

Special Program for Technical Vocational Education (SPTVE) on Industry-Required 21st Century Skills Acquisition: Basis to Strengthen Curriculum and Career Opportunities

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Abstract - The Special Program for Technical Vocational Education (SPTVE) plays a significant role in equipping students with 21st-century technical skills that align with industry demands. This study examined the level of development of industry-required skills integrated into the SPTVE curriculum and explored strategies to strengthen its implementation. Using a descriptive research design, data were gathered from students and teachers through surveys, interviews, and thematic/content analysis of the SPTVE curriculum. Findings indicate that while computer literacy, research projects, and hands-on activities are well-integrated into the curriculum, areas such as industry collaboration, innovation, and entrepreneurial development require further enhancement. The study highlights the need for stronger industry linkages, enhanced teacher training, improved facilities, and expanded work immersion opportunities to ensure that students graduate with competitive technical skills. Based on the results, a strategic plan is proposed to align the SPTVE curriculum with industry requirements, focusing on curriculum enhancement, industry partnerships, faculty upskilling, and competency-based learning. The study concludes that a strengthened SPTVE program will not only improve student employability but also contribute to economic growth and workforce development. Moreover, the study underscores the importance of nurturing soft skills alongside technical competencies. Communication, critical thinking, problem-solving, adaptability, and collaboration emerged as essential attributes that are moderately developed among learners but often overlooked in curriculum delivery. Integrating these 21st-century skills in classroom activities, performance tasks, and assessment frameworks is crucial to producing well-rounded graduates who are not only technically capable but also equipped to thrive in complex, real-world environments. By fostering both hard and soft skills within the SPTVE framework, schools can better prepare learners for diverse career pathways and lifelong learning.

Keywords: *Special Program for Technical Vocational Education, 21st-Century Skills, Industry Collaboration, Curriculum Development, Workforce Readiness.*

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I. INTRODUCTION

The world in which we live is accelerating, complexity is our new reality (Brown, 2015). This is becoming increasingly clear in education and the workplace. People now need to be flexible and innovative to be successful. However, while the idea of success has changed, the education system has not always adjusted its methods or goals to meet it. We are living through a period of rapid modification in an increasing globalized environment, to which education systems need to adapt, not just through an intermittent reform, but continuously. Innovation and technological advances are constantly changing the ways we communicate, work, and live together and education systems

which reflect this dynamic will be most capable of responding effectively to the current and changing needs of young people and society. Education which young people experience should equip them with the kinds of skills that prepare them to live in and shape the society of the future. With this, improvements in education and skills are of utmost importance. Amidst the dynamic environment of the 21st century, traditional concept, skills, and competencies have undergone a radical change. As global integration, technological advancement, and cultural nuances continue to redefine the way we live and work, a new set of essential skills has emerged: the 21st century skills. These skills enfold a diverse range of abilities that empower individuals to flourish in an interconnected world, navigate uncertainties,

and drive innovation. At the heart of the 21st century skills lie the ability to think critically and solve complex problems. In a world inundated with information and rapid changes, individuals must possess the capacity to analyze, evaluate, and synthesize information effectively. Critical thinking enables individuals to make informed decisions, challenge assumptions, and develop innovative solutions to multifaceted challenges. Moreover, problem-solving skills empower individuals to approach problems with creativity and adaptability, fostering a culture of innovation and progress. In an increasingly interconnected world, effective communication and collaboration have become indispensable skills.

Furthermore, collaboration skills enable individuals to work cohesively in teams, leverage collective expertise, and achieve shared goals. By fostering open communication and collaboration, it facilitates the exchange of ideas, the cultivation of diverse perspectives, and the creation of inclusive environments conducive to innovation and growth. 21st century skills emphasize the importance of nurturing creativity and fostering an environment conducive to innovation. Creative thinking enables individuals to approach challenges with fresh perspectives, explore unconventional solutions, and envision possibilities beyond the status quo. Moreover, fostering a culture of innovation encourages experimentation, risk-taking, and continuous improvement, propelling societies forward. As technology continues to redefine every aspect of our lives, digital literacy has become a fundamental skill. Digital literacy encompasses the ability to navigate, evaluate, and utilize digital technologies effectively and responsibly. It promotes critical awareness of the ethical, social, and security implications of technology, empowering individuals to make informed choices and navigate digital environments safely and ethically. Additionally, communication skills play a vital role in ensuring success in both personal and professional contexts. In today's globalized and digitally connected world, the ability to clearly express ideas, listen actively, and engage in meaningful dialogue is crucial across all fields—including technical and vocational careers. Strong communication enables individuals to convey technical information effectively, collaborate with colleagues, resolve workplace challenges, and build productive professional relationships. Within the context of SPTVE, incorporating communication skills into the curriculum is important in preparing learners for real-world interactions, such as presenting project proposals, coordinating with clients, or working within a team. Proficiency in both oral and written communication enhances employability and workplace adaptability, equipping graduates to thrive in various industries. Communication should therefore be considered an integral component of technical-vocational education to ensure learners are not only skilled in their trade but also capable of expressing their knowledge and engaging confidently in diverse settings.

On the other hand, SPTVE is critical components of global efforts to prepare individuals for skilled professions in various industries. These programs are designed to offer specialized training and education that equips learners with

practical skills and knowledge needed to succeed in specific technical fields. From automotive repair to agriculture, electrical installation to computer programming, these programs cater to a wide range of vocational interests and career paths. In response to the evolving demands of the workforce and advancements in technology, countries worldwide are investing in special programs for technical vocational education. These initiatives aim to address skills shortages, promote economic growth, and enhance overall employability. By offering hands-on training, industry-relevant curriculum, and partnership with businesses, these programs bridge the gap between education and employment, ensuring that graduates are well-prepared to enter the workforce or pursue further education. Key features of these programs often include apprenticeships, internships, and cooperative education opportunities, allowing students to gain real-world experience while earning their qualifications. Furthermore, SPTVE promotes inclusivity and diversity by providing pathways for individuals from diverse backgrounds to enter high-demand industries. These programs often accommodate learners of all ages and backgrounds, including those seeking career changes or retraining opportunities. By offering practical training, industry-aligned curriculum, and pathways to employment, these programs contribute to the development of a skilled workforce and the growth of economies around the world.

As we navigate the complexities of a rapidly changing world, investing in the development and integration of 21st century skills are a wise move and never a waste of time. Nowadays, the global economy is driven by innovation, technology, and skilled labor. Hence, cultivating 21st century skills is imperative for personal, professional, and societal advancement. As nations strive for economic advancement and sustainable development, the need for individuals equipped with 21st century skills has never been greater. The national government and policy makers recognize the strategic importance of Technical Vocational Education in driving economic development, reducing unemployment, and fostering social inclusion. Special program for Technical Vocational

Education is increasingly viewed as key to the nation's rising problems. The rapid pace of technological advancement and globalization has transformed the nature of work, creating both challenges and opportunities for individuals. Recognizing this transformation, the national government through the Department of Education strengthened the implementation of Special Program for Technical Vocational Education in secondary level. SPTVE aimed at equipping individuals with practical skills and knowledge required to excel in various technical fields. It is designed to bridge the gap between theoretical learning and real-world application, fostering a new generation of competent and confident technicians, craftsmen, and professionals. In the Philippines, the pursuit of excellence in technical vocational education is a cornerstone of the nation's commitment to fostering skilled workforce and driving economic growth. SPTVE represents a strategic investment in equipping individuals with the practical skills and knowledge necessary to succeed in a rapidly evolving global

landscape. By investing in SPTVE, the country is not only investing in the success of individuals but also in the prosperity of our nation as a whole.

Through collaboration among government, educational institutions, industry partners, and other stakeholders, we are shaping a brighter future where every individual has the opportunity to reach their full potential and contribute to our collective advancement. The Technical Education and Skills Development Authority (TESDA) plays a crucial role in providing technical vocational education and training programs that equip individuals with industry- relevant skills.

On the other hand, the cultivation of the 21st century skills is also recognized in the Philippines as essential for preparing individual to thrive in an increasingly competitive world.

These skills encompass a wide range of competencies needed to excel in today's society. Efforts to promote 21st century skills in the Philippines are evident across various sectors, including education, workforce development, and innovation. The Department of Education (DepEd) has been implementing K to 12 education reforms aimed at enhancing the curriculum to include critical thinking, creativity, communication, and collaboration skills. As nations transition further into the 21st century, the importance of the 21st century skills become increasingly evident. These skills encompass a broad range of competencies that are essential for success in today's rapidly changing world. In the Philippines, recognizing the significance of 21st century skills, efforts are underway to integrate them into education and training systems. By prioritizing the development of these skills, the government aims to prepare its citizens to adapt to evolving technologies, navigate complex challenges, and contribute meaningfully to the economy. Overall, the Philippines is committed to equipping its citizens with the 21st century skills needed to succeed in an increasingly complex and interconnected world.

Meanwhile on the community level, SPTVE represents a transformative initiative aimed at empowering local residents with the skills and knowledge needed in today's competitive job market. Designed to cater to the unique needs and opportunities of the community, SPTVE is a collaborative effort between educational institutions, government agencies, and industry partners, united in the shared goal of equipping individuals with practical expertise in technical and vocational fields. Through a comprehensive curriculum that integrates theoretical knowledge with hands-on training, students enrolled in SPTVE gain proficiency in a wide range of disciplines, including agriculture, automotive, food and information technology. Several secondary schools in the Province of Sorsogon are currently offering Special Programs for Technical Vocational Education.

Casiguran Technical Vocational School offers key specializations, including Agriculture, Information and Communications Technology (ICT), Cookery, Shielded Metal Arc Welding (SMAW), and Electronics Product Assembly and Servicing (EPAS), equipping students with the

essential skills and knowledge for diverse career pathways. CTVS is committed to providing quality technical-vocational education by offering a comprehensive suite of specialized programs that are aligned with the evolving needs of the workforce. These programs are designed not only to impart technical skills but also to develop the values and competencies necessary for lifelong learning and meaningful employment. Agriculture, as a specialization, equips students with hands-on knowledge in crop production, sustainable farming practices, and agribusiness. Students learn to manage agricultural enterprises, use appropriate technologies, and practice environmentally responsible farming, making them ready for work in both local and global agricultural industries. Likewise, Information and Communication Technology (ICT) focuses on computer systems servicing and digital literacy. The ICT program provides students with foundational and advanced skills in computer hardware, software, networking, and troubleshooting. Students are prepared for careers in tech support, IT services, and even further studies in programming, cybersecurity, or data analytics. The Cookery program develops students' competencies in food preparation, kitchen management, menu planning, and sanitation. Through practical training and exposure to real kitchen environments, learners gain the culinary skills needed in restaurants, hotels, and food service establishments—locally and internationally. On the other hand, Shielded Metal Arc Welding (SMAW) focuses on the essential skills of welding, including reading blueprints, metal fabrication, and safe handling of equipment. Students gain certification-ready experience that qualifies them for employment in manufacturing and other industrial sectors. Through EPAS, students learn how to assemble, install, maintain, and repair electronic products and systems. The course emphasizes technical problem-solving, diagnostics, and the use of tools and instruments—preparing students for careers in electronics, appliance servicing, and even small-scale entrepreneurship.

Students graduated from TechVoc schools were mostly passers of the National Certificate assessment and equipped with necessary skills needed in the job industry. The Local Government Unit are giving their full support to the students/constituents of their respective Barangays to attain the National Certificate by launching the “Assessment Ko, Sagot ng Barangay Ko” program. Providing financial assistance to the learners enable them to undergo assessment and obtain the National Certificate. However, National Certificate cannot guarantee a position in the company or in the industry. Finding a job requires a combination of skills, qualifications, and right attitude. To successfully secure an employment in the 21st century also requires 21st century skills. And while foundational skills such as numeracy and literacy remain important foundations for all future learning, students also need to develop 21st century skills. This requires a renewed focus on a whole range of skills including adaptability, critical thinking, creativity, problem solving and collaboration, to name some of the most prominent. These skills are often referred to as transferrable skills as they can be used in different scenarios and across different domains, reflecting the growing trend that young people will move across and between different areas of work during their

careers where their ability to transfer skill-sets to meet new challenges will be tested. By integrating 21st century skills such as critical thinking, collaboration, and digital literacy into technical education programs, countries can enhance the employability and productivity of their workforce, laying the foundation for sustainable development and prosperity. This is true. However, it remains unclear whether the competencies offered by SPTVE adequately align with these industry-required skills. Does Special Program for Technical Vocational Education relevant in the development of these skills? This is the question that should be asked by the implementers of SPTVE in the Department of Education. The challenge is how to strengthen SPTVE curriculum and transform teaching and learning so that the development of student competencies and the application of learning skills will allow them to remain competitive and career-ready.

II. OBJECTIVES

- To determine the 21st century skills required by the industries that are reflected in the SPTVE curriculum.
- To identify the insights of the learners on the different programs, projects and activities offered to them to develop the industry-required 21st century technical skills.
- To ascertain the challenges encountered by SPTVE teachers and learners in developing the industry-required 21st century skills.
- To propose a strategic plan that strengthens SPTVE thereby facilitating the learners' acquisition of the industry-required 21st century skills.

III. METHODOLOGY

To gather precise and measurable data from the respondents, this study adopted a descriptive-correlational design with an exploratory component. The descriptive nature of this research aimed to describe the current state of the SPTVE curriculum in terms of its focus on industry-required 21st century skills acquisition.

The target respondents of the study were fifty (50) grade ten (10) students under Special Program for Technical Vocational Education of Casiguran Technical Vocational School. This study used descriptive statistics and inferential for quantitative data analysis. Meanwhile, thematic analysis

was utilized to analyze data collected from the focus group discussions (FGDs), and document analysis for qualitative data analysis.

IV. RESULTS

➤ *Level of Development of 21st Century Technical Skills Required by Industries Reflected in SPTVE Curriculum*

The relevance of the offered curriculum is noticed when the competencies acquired by the learners' match with the skills needed by the industries and the communities. Thus, aligning education with the current industry needs has to be a prime consideration in the school curricular offerings. By aligning education with current industry needs, the schools can ensure that their curriculum offerings remain relevant and up-to-date.

Assessing the level of development of the 21st-century skills required by the industries being possessed by the students is a concrete step in finding out if the implemented programs, projects, and activities of the curricular programs in CTVS are still appropriate. Possession of the 21st-century skills on the part of the learners provides advantages for them. The chance of being employed is high if they possess certain 21st-century skills. These skills include technology literacy, critical thinking and problem solving, and adaptability and innovation.

Table 1 shows the level of development of technology literacy as one of the expected 21st-century skills possessed by the learners. Shown in the Table that in using ICT tools in accomplishing learning tasks, a mean value of 3.47 was acquired, manifesting the moderate level of development of such competency among the learner respondents. These learners can only use and perform basic digital tasks, such as using word processors and browsing the internet.

It was reflected in the Table that the learner respondents assessed themselves on the indicator, demonstration of fluency in utilizing digital technologies, with a mean value of 3.24, described as moderate. This moderate level of development implies a middle-level ability to understand and use digital technology for learning. This result is similarly noticed in the indicator stating the level of engagement of the learners with ICT platforms in accomplishing tasks.

Table 1 Level of Development of Technology Literacy as 21st Century Skills Required by the Industries

Indicators	Mean	Descriptions
Demonstrate fluency in utilizing digital technologies	3.24	Moderate
Theoretical knowledge of ICT has been put into real- world practice	2.54	Fair
Possess desirable competencies in emerging technologies such as robotics and automation	2.50	Fair
Show expertise in using ICT tools in the performance tasks	3.47	Moderate
Engage with ICT platforms in accomplishing tasks with ease	3.24	Moderate
Average	3.00	Moderate

In terms of putting ICT knowledge into practice in real-life situations, the mean value, 2.54, is obtained and described as fairly possessed by the learner respondents. Such is a reflection of the limited chance of the learners to employ ICT

knowledge in their daily learning activities. Likewise, the possession of desirable competencies in emerging technologies such as robotics and automation have a mean value of 2.50 and described as fair. This is a manifestation of

the inadequacy of learners in terms of knowledge on robotics and automation, considered as advanced technology.

Generally, the learner respondents have an average mean value of 3.00 in terms of the level of development of technology literacy and considered moderately developed. Such denotes the possession of the basic ability of learners related to their dealings with digital technology.

This average level of technology literacy aligns with the findings in the table 2, where learners also demonstrated a moderate development in critical thinking and problem-solving. Table 2 presents the assessment of learners' development in critical thinking and problem-solving skills based on industry-required competencies. All indicators received a moderate descriptive rating, indicating that while

learners are demonstrating these skills, there is still considerable room for enhancement. In developing the critical thinking and problem-solving skills of the students, asking relevant questions about issues they encounter is the highest-rated indicator with a mean of 3.58, showing that students are relatively confident in identifying and questioning real-world problems. Additionally, reflecting on the solutions offered, be open to revise based on new insights and feedback is the indicator that follows closely with a mean of 3.56, suggesting a willingness to adapt and improve ideas through feedback – an essential trait in dynamic work environments. The 3.45 mean, provide several solutions to certain problems indicator, implies that learners may need more support or experience in divergent thinking or creative problem-solving.

Table 2 Level of Development of Critical Thinking and Problem Solving as 21st Century Skills Required by the Industry

Indicators	Mean	Descriptions
Ask relevant questions about the issues they encounter	3.58	Moderate
Provide several possible solutions to certain problems	3.45	Moderate
Provide several possible solutions to certain problems	3.52	Moderate
Use concrete evidence to support their claims and solutions offered	3.56	Moderate
Reflect on the solutions offered and be open to revise based on new insights and feedback	3.53	Moderate
Average	3.53	Moderate

With an average mean of 3.53, the learners' ability to engage in critical thinking and problem-solving, is described as moderately developed. This suggests that the learners are able to demonstrate foundational skills such as asking relevant questions, considering multiple solutions, using evidence to support claims, and reflecting on feedback. However, the moderate rating indicates that while these skills are present, they are not yet consistently applied at a high level of proficiency. This implies the need for further enhancement of instructional approaches that promote deeper analytical thinking and more advanced problem-solving strategies.

Following the results in table 2, which showed a moderate development in learners' critical thinking and problem-solving skills, table 3 similarly reveals that learners

possess a moderate level of adaptability and innovation, suggesting a steady but developing proficiency in essential 21st century competencies needed in today's evolving work environments.

Table 3 presents the learner respondents' self-assessed level of development in the domain of adaptability and innovation. The learners demonstrated the highest level of competency in displaying resilience and adjusting their actions for better results, with a mean score of 3.45. This suggests that students are moderately capable of persevering through challenges and are willing to revise their strategies or behaviors to achieve improved outcomes. Such skill is essential in today's dynamic and uncertain professional environments, where the ability to bounce back and make calculated adjustments is crucial.

Table 3 Level of Development of Adaptability and Innovation as 21st Century Skills Required by the Industry

Indicators	Mean	Descriptions
Manifest openness to new ideas, techniques, and technologies	3.36	Moderate
Take risks to solve problems in creative and unique ways	3.27	Moderate
Display resilience and adjust their actions for better results	3.45	Moderate
Contribute creative ideas to achieve group success	3.37	Moderate
Average	3.36	Moderate

Contributing creative ideas to achieve group success got a mean of 3.37 which implies that the learners are fairly confident in their capacity to collaborate effectively by offering innovative input that benefits the group. This reflects a growing, though not yet highly developed, tendency among students to exercise creativity in team settings—a vital attribute for innovation in real-world tasks.

Moreover, learners also showed a moderate level of openness to new approaches, with a mean score of 3.36 for the indicator of manifesting openness to new ideas, techniques, and technologies. This indicates that while students are receptive to novel concepts and advancements, their adaptability to incorporate them into practice could still be enhanced.

Taking risks to solve problems in creative and unique ways is the indicator that garnered the lowest mean score of 3.27. Described as moderate, this result points to a slightly lower level of comfort among learners when it comes to venturing into unconventional or uncertain problem-solving approaches. This may reflect a need for a more supportive learning environment that encourages experimentation and values innovation even when outcomes are uncertain.

In relation to developing the adaptability and innovation skills of the learners, the average mean rating of 3.36 denotes that while students are beginning to demonstrate key traits of adaptability and innovation – such as resilience, creativity, and openness to change – there remains room for substantial growth.

The findings imply a need for more experiential learning opportunities, real-world problem-solving tasks, and pedagogical strategies that promote risk-taking and creativity in order to further develop these competencies to a higher level aligned with industry demands.

➤ *Programs, Projects and Activities Offered to Them to Develop the Industry-Required Technical 21st Century Skills*

The development of 21st-century skills among students is very essential because these skills serve as their protection to withstand and thrive in a complex global society. These skills also strengthen their career opportunities. Aware of these influences, the development of 21st century skills among students must be evident in the operation of the school.

The presence of programs, projects, and activities in the school operation intended for the development of industry-required 21st-century skills has to be a priority of any secondary school. Such is a mechanism to achieve the goal of secondary education and a channel to strengthen career opportunities among students. The Special programs offered by CTVS – Agriculture, ICT, Cookery, EPAS, and SMAW – are designed to provide learners with practical, industry-aligned skills that promote employability, entrepreneurial capability, and lifelong learning. Each program combines theoretical instruction with hands-on application and community engagement. The activities and projects aim to prepare students for TESDA certifications and real-world work environment.

As the Casiguran Technical Vocational School continuously offers specialized programs along with technical and vocational education, its administrator, staff, and the teachers have been implementing various programs, projects, and activities that are promoting the 21st-century skills.

➤ *School Initiatives Towards Technical Skills Building*

The existing curriculum of the Department of Education is standard-based. This standard based curriculum has been complied with by CTVS in terms of implementing several initiatives. The implementation is designed not only to achieve the specific standards in terms of what learners should know and be able to do at their particular level, but

also to develop the 21st-century skills that the industry sectors are looking for. Learners who specialize in Agriculture were exposed to technical skills development through blending agriculture education with technology, entrepreneurship, and real-world skills.

Specifically, the school has been implementing an income generating project tagged as Money sa Ani since 2022. *“Money sa Ani” has been instrumental in creating opportunities for students to develop entrepreneurial skills, likewise, providing fund for the agriculture students in their laboratory activities.*” This was stressed by Participant 1, who has been teaching Agriculture for more than 10 years. This IGP is just one of the many initiatives of the school under the Masaganang Paaralan Program which aims not only to raise fund but also to develop entrepreneurial, financial literacy, communication skills, critical thinking and problem solving. In the agriculture curriculum, critical thinking and problem-solving skills are essential content standards. Topics on environmental and ecological issues are integrated into the curriculum. Students must have skills in analyzing environmental concerns. Participant 2 proudly presented this idea, *“Climate change greatly affects the agriculture industry. Impacts of this phenomenon have to be made known to the students, thus dealing with climate and weather variability is oftentimes discussed in my class”.*

Further added by Participant 2, *“Adapting to climate change and environmental challenges has to be made clear to my agriculture students. Good that there are topics or lessons in agriculture about sustainable farming practices.”*

Furthermore, Shielded Metal Arc Welding (SMAW) students create steel products such as plants stand, window grills, bedside lamps, etc. They also take on repair jobs for the school, developing their welding skills and craftsmanship. Meanwhile, Electronics Product Assembly and Servicing (EPAS) specialization offers eFix or Electronics Repair and Upcycling Corner, where students repair and refurbish small appliances such as electric fans, radios, and rice cookers.

Students also engage in installation of electric fans in classrooms. Participant 3, an experienced SMAW instructor, stated, *“In welding, safety is everything. I always tell my students that mastering technique is important, but following safety standards is non-negotiable. We incorporate real-site safety practices even in our school workshops.”* As learners interact with clients, they improve their communication, time management, and customer service abilities. The program also promotes critical thinking, attention to detail, and problem-solving—skills essential in high-pressure welding tasks. *“I let students analyze welding defects and troubleshoot errors in their work,”* explained Participant 4. *“This helps them understand the importance of quality assurance and builds their confidence in making sound judgments in the field.”* Participant 4 added, *“SMAW is not just about joining metals—it’s about building structures with integrity and precision. That’s a responsibility we pass on to our students.”*

In the cookery specialization, students run a school-based enterprise, where students sell meals and snacks they make themselves. Students are hands-on in every step, from sourcing ingredients to cooking, packaging, and pricing. This initiative helps them master food preparation and safety while building entrepreneurship and marketing skills. More than just raising income, these activities cultivate 21st century skills such as innovation, critical thinking, adaptability, and collaboration. Participant 5, a cookery teacher with more than 8 years of teaching experience, shared, *“I emphasize the importance of food safety and proper handling because it's not just about cooking—it's about maintaining health standards and professionalism. I make sure students understand kitchen protocols and the importance of hygiene in every step.”* The curriculum also integrates 21st-century skills such as creativity, communication, and adaptability. Lessons often involve practical applications, teamwork, and problem-solving in a kitchen setting. *“We often simulate real-life restaurant scenarios,”* said Participant 6. *“Students are challenged to create meals under time pressure, plan menus within a budget, and respond to customer preferences. This helps them think critically while building their confidence in the kitchen.”* Participant 6 added, *“Cookery is more than just learning recipes—it's about discipline, innovation, and service.”*

In terms of enhancing technical skills within the Information and Communication Technology specialization, hands-on training in computer servicing, basic programming, graphic design, and office productivity tools are integrated in the curriculum. Participant 7, a seasoned ICT teacher with over 10 years of experience, shared, *“I ensure my students understand both the tools and the responsibilities that come with using technology. For instance, we explore the basics of cybersecurity and ethical online behavior to help students become responsible digital citizens.”* The school has also facilitated simulation-based learning environments that mimic real-world ICT workplaces, providing learners with practical experience in troubleshooting, system maintenance, and digital content creation. Critical thinking, collaboration, and creativity are emphasized across various ICT topics. Students are encouraged to assess the role of emerging technologies and consider their impact on society and daily life. As Participant 8 explained, *“Artificial intelligence and automation are transforming industries but still not included in the curriculum guide of ICT. However, I often integrate the idea of these technologies in the lesson because I want students to be aware, not just of how to use technology, but how it affects their lives and future careers.”* By aligning instruction with current industry needs and global trends, the ICT special program at CTVS ensures that students are not only tech-savvy but also adaptable and responsible in their use of technology.

Lastly, CTVS actively promotes technical skills development in Electronics Product Assembly and Servicing specialization by also providing structured, hands-on training in assembling, servicing, diagnosing, and repairing electronic products and systems. The program covers a range of technical skills including circuit board assembly, troubleshooting of electronic devices, schematic reading, and

preventive maintenance procedures. Participant 9, who has taught EPAS for more than a decade, shared, *“I make sure that students understand not just how to fix devices but how these devices actually work. Hands-on learning is key—we spend a lot of time diagnosing faults and practicing actual repairs to build their confidence.”* Through these initiatives, the school ensures that learners graduate with strong technical foundations and practical experience. The program also encourages analytical thinking and precision. Real-world scenarios are simulated in class, where students troubleshoot malfunctioning devices and interpret service manuals. *“It's important that students learn how to think like technicians,”* said Participant 10.

“They need to understand what causes a circuit to fail and how to systematically restore functionality. This kind of training sharpens their logic and attention to detail.” Participant 10 further added, *“We're not just producing repair workers—we're shaping future electronics professionals who can innovate and adapt to the demands of the tech industry.”* By offering skills training and fostering a problem-solving mindset, the EPAS special program at CTVS continues to empower students to pursue careers in electronics, both as skilled workers and as future entrepreneurs in the growing tech service sector.

➤ Workplace Readiness Engagement Activities

In response to the increasing demand for job-ready and highly competent graduates, CTVS prioritizes workplace readiness engagement activities as an integral component of its technical vocational education. These activities are carefully designed to expose students to real-life work settings, simulate industry-based tasks, and instill the soft skills and professional values required in the workforce.

To ensure that learners in the Agriculture specialization are prepared for real-world employment and entrepreneurial opportunities, the school has implemented targeted workplace readiness engagement activities that mirror the practices and demands of the agricultural sector, all aligned with TESDA-based competencies and sustainable agricultural principles. Students manage crop production areas within the school, applying concepts in soil management, planting, organic farming, and harvesting. Along with these, students are also given the opportunity to experience the actual use of farm tools and equipment - though equipment like tractor isn't available in school, the LGU has always been extending its support by lending their equipment, simulating real-life agricultural work settings. Moreover, students engage in the planning and management of small-scale agri-business projects such as vegetable sales, developing entrepreneurial and financial management skills.

In terms of Information and Communication Technology specialization, the school also implements various workplace readiness engagement activities that bridge academic learning with industry practice. One of which is the simulation-based learning environments that mimic realworld ICT workplaces, providing learners with practical experience in troubleshooting, system maintenance, and digital content creation. These simulations introduce

learners to project timelines and productivity tools. Learners are also engaged in maintaining the school's computer systems, troubleshooting hardware/software issues, and assisting with network management, thereby applying their skills in actual technical support roles.

On the other hand, workplace readiness engagement activities in Cookery specialization are designed to simulate real kitchen and food service environments, ensuring that learners develop both technical and culinary skills and essential work habits. Students undergo training in a fully equipped kitchen, where they learn essential cooking techniques. Learners take part in preparing and serving food during school events, meetings, and celebrations. This simulates catering operations and helps students build confidence in large-scale food preparation and time management.

In addition to the initiatives of the school in ensuring the readiness of the learners in a work environment, Shielded Metal Arc Welding specialization set up workstations as per blueprint specs, emphasizing layouts, space management, and tool organization, simulating real job environments. Apart from this, students are also given opportunity to create their own products and apply their welding skills to real-world fabrication tasks.

Competency-based training program that aligns with TESDA standards is also evident in Electronics Product Assembly and Servicing specialization. Students are trained in a dedicated electronics laboratory equipped with essential tools and testing equipment. To bridge classroom learning with real-world application, the school engages in school-based and community servicing projects, where they conduct actual repair and maintenance of electronic gadgets and home appliances. These projects allow learners to apply their skills, interact with clients, and build confidence in service delivery.

➤ *Technology Learning Integration Project*

In today's society, the fusion of technology and traditional industries has become more than just an innovation, it is a necessity. As industries evolve, so must the approach to teaching and learning. In line with this, the Information and Communication Technology specialization in CTVS takes a pioneering step through the implementation of its technology integration project. This project reflects our recognition that ICT is not just a subject but a vital tool that enhances learning, communication, productivity, and problem-solving across all fields. By engaging in activities that simulate industry practices—such as digital content creation, basic programming, and IT support—students develop meaningful technical skills and 21st-century competencies essential to modern life and work.

Among the special programs offered, ICT stands out as the forefront of technological advancement, embedding digital tools and platforms directly into student learning experiences. This initiative allows learners to apply their knowledge in practical contexts, bridging the gap between theory and application while fostering digital fluency, critical thinking, and creativity.

➤ *Innovation, Learning Fair and Caravan*

The Innovation, Learning Fair and Caravan, also known as TechVoc Week in CTVS, is a dynamic, school-based initiative designed to showcase the skills, creativity, and innovations of learners. This culminating event brings together hands-on demonstrations, interactive exhibits, and student-led innovations that reflect the competencies they have developed through their specialized training.

Exhibit of organically grown produce, organic concoctions and fertilizers, and propagated plants for agriculture; Webpage design and demonstration of simple websites, or multimedia projects for ICT; Cooking demos featuring local dishes and healthy meal alternatives and food stalls showcasing different innovative products made by the students in cookery; Interactive circuit boards and wiring systems created by the students and repair simulation for basic appliances for EPAS; and Display of welded student projects.

TechVoc Week aims to showcase learners' technical competencies and the outcomes of their specialization training. Likewise, to strengthen community and industry engagement by involving local stakeholders in the fair.

V. INDUSTRY COLLABORATION

Industry collaboration is a vital component in enhancing the effectiveness and relevance of technical-vocational education. Through partnerships with various local industries, businesses, and government agencies, students are provided with opportunities to experience real-world applications of their skills, making them better prepared for employment or entrepreneurship.

In Agriculture, collaboration with local farms, cooperatives, agency such as Department of Agriculture (DA), and Local Government Unit (LGU) provide students with learning opportunities. Meanwhile, ICT students benefit from linkages with tech firms and BPOs. Industry collaboration is strongly emphasized in the Agriculture and ICT specializations at the Junior High School level, where partnerships focus on the provision of trainings, materials, tools, and technical support rather than workplace immersion. These collaborations aim to strengthen the learning experience by enriching classroom instruction with updated knowledge and resources from industry partners.

➤ *Challenges Encountered by SPTVE Teachers and Learners in Developing the 21st Century Technical Skills*

Despite the efforts of the school to provide quality learning experiences for students enrolled in the special programs, the occurrence of problems still happens. These problems are encountered by the SPTVE teachers as well as the learners. Specifically, these problems hinder the development of the industry-required 21st-century skills among learners.

Table 4 disclosed the challenges encountered by teachers in developing the 21st-century skills of learners. Based on the Table, the insufficiency of supplies, equipment,

and facilities obtained a frequency of 14 (rank 1). This limitation greatly affects the delivery of hands-on and practical learning experiences in technical-vocational specializations where access to tools, machines, and updated laboratories is critical. Without proper resources, teachers are often unable to demonstrate or allow students to fully engage in real-world applications. The minimal presence of resources in the delivery of content and performance standards in teaching special programs limits students in developing technology literacy, critical thinking and problem solving, and adaptability and innovation.

The need to upgrade the teaching materials had a frequency of 12 (rank 2). This shows that there are teachers who are still referring to outdated teaching resources and the inadequacy of relevant learning media is prevailing. The lack

of updated instructional resources hampers the relevance and effectiveness of classroom instruction, making it difficult for students to stay current with evolving trends. Another significant concern raised is the lack of training for teachers, which was noted by 11 respondents. This highlights a gap in professional development programs that are meant to enhance teachers' capabilities in integrating modern teaching strategies and technologies. Teachers themselves need continuous learning opportunities to keep pace with innovations.

The limited presence of industry partners, reported by 10 teachers, rank 4 among the challenges. Industry collaborations are vital in bridging the gap between academic instruction and workplace demands.

Table 4 Challenges Encountered by Teachers in Developing the 21st Century Skills

Challenges	Frequency	Rank
Insufficient supplies, equipment, and facilities	14	1
The need to upgrade the teaching materials	12	2
Lack of training for teachers	11	3
Limited industry partners	10	4
Lack of interest of some learners	9	5

Lastly, the lack of interest among some learners, cited by 9 respondents, poses a concern that affects the overall learning climate. Student engagement is essential in developing critical thinking, problem-solving, and innovative abilities. A lack of interest may stem from unengaging lessons, outdated learning materials, or limited access to practical experiences – further underscoring the need for system-wide improvements in teaching resources and methodologies.

While teachers face numerous challenges in delivering the 21st century skills, it is equally important to recognize the difficulties encountered by learners themselves, as presented in table 5. Notably, both teachers and students identified the insufficient supplies, equipment, and facilities, with 38 respondents (rank 1) for learners identifying this as a major hindrance, followed by the need to upgrade teaching materials which are identified by 30 respondents (rank 2), indicating a shared concern that significantly impacts the development of 21st century skills, as shown in tables 4 and 5.

Table 5 Challenges Encountered by Learners in Developing Their 21st Century Skills

Challenges	Frequency	Rank
Insufficient supplies, equipment, and facilities	38	1
The need to upgrade the teaching materials	32	2
Limited industry partners	28	3
Lack of interest of some learners	22	4
Limited exposure to technology and innovation	19	5

The limited industry partnerships are also identified with a frequency of 28 (rank 3), which negatively affect the learning experience and students' ability to keep pace with technological advances and workplace experiences. Other concerns included lack of interest of some learners and limited exposure to technology and innovation, with a frequency of 22 (rank 4) and 19 (rank 5), respectively.

➤ Proposed Strategic Plan to Strengthen SPTVE

• Rationale

Special Program for Technical Vocational Education (SPTVE) has a significant impact in equipping junior high school students with industry-required 21st-century skills, preparing them for both employment and entrepreneurship. However, despite its significance, various challenges hinder its full potential, including gaps in curriculum alignment with industry standards, limited industry partnerships, insufficient hands-on training, and the need for enhanced faculty development.

This proposed strategic plan aims to address these challenges by implementing targeted interventions to enhance curriculum relevance, strengthen industry linkages, improve teacher competencies, and expand opportunities for student skill development. This plan seeks to bridge the gap between education and employment, ensuring that graduates are well-prepared for the demands of the modern workforce. The proposed strategies will serve as a basis for curriculum improvement, resource enhancement, and policy formulation, ultimately leading to better career opportunities.

- *Goal*

To strengthen the Special Program for Technical Vocational Education (SPTVE) by aligning its curriculum with industry standards, strengthening partnerships with key sectors, upskilling educators, and expanding hands-on learning experiences. This strategic initiative aims to equip students with industry-relevant 21st-century technical skills, ensuring career readiness, entrepreneurial opportunities, and a more competitive workforce that contributes to national development.

VI. DISCUSSION

➤ *Level of Development of 21st-Century Skills Required by Industries Reflected in the SPTVE Curriculum*

The findings of the study revealed that the learners of Casiguran Technical Vocational School generally exhibit a moderate level of development in the key 21st-century skills expected by industries. This level of development signifies that while students are acquiring essential skills such as technology literacy, critical thinking, adaptability, and problem-solving, these competencies were not yet fully optimized to meet the rigorous demands of a fast-evolving workforce. This moderate proficiency level suggests that students can perform basic digital tasks, engage in problem-solving processes, and demonstrate flexibility, but often lack advanced application or fluency in real-world scenarios.

The result concerning technology literacy mirrors the findings of Mina et al. (2020), who observed that STEM senior high school students in Zambales demonstrated only moderate proficiency in digital literacy domains such as information access, media analysis, and the application of technology. This indicated that even with curriculum exposure, students may struggle to transfer theoretical knowledge into more complex, functional applications. The similarity between these two contexts—STEM and technical-vocational—highlights a broader trend in the Philippine secondary education system, where access to resources, digital tools, and experiential learning opportunities often dictates the level of student skill acquisition.

Furthermore, in the context of SPTVE, a moderate level of 21st-century skills development can be attributed to several factors. These include limited access to updated ICT equipment, insufficient training for teachers on the integration of 21st-century pedagogies, and a curriculum that may lack sufficient focus on emerging technologies and innovation-driven activities. As a result, learners tend to become competent in routine tasks but fall short in higher-

order thinking, entrepreneurial decision-making, or using technology for complex problem-solving.

Additionally, the moderate level of development in critical thinking and problem solving—skills that are central to employability and workplace productivity—points to the need for more interactive and project-based learning strategies within the SPTVE curriculum. These strategies, if effectively implemented, can push learners beyond rote learning and help them build confidence in analyzing real-world situations, proposing innovative solutions, and making informed decisions.

The moderate ratings across multiple domains of 21st-century skills suggest that while the SPTVE curriculum lays the groundwork for essential skill development, it must be continuously enhanced to address the growing demands of industries. The integration of job shadowing, income generating projects, collaborative research, and technology-driven instruction can serve as effective interventions to elevate these skill levels. Furthermore, industry-academe partnerships could provide learners with more immersive and practical exposure, allowing them to apply classroom-acquired skills in authentic workplace settings.

In summary, the moderate level of 21st-century skill development among Casiguran Technical Vocational School students reflects both progress and ongoing challenges. While the SPTVE curriculum provides valuable foundations, there remains a critical need to deepen the application, integration, and real-world relevance of these skills to ensure that graduates are fully prepared to contribute meaningfully to the labor force and adapt to the dynamic demands of modern industries. This underscores the importance of ensuring that SPTVE remains market-driven, meaning that the competencies taught must directly correspond to the skills that industries currently require. A curriculum that is aligned with market needs ensures employability and minimizes the mismatch between training and workforce demand. This principle resonates with the framework of the Philippine Qualifications Framework (PQF), which emphasizes alignment between education outcomes and industry competencies.

➤ *Programs, Projects, and Activities Offered to them to Develop the Industry-Required 21st Century Skills*

In response to the growing need for a workforce equipped with industry-relevant and future-ready competencies, Casiguran Technical Vocational School has adopted and implemented a wide range of programs, projects, and activities specifically designed to develop the 21st-century skills of its learners. These initiatives are aligned not only with the Department of Education's emphasis on lifelong learning, global competitiveness, and holistic development, but also with international education frameworks such as those advocated by UNESCO-UNEVOC and the Sustainable Development Goals (SDGs).

Innovation Fairs serve as platforms for students to showcase their inventions, prototypes, and entrepreneurial ideas. These events foster a culture of creativity,

experimentation, and solution-oriented thinking. Learners are encouraged to develop and present their outputs based on real community or industry needs, which reinforces their ability to identify problems, propose viable solutions, and communicate ideas effectively. Participation in such innovation-centered activities builds confidence and practical experience that are essential for both employment and self-employment opportunities.

Workplace Readiness Engagement Activities, such as mock interviews, resume writing workshops, and job shadowing experiences, bridge the gap between school and employment by familiarizing students with industry expectations and work environments. These activities not only enhance students' professional behavior and workplace etiquette but also promote adaptability, initiative, and personal responsibility. The inclusion of income-generating projects, such as schoolbased enterprises or production work, further equips learners with financial literacy, resource management, and entrepreneurial mindset—skills aligned with Sustainable Development Goal 8, which advocates for decent work and economic growth.

To support both technical training and real-world application, the school offers various income-generating projects (IGPs) embedded in its specialized subjects. Studies by Del Mundo and Padilla (2021) and Albina and Sumadsad (2019) affirm that income-generating projects in technical-vocational education significantly enhance student motivation, financial literacy, and readiness for employment or entrepreneurship. These projects serve as authentic platforms for students to apply their competencies in real-world settings, thus deepening their understanding and retention of skills while fostering a sense of ownership and economic responsibility.

The school also fosters partnerships with local industries and government agencies, which provide immersion opportunities, technical demonstrations, and expert mentoring. These collaborations ensure that learners are exposed to current trends and innovations in their respective fields, enhancing the relevance and practicality of their learning experiences. Real-world exposure through industry linkages reinforces the application of classroom-acquired knowledge in authentic settings, a key principle emphasized by UNESCO-UNEVOC (2018) in advancing quality technical and vocational education.

Furthermore, all these initiatives contribute significantly to Sustainable Development Goal 4 (Quality Education) by promoting inclusive, equitable, and skill-based education. By integrating these programs into the curriculum, Casiguran Technical Vocational School not only addresses the needs of its learners but also contributes to national economic development through the cultivation of a skilled and competitive workforce.

The programs, projects, and activities implemented at Casiguran Technical Vocational School are strategically designed to support the holistic development of learners' 21st-century skills. These efforts provide learners with

meaningful, engaging, and practical experiences that prepare them for the demands of the modern labor market, encourage lifelong learning, and empower them to become productive, innovative, and socially responsible individuals in their future careers.

➤ *Challenges Encountered by SPTVE Teachers and Learners in Developing the 21st Century Skills*

Despite various initiatives to enhance technical-vocational education through programs and strategic projects, Casiguran Technical Vocational School, like many other public institutions, faces significant challenges that hinder the full development of industry-aligned 21st-century skills among both teachers and learners. Based on the data gathered, several interrelated issues emerged, highlighting the systemic gaps that require urgent attention for the successful implementation of the Special Program for Technical Vocational Education (SPTVE).

Foremost among the challenges identified is the insufficiency of tools, equipment, and facilities essential for skill acquisition in technical-vocational field. This includes outdated machines, malfunctioning ICT units, limited welding tools, and inadequate space for food processing laboratories. These issues are critical, as hands-on experience forms the backbone of competency-based learning. As De Guzman and Manuel (2020) emphasized, resource constraints in TVET institutions directly impair the delivery of practical training and reduce student engagement. Without the proper tools and environments to simulate industry settings, learners may struggle to gain the confidence and competence needed in actual workplaces.

Another major issue is the use of outdated or non-contextualized teaching and learning materials, which limits the relevance of instruction. Teachers often resort to improvised or borrowed resources that may not reflect current industry practices. In the age of digital transformation, the gap between classroom instruction and real-world applications widens when instructional content fails to evolve. Bernardo et al. (2021) noted that the lack of updated teaching resources and contextualization hinders learners' ability to apply what they learn, especially in fields that rapidly adapt to technological change such as ICT and electronics.

The lack of sufficient funding is also a pressing concern. Both teachers and learners identified financial limitations as a barrier to implementing quality projects, acquiring raw materials, and sustaining income-generating activities. Without an adequate budget, many innovative ideas remain unrealized. This not only affects learning opportunities but also demotivates both students and teachers from fully engaging in practical, entrepreneurial, or community-based initiatives. Moreover, the burden often falls on the educators to shoulder minor expenses, which is unsustainable in the long term.

On the part of the teachers, the lack of relevant and continuous professional development significantly affects the quality of instruction. Some teachers have not received

upskilling or refresher training in their respective areas of specialization, which impedes their ability to deliver updated and innovative lessons. As highlighted in the study of Villacorta (2018), effective TVET instruction required instructors to stay current with both pedagogy and industry standards, especially in emerging technologies and digital tools. Without institutional support for professional growth, the instructional capacity of teachers diminishes over time.

The limited industry partnerships further compound the problem. A strong link between schools and industries is vital for curriculum relevance, training support, immersion opportunities, and employment pathways. However, the absence or weakness of these linkages restricts learners' access to authentic work-based learning and mentorship. Strengthening school-industry collaboration, as recommended by the Asian Development Bank (2014), ensures that TVET programs align with labor market demands and improve post-graduation employability.

Additionally, both teachers and learners identified lack of interest among some students as another pressing issue. This suggests that some learners are not motivated to engage in technical/vocational training. It is important to address the needs of the minority who may struggle with motivation due to personal, socioeconomic, or academic reasons. Targeted interventions such as peer mentoring, counseling, or project-based incentives can be effective in nurturing their interest. In conclusion, while the SPTVE program holds immense potential in preparing students for future careers, the development of 21st-century skills continues to be challenged by systemic and contextual limitations—ranging from lack of tools and funding, to weak industry collaboration and professional training gaps. Addressing these challenges requires a coordinated effort from policymakers, school administrators, industry partners, and the community to build a more enabling and responsive learning environment. Only through these collaborative efforts can the vision of producing skilled, competent, and globally competitive Filipino youth be truly realized.

➤ *Proposed Strategic Plan to Strengthen Special Program for Technical Vocational Education*

To address the persistent challenges hindering the full implementation of the Special Program for Technical Vocational Education (SPTVE) and to maximize its potential in developing 21st-century industry-required skills, a strategic plan is proposed that focuses on four key areas: resource enhancement, teacher capacity building, industry linkage, and curriculum modernization.

First, the improvement of learning facilities and the procurement of updated tools and equipment are essential. These enhancements can be supported through stronger income-generating projects (IGPs) such as school-based enterprises in ICT repair, crop production, or food processing, which not only provide authentic learning experiences but also raise funds to sustain the program. As highlighted by Luna and Montemayor (2018), well-executed IGPs contribute significantly to the financial stability and practical relevance of TVET programs.

Equally vital is the continuous professional development of teachers. Regular training on modern technologies, industry trends, and digital teaching strategies will empower teachers to deliver relevant and engaging lessons. Goulão and Reis (2019) emphasized the effectiveness of blended learning approaches and digital assessment tools in making vocational education more responsive and flexible. Additionally, job shadowing or immersion programs for teachers in industry settings will ensure that instruction is aligned with current workplace demands. The plan also calls for the strengthening of partnerships with local industries and community stakeholders. Through formal collaborations, students can participate in workplace immersion, job shadowing, and mentorship opportunities, which bridge the gap between school and the real world. These partnerships, as supported by UNESCO-UNEVOC (2018), enhance the relevance of training by exposing learners to current industry practices. Community-based collaborations with barangay councils, cooperatives, and local governments are likewise encouraged to support resource sharing and context-based technical training, especially in remote or underserved areas.

Curriculum modernization is another central component. Aligning learning outcomes with the Philippine Qualifications Framework (PQF) and integrating digital and entrepreneurial skills will ensure that learners are equipped with both technical and soft skills. Emphasis should be placed on critical thinking, communication, creativity, and collaboration—the core 21st-century competencies—as well as digital literacy, problem-solving, and environmental awareness. Project-based learning, simulation exercises, and digital learning platforms should be integrated to promote deeper understanding and workplace readiness.

This strategic plan also supports several Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 17 (Partnerships for the Goals), by promoting inclusive, innovative, and collaborative approaches to technical education. Ultimately, the implementation of this plan in schools like Casiguran Technical Vocational School will significantly strengthen SPTVE delivery, ensuring that students are well-prepared for both employment and lifelong learning in an increasingly competitive global economy.

By implementing this strategic direction, Casiguran Technical Vocational School and similar institutions can significantly improve the delivery of technical education, better preparing students for both higher education and immediate employment.

VII. THEORETICAL IMPLICATION

The integration of experiential learning into technical vocational education stands as a powerful approach to bridging the persistent gaps between education and industry expectations. By immersing students in hands-on, real-world activities, this method ensures that learning is not confined to theoretical knowledge but is translated into practical, applicable skills. Experiential learning empowers students to

"learn by doing," which aligns with both constructivist theory, where learners construct new knowledge based on their experiences, and experiential learning theory (Kolb, 1984), which emphasized reflection, active experimentation, and concrete experience as central components of the learning process. In the context of the Special Program for Technical Vocational Education (SPTVE), this model is not only appropriate but essential. It equips learners with the critical thinking, problem-solving, and adaptability skills required in fastevolving industries such as information and communications technology (ICT), agri-tech, electronics, and technical trades.

Schools like Casiguran Technical Vocational School that integrate practical activities such as income-generating projects, innovation fairs, workplace immersion, and job shadowing provide learners with opportunities to experience authentic workplace scenarios. These activities reinforce the development of core 21st-century skills—collaboration, communication, creativity, and digital literacy—making students more job-ready and responsive to labor market demands. Moreover, they promote self-confidence, entrepreneurial mindset, and lifelong learning—traits that are essential in today's unpredictable global economy.

However, despite the promise of experiential learning in vocational education, several structural challenges inhibit its full potential. Among these are budget constraints, which limit the acquisition of modern tools, updated instructional materials, and the maintenance of functional laboratories and workshops. These financial limitations also affect the implementation of schoolbased enterprises and hinder participation in external competitions, trade fairs, or national certifications, which are crucial in validating students' competencies.

Another significant obstacle is the limited scope of industry partnerships, particularly in rural or less industrialized areas. Without strong linkages to industries, schools struggle to provide meaningful work immersion, internship placements, and opportunities for technology transfer. This situation calls for more aggressive efforts in establishing public-private partnerships, which can bring in not just technical expertise but also financial and material support. Furthermore, these collaborations can lead to curriculum alignment, ensuring that what is taught in schools mirrors current industry standards and technologies.

The proposed strategic plan to address these challenges is grounded in human capital theory, which posits that investing in people's education and skills development leads to greater productivity, innovation, and ultimately, economic growth. By viewing vocational education as a long-term investment in human resources, the plan underscores the importance of systemic support—such as government subsidies, incentives for industry partners, and continuous teacher training—to ensure that learners are equipped with the right competencies. Human capital theory also supports the idea that developing a skilled workforce is not just beneficial to individuals but essential to national development. Likewise, these development and approaches

are most effective when guided by labor market intelligence and aligned with economic triggers, ensuring that education produces not only skilled graduates but also industry-relevant contributors to national productivity.

While experiential learning is clearly a transformative tool for technical vocational education, its success hinges on curriculum responsiveness, industry collaboration, sufficient resourcing, and policy support. The alignment of these elements will allow programs like SPTVE to truly prepare students for future careers, enhance national workforce competitiveness, and contribute to sustainable socioeconomic advancement.

VIII. PRACTICAL IMPLICATION

The integration of experiential learning methodologies in technical vocational education and training (TVET) is instrumental in shaping students' preparedness for real-world employment. Unlike traditional pedagogical approaches that often prioritize rote memorization and theoretical knowledge, experiential learning fosters active participation in real-life tasks, enabling students to bridge the gap between what is learned in the classroom and what is demanded in the workplace.

By emphasizing practical skill application, this approach nurtures learners' critical thinking, problem-solving, and decision-making capabilities, which are key components of 21st-century competencies.

Programs such as income-generating projects, job shadowing, and workplace immersion have proven effective in delivering authentic learning experiences. Income-generating projects, for example, allow students to manage small-scale business ventures within the school setting—developing financial literacy, entrepreneurship, and operational planning skills. These projects do not only enhance their technical competencies but also instill a sense of responsibility and innovation, while potentially contributing to school resources. Job shadowing, on the other hand, provides learners with a front-row seat to observe professionals at work. Through this strategy, students gain insights into workplace culture, workflow processes, time management, and ethical standards—factors that are difficult to convey through lectures alone. Workplace immersion, a requirement in many senior high school programs, takes this further by immersing students in real job environments, where they apply their acquired skills, receive mentoring from industry experts, and adapt to professional expectations. These strategies enhance learners' adaptability, confidence, and career readiness, aligning with the evolving demands of dynamic labor markets.

However, the implementation of these experiential strategies is not without challenges. Resource constraints—including inadequate funding, lack of up-to-date equipment, and insufficient instructional materials—impede the ability of schools to offer quality technical training. Many public schools, particularly in rural areas, continue to rely on outmoded tools and outdated curricula, leaving students

underprepared for contemporary industry demands. Furthermore, limited industry relationships hinder the development of partnerships that are vital for job shadowing, internships, and work immersion programs. Without strong linkages to the private sector, students are denied access to current industry practices and employment networks.

This situation points to the urgent need for greater collaboration between educational institutions and industry stakeholders, as well as increased investment in tools, training, and infrastructure. The strategic plan proposed in this study responds to these gaps by prioritizing organized support mechanisms such as faculty upskilling, industry-academe linkage, curriculum enhancement, and sustainable funding strategies. For instance, forming Memorandum of Agreement (MOA) with local industries can facilitate access to mentors, facilities, and internship placements, while regular teacher training ensures that instruction remains relevant and up to date. These efforts align with the principles of Human Capital Theory, which posits that investing in education and skill development yields significant returns in productivity, employability, and economic growth. By equipping students with critical 21st-century skills—including digital literacy, communication, collaboration, and innovation—SPTVE programs help produce a workforce that is competitive both locally and globally. Ultimately, the successful implementation of experiential learning in technical education not only enhances job preparation but also contributes meaningfully to national development, particularly through the promotion of inclusive economic participation and the reduction of youth unemployment.

➤ *Limitations of the Study*

This study provides valuable insights into the implementation and impact of the Special Program for Technical Vocational Education (SPTVE) at Casiguran Technical Vocational School, however, certain limitations inevitably influenced the breadth and depth of the findings. One of the primary limitations stems from the limited number of respondents, comprising only a select group of teachers and students. This small sample size constrains the generalizability of the findings and may not fully capture the diverse experiences, perceptions, and challenges across the broader school population. The limited respondent pool restricts the richness of the data, especially in terms of representing varying teaching practices, learner engagement levels, and the nuanced challenges encountered in different specializations.

To address this limitation, the study incorporated supplementary data sources through document analysis, which served as a triangulation method to support and validate the information gathered from the respondents. Institutional documents such as curriculum guides, school reports, training modules, and project documentation provided context and empirical support to the qualitative data. However, while this approach enhances reliability, it may still not fully compensate for the absence of voices from a wider spectrum of stakeholders such as parents, industry partners, school administrators, and alumni, whose perspectives could provide a more holistic understanding of SPTVE's impact.

Additionally, the study was limited by its scope, focusing solely on the specialized programs currently offered at Casiguran Technical Vocational School. While this focus allows for in-depth analysis, it inherently excludes other schools and settings that may have different implementation models, resource allocations, or industry linkages. As such, the findings may not be readily applicable to other institutions offering similar programs but operating under different contexts or constraints.

Moreover, some contextual limitations must be acknowledged, particularly those relating to time and access. Data collection was bound by the academic calendar and school availability, which limited the opportunity to observe the implementation of programs over extended periods. Also, certain administrative and logistical restrictions may have hindered access to more comprehensive records or limited the participation of some respondents due to scheduling conflicts or institutional protocols.

The study did not explore longitudinal outcomes of the SPTVE graduates, which could have provided stronger evidence regarding the long-term effectiveness of the program in relation to employability, further education, or entrepreneurial success. This limits the study's ability to comment definitively on the real-world application and sustainability of the skills acquired through the program.

In light of these limitations, future research may benefit from broader respondent representation, comparative analysis with other TVET institutions, and long-term tracking of graduate outcomes to generate more inclusive and conclusive insights into the effectiveness of SPTVE in developing 21st-century skills.

➤ *Future Research Direction*

Future research must adopt a broader, multi-dimensional lens to fully explore the potential and challenges of Special Program for Technical Vocational Education (SPTVE) in cultivating 21st-century skills among learners. One critical area for future inquiry is the long-term impact of experiential learning on students' career trajectories. While the current study captures the immediate effects of income-generating projects, job shadowing, and workplace immersion, there is a pressing need for longitudinal studies that track learners beyond graduation. Such studies could evaluate the extent to which experiential learning contributes to employment stability, career advancement, and skill flexibility in dynamic labor markets. Exploring these aspects can provide concrete evidence of how well technical-vocational education prepares graduates for the evolving demands of real-world work environments.

Another essential avenue of research lies in examining effective models of industry-education partnerships. As workforce demands continuously evolve, future studies should investigate the characteristics of successful collaboration between schools and industry sectors.

These partnerships are not only vital for aligning training programs with current labor market needs but also

for enhancing accessibility to technical training, particularly in underserved or rural areas. Research into best practices for internship programs, joint curriculum development, shared facilities, and industry-led training modules could inform more sustainable and impactful TVET implementation.

Moreover, with the increasing reliance on technology in both education and the workplace, future research should explore the role of emerging technologies—such as augmented reality (AR), virtual simulation, artificial intelligence (AI), and robotics—in enhancing vocational instruction. Studies focusing on how these technologies can bridge the resource gap (especially in schools with limited equipment or technical infrastructure) may lead to innovative, cost-effective solutions for delivering hands-on training in virtual environments. Investigating how these tools affect student engagement, skill retention, and instructional efficiency will be crucial to modernizing TVET delivery systems.

Additionally, there is great potential in conducting comparative studies across regions or countries with diverse TVET frameworks. Such research could identify which educational policies, pedagogical strategies, and curriculum designs are most effective in embedding 21st-century skills—such as critical thinking, communication, collaboration, adaptability, and digital literacy—into technical training. Comparative analyses may also highlight how contextual factors such as governance, funding models, cultural attitudes toward vocational education, and economic structure influence the success of TVET systems.

Lastly, further research could also focus on the integration of soft skills assessment into vocational education. As technical and academic competencies remain essential, it is equally important to measure and monitor learners' progress in communication, creativity, emotional intelligence, and entrepreneurial thinking—skills that are highly valued in the modern labor force. Developing valid assessment tools and frameworks for these non-technical competencies would provide a more comprehensive picture of learners' readiness for employment and lifelong learning. Future research should not only address the current challenges identified in this study but also seek to inform innovative, forward-looking approaches that strengthen the relevance, inclusiveness, and effectiveness of technical vocational education in preparing learners for a rapidly changing global workforce.

IX. CONCLUSIONS AND RECOMMENDATIONS

Based on the preceding findings, the researcher concludes that the learners exhibit a moderate level of development in essential 21st-century industry-required skills, including technology literacy, critical thinking, problem-solving, adaptability, and innovation; The school's initiatives cultivate industry-relevant 21st-century skills by integrating experiential learning opportunities such as income-generating projects, job shadowing, school-based enterprises, and immersive workplace experiences; The

development of 21st-century skills among learners is hindered by instructional resource shortages, outdated learning materials, limited industry partnerships, limited training, and financial constraints; The proposed strategic plan prioritizes the development of essential 21st-century skills, equipping learners with technology literacy, critical thinking, problem-solving, adaptability, and innovation.

Based on the findings and conclusions, the following recommendations are given (1) The school curricular design be contextualized through strengthening industry partnerships, updating curricula with emerging technologies, and ensuring adequate resources for hands-on training in technical vocational fields. (2) A monitoring and assessment tool primarily intended to assess the 21st-century skills level of development, be crafted and validated to determine the extent of progress.

School mentorship opportunities and integration of emerging technologies be strengthened through experiential learning programs intended both to the teachers and learners. (3) The school has to prioritize resource allocation, update learning materials, enhance teacher training, and secure financial support to ensure effective skill development and workforce readiness of the learners. (4) The proposed strategic plan be adopted to strengthen SPTVE thereby facilitating the acquisition of industry-required 21st century skills.

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