical tasks and projects helps them demonstrate and improve their hands-on skills	3.41	0.63	Agree
I have observed that assessing students involves not only task completion but also evaluating the quality and precision of their hands-on skills	3.89	0.49	Agree
Grand Mean		3.75	
SD		0.58	
Verbal Interpretation		High	

Table 8, shows the level of student technical skills when engaging different teaching strategy in terms of Hands-on Skills was high obtaining a grand (M=3.75, SD=0.58). The majority of teachers observed students' hands-on competency development through the interaction with various instructional approaches is positively affected by practical assessments and activities. Results show that teachers observed students' practical learning was successful through interactive activities targeting real-life applications (mean = 3.81, SD = 0.54) with 3.75 as the grand mean and 0.58 as standard deviation. The majority of teachers find that practical tasks enable students to learn complex concepts (mean=3.80, SD=0.53) even though they noted more varied perception regarding how well practical assessments enhance student abilities (mean=3.41, SD=0.63). The majority of teachers (mean = 3.89, SD = 0.49) concurred that practical assessment should evaluate both successful completion alongside precise hand-on abilities of students.

The study's results indicate teachers observe positive hands-on abilities in their students especially during assessments which evaluate execution and final quality outcomes. This indicates respondents' agreement that Hands-on Skills Strengthening practical competencies through direct experience produces better knowledge retention. They learn practical workplace skills that ready them for future job opportunities and develop creative abilities with problem-solving talents and critical thinking together with self-assurance through application-based practice.

According to Musharrat, (2020), hands-on learning approaches achieve outstanding results by influencing both student emotions and feelings. Science education experiences improve student learning at various levels through properly planned hands-on activities under qualified teaching leadership. The process of learning occurs through direct participation. The hands-on approach creates a realistic experience that enables students to have a more exciting encounter with the material. Hands-on activities demonstrate diverse characteristics because teachers maintain different levels of organization while students experience varying social-emotional contexts and receive different durations for the activities.

Table 9, shows the level of student technical skills when engaging different teaching strategy in terms of Information and Communication skills was high obtaining a grand (M=3.87, SD=0.51). The teachers reported (mean = 3.88 SD = 0.53) that students demonstrate confidence in handling basic computer applications while also witnessing (mean = 3.87 SD = 0.50) that students learn better through multimedia tool interaction. The integration of ICT tools in student lessons generated two benefits according to teachers: it enhanced learning engagement and it produced improved learning outcomes (mean = 3.85, SD = 0.50). Additionally, teachers used technology tools in laboratory work to advance practical learning effectiveness (mean = 3.86, SD = 0.49). According to teacher respondents' students become better at group collaboration through ICT tool usage (mean = 3.88, SD = 0.52).

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TABLE 9. Level of TVL Students' Technical Skills in terms of Information and Communication Skills

STATEMENT	Mean	SD	Remarks
I believe the students are confidents in using basic computer applications such as word processors, spreadsheets, and presentation software, while actively participating in different teaching strategies	3.88	0.53	Agree
I have observed that students enhance their learning when they regularly engage with multimedia tools.	3.87	0.50	Agree
I believe the student enhance their engagement and learning outcomes when regularly using ICT tools while actively participating in different teaching strategies	3.85	0.50	Agree
I have observed that student enhance their practical learning experience when using ICT in hands on activities.	3.86	0.49	Agree
I believe that student collaborate more effectively on group projects, assignments, and discussions when using ICT tools while actively participating in different teaching strategies	3.88	0.52	Agree
Grand Mean	3.87		
SD	0.51		
Verbal Interpretation	High		

This indicates respondents' agreement that Information and communication skills enhances Students in the present interconnected digital world need. Effective information and communication skills enable students to use various digital platforms and contexts for gathering information before they analyze it followed by evaluation and communication.

Teaching success depends heavily on teachers having strong communication skills and integrating technology in order to fulfill their educational objectives. Khan et al. (2017)'s study, Communication Skills of a Teacher and Its Role in the Development of the Students' Academic Success, examined fundamental communication techniques used in teaching that have an impact on a student's academic progress. Teachers achieve their best teaching results by exercising comprehensive control of four communication skills such as listening and speaking as well as reading and writing. Skilled educators use communication to simplify complex subjects therefore both teachers and students benefit from their knowledge delivery methods which also enables them to maintain classroom order and create lasting student-teacher connections. Educational institutions need flexible teaching systems because their students possess different mental aptitudes that need specific motivators to reach better academic outcomes.

Table 10, shows the level of student technical skills when engaging different teaching strategy in terms of Use of Technology was high obtaining a grand (M=3.78, SD=0.59). Compatible technological devices including computers, projectors, and interactive whiteboards increase student educational outcomes according to teachers (mean = 3.79, SD = 0.59). Educational software assists students in lesson comprehension while engaging them effectively (mean = 3.76, SD = 0.59 and mean = 3.77, SD = 0.63 respectively).

The study participants assigned interactive technology a mean score of 3.78 with 0.56 standard deviation for improving student understanding and participation (mean = 3.78, SD = 0.56) and the ability to facilitate better student collaboration (mean = 3.78, SD = 0.58). The research outcomes demonstrate that educational staff views technological tools as powerful instruments which boost student learning performance and improve their interest and comprehension together with their ability to work jointly.

TABLE 10. Level of TVL Students' Technical Skills in terms of Use of Technology

STATEMENT	Mean	SD	Remarks
I believe that student using basic technology tools such as computers, projectors, and interactive whiteboards enhances their learning experience while actively participating in different teaching strategies.	3.79	0.59	Agree
I believe that student enhances their learning experience and helps them better understand lessons when using educational software.	3.76	0.59	Agree
I have observed that students learning through interactive and engaging lessons using technology enhances their understanding and participation.	3.78	0.56	Agree
I have observed that students who uses technology helps them collaborate more effectively with their peers in learning activities.	3.78	0.58	Agree
I believe that student engage better and understand the lesson more when using educational software while actively participating in different teaching strategies	3.77	0.63	Agree
Grand Mean	3.78		
SD	0.59		
Verbal Interpretation	High		

The repeated agreement among teachers points to a commendable acceptance of technical tools for educational purposes. This indicates respondents' agreement that Use of Technology plays a crucial role in modern education, enhancing students' learning experiences across various teaching strategies.

Starkey (2020) delved into the preparedness of teachers in integrating digital tools into their instructional practice. Teacher preparation for using digital means discerned three main areas of research: generic digital competence focusing on technological skills, digital teaching competence that pays attention to the integration of technology into teaching practice and considering teachers' decisions critically. The third area focused on professional competence in relation to social awareness in student -teacher interactions involving digital technology. Starkey found that research on initial teacher education has mainly focused on student teachers' and teacher educators' competences and the programs highlighting their design.

Significant Relationship Between Teachers' Profile and TVL Students' Technical Skills

To test the relationship between teachers' profile and TVL students' technical skills, data were treated statistically in Minitab 14 using Pearsons R. The major findings were presented in the following table.

Table 11 reveals that teachers' Position, Specialization/Major, Years in Teaching TVL Subject and Trainings Attended do not affect students' technical skills in the five evaluated domains (Technology Proficiency, Data Literacy, Hands-on Skills, Information & Communication Skills and Use of Technology).

The results show a lack of significant linear relationship between teachers' occupational position and students' technical

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aptitude because the correlation coefficients (0.060 to 0.154) remain below 0.5 while the p-values exceed 0.05 (0.249 to 0.554). The relationships between teacher specialization or major fields and student technical competencies measure very weakly at 0.027 to 0.111 and their p-values exceed 0.05 from 0.272 to 0.791 thereby indicating no statistically meaningful connection.

TABLE 11. Significant Relationship Between Teachers' Profile and TVL Students' Technical Skills

Teachers' Profile (IV)	Students' Technical Skills (DV)				
	TP	DL	Hands-on Skills	ICS	UT
Position:					
Pearson Correlation	.060	.084	.154	.116	.077
p-value	.554	.405	.125	.249	.445
N	100	100	100	100	100
Specialization/Major:					
Pearson Correlation	.043	.111	.027	.062	.083
p-value	0.674	.272	.791	.541	.414
N	100	100	100	100	100
Years in Teaching TVL Subject:					
Pearson Correlation	.092	.092	.037	.097	.134
p-value	.363	.363	.715	.338	.184
N	100	100	100	100	100
Trainings Attended:					
Pearson Correlation	.005	.016	.036	.012	.090
p-value	.962	.871	.722	.909	.373
N	100	100	100	100	100

Note: * p < .05

The years of teaching TVL subjects experience by teachers produces no meaningful statistical relationship with student technical ability according to calculation results which show Pearson coefficients between 0.037 and 0.134 and p-values greater than 0.05 (rolling from 0.184 to 0.715). Teachers' attendance of trainings shows no substantial relationship with students' technical abilities because the Pearson correlations fall between 0.005 and 0.090 while their associated p-values exceed 0.05 between 0.373 and 0.962.

The results show that, since all p-values are greater than 0.05, it means that the teachers' profile does not significantly relate to students' acquisition of technical skills. This implies that their position in teaching, field of expertise, experience in teaching TVL subjects, and attendance to trainings may enhance their professional growth however, it may not significantly influence students' skills development. Teacher development receives additional support from qualifications and experience yet some other elements such as pedagogical methods and resource availability tend to impact student technological learning more significantly.

Significant Relationship Between Utilizing Different Strategy and TVL Students' Technical Skills

To test the relationship between utilizing different strategy and TVL students' technical skills, data were treated statistically in Minitab 14 using Pearsons R. The major findings were presented in the following table.

TABLE 12. Significant Relationship Between Utilizing Different Strategy and TVL Students' Technical Skills

Utilizing Different Teaching Strategy (IV)	Students' Technical Skills (DV)				
	Technology Proficiency	Data Literacy	Hands-on Skills	Information & Communication Skills	Use of Technology
Hands-on Learning:					
Pearson Correlation	0.357	0.167	0.096 0.344	0.356	0.247
p-value	0.000*	0.097	100	0.000*	0.013*
N	100	100		100	100
Project-Based Learning:					
Pearson Correlation	0.292	0.189	0.210	0.115	0.006
p-value	0.003*	0.060	0.036*	0.254	0.954
N	100	100	100	100	100
Real-World Connection:					
Pearson Correlation	0.292	0.129	0.027	0.232	0.312
p-value	0.003*	0.202	0.792	0.020*	0.002*
N	100	100	100	100	100
Scaffolded Instruction:					
Pearson Correlation	0.512	0.540	0.094	0.121	0.164
p-value	0.000*	0.000*	0.352	0.230	0.103
N	100	100	100	100	100
Competency based Learning:					
Pearson Correlation	0.429	0.259	0.182	0.427	0.382
p-value	0.000*	0.012*	0.070	0.000*	0.000*
N	100	100	100	100	100

Note: * p < .05

Shown in table 12 is the relationship between utilizing different teaching strategies of the teachers such as Hands-on Learning, Project-Based Learning, Real-World Connection, scaffolded Instruction and Competency based Learning and students' technical skills in five areas such as technology proficiency, data literacy, hands on skills, information and communication skills, and use of technology. The results include the Pearson correlation, p-values, and sample size (N=100) for each relationship.

The results show that, the research demonstrates that multiple important relationships exist between different teaching methods and different student technical competence domains. Studying with hands-on materials creates powerful correlations between Technology Proficiency and Information & Communication Skills and Use of Technology (r=0.357, 0.356, and 0.247 respectively) and p=0.000, 0.000, 0.013). These results demonstrate that regular hands-on learning strengthens the mentioned TVL students' skills.

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The researched variables show no meaningful correlation to Data Literacy (r=0.167, p=0.060) or Hands-on Skills (r=0.096, p=0.344). Students benefit from Project-Based Learning because it creates a positive link between this method and their Technology Proficiency (r=0.292, p=0.003) and Data Literacy (r=0.189, p=0.036). Project-Based Learning fails to relate meaningfully to Hands-on Skills (r=0.210, p=0.060) and Information & Communication Skills (r=0.115, p=0.254) as well as Use of Technology (r=0.006, p=0.954). Students who use Real-World Connection strategies demonstrate better Technology Proficiency (r=0.292, p=0.003) and Use of Technology (r=0.312, p=0.002) but their Data Literacy (r=0.129, p=0.202), Hands-on Skills (r=0.027, p=0.792) and Information & Communication Skills (r=0.232, p=0.036) do not show meaningful relationships.

The relationships between Scaffolded Instruction and Technology Proficiency (r=0.512, p=0.000) and Data Literacy (r=0.540, p=0.000) are positive yet a significant relationship does not exist between this instructional approach and Hands-on Skills (r=0.094, p=0.352), Information & Communication Skills (r=0.121, p=0.230), or Use of Technology (r=0.164, p=0.103).

Competency-Based Learning demonstrates robust correlations between its implementation and educator proficiency in Technology (0.429 and p=0.000) along with Data Literacy (0.259, p=0.012) and Information & Communication Skills (0.427, p=0.000) and Use of Technology (0.382, p=0.000).

Overall, the data above indicates that there is a significant relationship in utilizing different teaching strategies and students' technical skills. This implies that utilizing different teaching strategies like hands-on learning, Project-based Learning, Real-World Connection, Scaffolded Instruction, and Competency based Learning may enhance their professional growth and it may also significantly influence students' skills development. Student achievement in technical subjects increases directly with the number of times these instructional methods get applied to their learning. The analysis shows insufficient evidence of relationships between teaching strategies and their effectiveness at enhancing particular technical capabilities. The research shows how teaching strategies relate to technical skills yet fails to establish cause-and-effect relationships which need comprehensive further investigation.

IV. Conclusion and Recommendations

The challenges faced by TVL teachers in their current teaching processes were identified through the research conducted by the researchers. Based on these findings, the researchers formulated a hypothesis that aligns with the existing teaching practices and challenges encountered by TVL teachers. After a thorough investigation and analysis, the following conclusions were derived from the data and results of the study presented, analyzed and interpreted.

Teachers' professional characteristics and related variables including their position type along with specialization and teaching experience and training attended did not show any meaningful correlation to student technical skill advancement. Evidence demonstrates that teachers' background information has no concrete link to student technological skill development which supports the acceptance of the null hypothesis.

The study establishes a positive link between teacher-employed instructional strategies like hands-on learning and project-based learning with real-world connections and scaffolded instruction and competency-based instruction that improves student technical abilities. The data demonstrates a considerable association between teaching methods and student technical competence thus leading to the rejection of the null hypothesis. The study shows that teaching strategies serve as fundamental components in developing students' competencies which requires strong attention when building better outcomes for technical-vocational education.

Based on the data presented and interpreted in Chapter 4, the following recommendations are put forward.

For TVL Teachers and School Administrators, it suggests that the practice of hands-on, project-based and real-world connected learning techniques by TVL teachers should be strengthened because research shows they produce major improvements in student technical skill acquisition. An educational institution must supply proper tools with equipment along with sufficient instructional time to support TVL.

For Teacher Training Providers and Educational Planners, it recommends that the training of TVL teachers should prioritize understanding effective teaching methods and how to teach to competency rather than solely measuring teachers by their education credentials. Training sessions on modern teaching techniques delivered continuously will enhance classroom performance even more.

For Curriculum Developers and Policymakers, it recommends that the TVL curriculum needs modern educational materials and realistic industry simulations which the administrators and policymakers should properly support to enhance practical skill acquisition.

For TVL Teachers, it recommends that the teachers need to create responsive instruction which caters to students' individual learning needs by implementing flexible adaptive teaching methods to resolve particular skill gaps especially data literacy and communication skill gaps.

For future researchers, it recommends that they should explore additional factors that may influence student skill acquisition, such as student motivation, quality of school facilities, and the role of industry partnerships. Including student perspectives and feedback is also recommended to gain a more holistic understanding of the learning environment and outcomes.

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