## COMPETENCIES INTEGRATING 21ST CENTURY SKILLS IN TEACHING PRACTICES AMONG TECHNOLOGY AND LIVELIHOOD EDUCATION (TLE) TEACHERS IN THE TECHNICAL-VOCATIONAL SCHOOLS IN THE DIVISION OF NORTHERN SAMAR

**ABSTRACT**

This study aimed to determine the competencies integrating 21st-century skills of Technology and Livelihood Education (TLE) teachers in the technical-vocational schools in the Division of Northern Samar. Specifically, it sought to describe the profile of teachers in terms of their baccalaureate degree earned, years in teaching TLE subjects, relevant trainings attended, and competency certification. It also assessed the extent to which teachers integrate 21st-century skills—namely communication, collaboration and teamwork, critical thinking and problem solving, life-long learning and career skills, learning and innovation, information management, occupational safety and health, environmental literacy, and entrepreneurial skills—as rated by themselves and their school administrators. Furthermore, it examined the significant relationships between the teachers’ profiles and their competencies in integrating these skills.

The study employed a descriptive-correlational research design involving a total enumeration of 170 TLE teachers, along with 15 school heads and 15 TLE department heads from public technical-vocational high schools in the division. Data were collected using a researcher-developed questionnaire anchored on the Philippine TVET Trainers Qualification Framework (PTTQF) and analyzed using frequency counts, percentages, weighted means, and Pearson correlation.

Findings revealed that the teachers were generally very highly competent in integrating 21st-century skills, with the highest level observed in occupational safety and health and the lowest in critical thinking and problem solving. Significant relationships were found between selected profile variables—such as degree earned, teaching experience, trainings attended, and competency certifications—and specific competency domains. These results imply the need for sustained capacity-building efforts, alignment of teaching assignments with academic specialization, and strengthened access to TESDA-aligned certifications and professional development programs to ensure effective delivery of TLE instruction responsive to 21st-century demands.

***Keywords:*** *Work Attitudes, Innovative Work Behavior, Educational Leadership*

1. **INTRODUCTION**

In the age of the Fourth Industrial Revolution, education systems across the globe are under increasing pressure to adapt to rapidly changing technological, social, and economic landscapes. This transformation calls for an urgent recalibration of teacher competencies, particularly in the field of Technology and Livelihood Education (TLE), which plays a pivotal role in equipping learners with job-ready, life-relevant skills [1]. In the Philippine context, the Department of Education (DepEd) and the Technical Education and Skills Development Authority (TESDA) have introduced frameworks and standards that emphasize the integration of 21st-century skills into technical-vocational education to prepare students for the dynamic demands of work and life.

The implementation of the K to 12 Basic Education Curriculum highlights the necessity of strengthening TLE instruction in secondary education to develop learners' technological proficiency, entrepreneurship, and work ethics [2]. DepEd Order No. 42, s. 2017 (National Adoption and Implementation of the Philippine Professional Standards for Teachers) identifies teacher quality indicators that align with 21st-century teaching demands, stressing pedagogical innovation, communication skills, and life-long learning [3]. Meanwhile, TESDA’s Philippine TVET Trainers Qualification Framework (PTTQF) provides guidelines for ensuring that technical-vocational trainers possess not only content expertise but also the competencies to foster innovation, safety, and productivity in the classroom [4].

Recent studies have shown that TLE teachers’ effectiveness is significantly influenced by their educational background, teaching experience, and training participation [5][6]. These factors form part of the teacher profile that correlates with competency in delivering instruction that incorporates communication, collaboration, problem-solving, and environmental awareness—hallmarks of 21st-century education [7].

The increasing relevance of soft skills such as critical thinking, teamwork, and entrepreneurial capacity is emphasized by global frameworks like UNESCO’s Education 2030 Agenda, which has also been integrated into Philippine education policies [8]. DepEd’s issuance of Order No. 21, s. 2019 on the Policy Guidelines for the K to 12 TLE and TVL Track Curriculum underlines the importance of aligning TLE competencies with industry demands, work ethics, and innovation [9]. Additionally, TESDA Circular No. 018, s. 2022 strengthens competency-based training delivery and assessment procedures in line with the National Technical Education and Skills Development Plan (NTESDP) 2023–2028 [10].

However, despite these reforms and guidelines, disparities remain in how teachers in technical-vocational schools integrate these competencies into classroom practice, especially in rural areas such as Northern Samar. Limited access to continuous training, under-resourced schools, and gaps in certification contribute to a variable competency landscape among TLE teachers [11][12]. The need to evaluate teachers' actual integration of 21st-century skills in terms of their communication, collaboration, innovation, and entrepreneurial practices is crucial in improving the delivery of TLE subjects and meeting the expectations of the labor market and national development goals [13].

Thus, this study aims to determine the competencies integrating 21st-century skills of TLE teachers in technical-vocational schools in the Division of Northern Samar, looking into their profiles in terms of baccalaureate degree earned, years in teaching TLE Subjects, relevant trainings attended, competency certification, extent of competency integration based on the PTTQF, and the relationship between their profiles and perceived competencies as rated by themselves and their school administrators.

1. **MATERIALS AND METHODS**

This study was conducted in technical-vocational (Tech-Voc) schools within the Division of Northern Samar and utilized a descriptive-correlational research design to examine the competencies integrating 21st-century skills among Technology and Livelihood Education (TLE) teachers. The target population consisted of 170 teachers handling technical-vocational subjects across 15 Tech-Voc schools. Given the relatively manageable number of teachers and institutions, the study employed complete enumeration for all respondent groups. Specifically, the respondents included all 170 Tech-Voc teachers, along with the 15 school heads and 15 TLE department heads from each technical-vocational-livelihood (TVL) school. The research instrument was anchored on the competency domains integrating 21st-century skills as prescribed by the Philippine TVET Trainers Qualification Framework (PTTQF) [14].

1. **RESULTS AND DISCUSSION**

**TLE Teachers’ Baccalaureate Degree Earned**

Table 1 shows the distribution of TLE teachers in the Division of Northern Samar based on their baccalaureate degrees, which were classified into two main categories: TVL track and non-TVL track degrees. Among the 170 total respondents, the highest proportion—56 teachers or 32.94%—earned the Bachelor of Technology and Livelihood Education (BTLEd), a degree specifically designed to prepare educators for TLE instruction in the K to 12 curriculum. This is followed by 40 teachers or 23.53% who graduated with a Bachelor of Science in Agricultural Education, another degree closely aligned with technical-vocational content, particularly the Agri-Fishery Arts component of TLE. Together, these two programs account for 96 teachers or 56.47%, representing a strong core of educators with formal qualifications related to technical-vocational education and training (TVET).

Other TVL-aligned degrees include BS Information Management (4.12%), BA/BSBA in Management (1.76%), BS in Information Technology (1.18%), BS Accountancy (0.59%), and BS in Hotel and Restaurant Management (0.59%). Though these degrees relate to specific TLE components such as ICT, Entrepreneurship, and Home Economics, their lower representation suggests that specialization in these areas is limited, potentially affecting the range of expertise available in certain TLE strands.

On the other hand, non-TVL degree holders constitute a significant portion of the TLE teaching workforce. Notably, 54 teachers or 31.76% hold a Bachelor of Secondary Education (BSEd), a generalist degree typically intended for teaching core academic subjects. The presence of BSEd graduates in TLE may indicate staffing flexibility in the division, where available teaching manpower is deployed across subject areas regardless of specialization. Other non-TVL degrees such as BS in Community Development (1.18%), BS in Nursing (1.18%), BS in Environmental Science (0.59%), and BS in Political Science (0.59%) were also recorded, though each comprises only a small fraction of the sample. These degrees, while not directly related to the TLE curriculum, suggest that some teachers transitioned into TLE from other disciplines, possibly due to reassignments or lack of available specialized personnel.

The overall data indicate a diverse academic background among TLE teachers, with a majority coming from relevant fields, but a significant minority (approximately 43.53%) holding degrees not originally intended for technical-vocational instruction. This trend has important implications for the quality and depth of instruction in TLE, especially in specialized areas such as ICT, Entrepreneurship, and Industrial Arts. It also underscores the necessity of sustained professional development, TESDA competency certifications, and upskilling programs to bridge the content and pedagogical gaps that may exist among non-TVL graduates. Strengthening alignment between teacher qualifications and teaching assignments remains critical in ensuring the effectiveness of TLE instruction and the achievement of intended learning outcomes in the senior high school Technical-Vocational-Livelihood (TVL) track.

**Table 1. Profile of Teachers in terms of Baccalaureate Degree Earned**

|  |  |  |
| --- | --- | --- |
| **Degree** | **Frequency** | **Percent** |
| TVL track |  |  |
| BTLEd | 56 | 32.94 |
| BS Agricultural Education  | 40 | 23.53 |
| BA/BSBA Management | 3 | 1.76 |
| BS Information Management  | 7 | 4.12 |
| BS Information Technology  | 2 | 1.18 |
| BS Accountancy | 1 | 0.59 |
| BS Hotel and Restaurant Management | 1 | 0.59 |
| Non-TVL track |  |   |
| BSEd | 54 | 31.76 |
| BS Community Development  | 2 | 1.18 |
| BS Nursing  | 2 | 1.18 |
| BS Environmental Science  | 1 | 0.59 |
| BS Political Science | 1 | 0.59 |
| **Total** | **170** | 100 |

**TLE Teachers’ Years in Teaching TLE Subjects**

Table 2 presents the distribution of TLE teachers according to their years of experience in teaching Technology and Livelihood Education (TLE) subjects. Out of the 170 respondents, the majority (119 teachers or 70%) have 1 to 15 years of teaching experience. This indicates that a significant portion of the TLE teaching workforce consists of early- to mid-career educators, possibly reflecting recent hiring initiatives under the K to 12 reform and the growing emphasis on technical-vocational education in the senior high school curriculum.

Meanwhile, 27 teachers or 16% fall within the 16 to 30 years of teaching experience category, representing mid- to late-career professionals who have likely gained extensive exposure to both traditional and modern approaches in TLE instruction. These teachers are presumed to have rich teaching backgrounds and may serve as mentors or leaders within their departments. Their longevity in service also suggests institutional knowledge that can support school-based management and curriculum contextualization efforts.

The group with the longest tenure—31 to 45 years of teaching experience—comprises 24 teachers or 14% of the respondents. This cohort brings decades of teaching practice, likely beginning even before the implementation of the K to 12 program. Their experience can provide valuable insights into the historical evolution of TLE instruction and the shifts in pedagogical and industry trends. However, this group may also face challenges related to integrating newer 21st-century skills, digital tools, or competency-based frameworks without targeted retooling.

Overall, the data show that the TLE teaching workforce in the Division of Northern Samar is relatively young in terms of teaching experience, with 70% having 15 years or less. While this suggests a dynamic and possibly adaptable teaching force, it also implies the need for sustained professional development, especially in technical mastery, competency certification, and pedagogical innovations. At the same time, the presence of more experienced teachers highlights the potential for peer coaching, leadership in curriculum implementation, and preservation of instructional quality. These varied levels of experience across the workforce must be strategically leveraged to ensure effective delivery of TLE and full integration of 21st-century competencies.

**Table 2. Profile of Teachers in terms of Years in Teaching TLE Subjects**

|  |  |  |
| --- | --- | --- |
| **Year in Teaching TLE** | **Frequency** | **Percent** |
| 1 - 15 | 119 | 70 |
| 16 - 30 | 27 | 16 |
| 31 - 45 | 24 | 14 |
| **Total** | **170** | **100** |

**TLE Teachers’ Relevant Trainings Attended**

Table.3 illustrates the range and frequency of local, regional, and national trainings attended by TLE teachers in the Division of Northern Samar. The data reveal a broad but uneven distribution of training participation, with most teachers having attended local-level trainings. Among the local trainings, In-Service Training (96 hours) and Division Training (88 hours) stand out, each attended by two teachers, indicating some level of institutional effort to provide ongoing professional development. Other common local trainings include Produce Organic Concoction and Extracts (24 hours), which was attended by four teachers, reflecting a targeted skill-building effort relevant to agricultural and home economics strands in TLE. Additionally, Trainers Methodology (24 hours) appeared in two entries, suggesting growing awareness of TESDA’s requirement for competency-based instruction.

Despite this variety, the frequency of participation across many local trainings remains very low, often only one teacher per session, pointing to limited reach or access. This limited participation may be due to logistical constraints, funding issues, or a lack of systematized training needs assessment.

At the regional level, participation is even more sparse but notable for higher training hours. For instance, ADM Summit 2024 (264 hours) and Trainers Methodology 1 (156 hours) were each attended by only one teacher, yet reflect a deepened training focus. Similarly, Empowering Education (36 hours) was another regionally organized session, attended by a single participant. This suggests that while regional trainings offer in-depth content, they are not widely attended, perhaps due to selection criteria or limited quotas.

The national-level trainings show a wide variety of topics, including Basic Computer Literacy (120 hours), Carpentry NC II (16–65 hours), Food Processing NC II, and Trainers Methodology (TM)—all TESDA-recognized programs critical for TLE content mastery. Notably, the Master Classes for TLE (24 hours) and Master Classes for Secondary Teachers Grade 7 TLC (264 hours) reflect advanced instructional design and pedagogy training but were also each attended by only one teacher. The fact that multiple participants only appear in local trainings—especially in low-hour, skill-specific sessions—emphasizes a training participation gap at higher levels.

Overall, the data suggest that while teachers in the division have accessed a diverse array of trainings, the participation per training remains low and inconsistent, particularly at the regional and national levels. Most trainings were short-term (24–88 hours) and largely local in scope, indicating a need for more comprehensive, accessible, and inclusive capacity-building programs. Additionally, given the multiple demands of TLE as a multi-strand subject (e.g., ICT, Agri-Fishery, Home Economics, Industrial Arts), there is a need to standardize training participation, align it with teacher specialization, and support TESDA certification pathways through broader rollout of Trainers Methodology and NC II/III programs. A more equitable and strategic approach to training distribution would enhance overall teacher competencies and ensure the effective integration of 21st-century skills in TLE instruction.

**Table 3. Profile of Teachers in terms of Relevant Trainings Attended**

|  |  |  |
| --- | --- | --- |
| **Local Training** | **Hours** | **Frequency** |
| * In-Service Training
 | 96 | 1 |
| * Division Training
 | 88 | 2 |
| * Bread and Pastry Production National Certificate II & Emergency Medical Services National Certificate III
 | 60 | 1 |
| * Cookery National Certificate Level II (NC II)
 | 64 | 1 |
| * In-Service Training on SOLO Taxonomy
 | 36 | 1 |
| * In-Service Training MICRO
 | 120 | 1 |
| * MATATAG Curriculum
 | 84 | 1 |
| * School-Based Training
 | 88 | 1 |
| * Technology TRAINING
 | 24 | 1 |
| * Trainers Methodology
 | 24 | 2 |
| * Transforming Teaching and Learning
 | 24 | 1 |
| * Produce organic concoction and extracts
 | 24 | 4 |
| **Regional Training** | **Hours** | **Frequency** |
| * ADM Summit 2024
 | 264 | 1 |
| * Trainers Methodology 1
 | 156 | 1 |
| * Empowering Education
 | 36 | 1 |
| **National Training** | **Hours** | **Frequency** |
| * Philippine Association for Technology in Home Economics of State Colleges and Universities, Inc
 | 156 | 1 |
| * Basic Computer Literacy
 | 120 | 1 |
| * Carpentry NC II
 | 16 | 1 |
| * Master Classes for TLE
 | 24 | 1 |
| * Master classes for Sec. Teacher Gr. 7 TLC
 | 264 | 1 |
| * NC 2 & MT 1
 | 32 | 1 |
| * NC2 CARPENTRY
 | 65 | 1 |
| * Skills Enhancement Training & Assessment for Tech Voc.
 | 24 | 1 |
| * Trainers Methodology (TM) and Food Processing National Certificate II (FP NC II)
 | 36 | 1 |
| *Note: Multiple Response* |  |  |

**TLE Teachers’ Competency Certification**

Table.4 presents the distribution of TLE teachers according to their TESDA competency certifications, which are essential in validating technical expertise and instructional qualification in the TLE curriculum. Among the 170 respondents, the majority (130 teachers or 76%) hold National Certificate II (NC II) in various fields, making this the most dominant level of certification. The most common NC II certifications include Bread and Pastry Production (40 teachers), Cookery (22), Dressmaking (15), Computer Systems Servicing (15), and Housekeeping (15), reflecting strong coverage in Home Economics and ICT strands. Other notable NC II specializations include Agricultural Crops Production, Automotive Servicing, Electrical Installation and Maintenance, Carpentry, and Plumbing, though with fewer certifications, suggesting a need for strengthened specialization in Industrial Arts and Agri-Fishery strands.

A smaller portion, 8 teachers (5%), hold NC I certifications, including Food Processing, Agricultural Crops Production, and Automotive Body Painting/Servicing. These certificates indicate entry-level qualifications, which, while still valuable, may limit the teachers' ability to deliver more advanced technical content or train learners for industry-level standards. Meanwhile, only 7 teachers (4%) have obtained NC III certifications, such as in Food and Beverage Services, Housekeeping, Electrical Installation, and Programming. This small group represents the highest level of certification among the respondents, showcasing advanced skill mastery and a potential pool of mentors for both students and fellow educators.

Notably, 25 teachers (15%) have no TESDA-issued National Certificate, although some reported completing basic computer operation training. This absence of certification presents a concern, especially in a competency-based curriculum where teacher qualifications are expected to mirror workplace standards. It underscores the need for these teachers to undergo TESDA-accredited training and assessment to align with DepEd and TESDA policies mandating industry-based certification for those handling technical-vocational courses.

In sum, while a substantial majority of TLE teachers possess at least one NC II certificate, the limited number of NC III holders and the presence of non-certified teachers highlight a professional development gap. To ensure quality and industry-aligned TLE instruction, there is a pressing need for expanded access to higher-level TESDA certifications, as well as support systems that enable uncertified teachers to complete relevant training. Strengthening the competency certification profile of TLE teachers is essential in maintaining instructional credibility and equipping learners with market-relevant skills.

**Table 4. Profile of Teachers in terms of Competency Certification**

|  |  |  |
| --- | --- | --- |
| **COMPETENCY** | **Frequency** | **Percent** |
| NC I Food Processing (4)Agricultural Crops Production (2)Automotive Body Painting/Finishing (1)Automotive Servicing (1) | 8 | 5 |
| NC IIBread and Pastry Production (40)Cookery (22)Dressmaking (15)Computer Systems Servicing (15)Housekeeping (15)Agricultural Crops Production (5)Electrical Installation and Maintenance (5)Automotive Servicing (5)Carpentry (4)Plumbing (4) | 130 | 76 |
| NC IIIFood and Beverage Services (2)Housekeeping (2)Electrical Installation and Maintenance (2) Programming (1) | 7 | 4 |
| No National Certificate (teachers have Basic Computer Operation) | 25 | 15 |
| **Total** | **170** | **100** |

**Competencies Integrating 21st Century Skills of Teachers**

Table 5 presents the competences integrating 21st century skills of teachers. In terms of communication, the teachers rated themselves as very highly competent (sub-mean = 4.32). This suggests strong capability in interpreting, processing, and responding to workplace information and instructions. Among the indicators, the highest mean (4.41) was in following written instructions in sequence, implying that teachers are confident in executing clear directives with accuracy. The lowest-rated item (4.20) referred to giving feedback to supervisors, which, although still within the VHC range, may reflect a minor hesitancy in initiating upward communication. This indicates that while teachers can effectively process and act on information, opportunities exist to improve in sharing feedback within professional hierarchies.

For collaboration and teamwork, the teachers again rated themselves very highly competent (sub-mean = 4.37), indicating that they possess a strong sense of cooperation, respect, and shared responsibility. The highest score (4.46) was for positively fulfilling duties to promote cooperation and good relationships, which reflects a culture of mutual respect and collective productivity. The lowest score (4.30), related to contributing to workgroup goals according to organizational requirements, suggests that while collaboration is evident, there may be a slight gap in aligning group work with formal organizational directives or expectations.

Under critical thinking and problem solving, the sub-mean was 4.11, the lowest among all the competency domains, placing it in the highly competent category. Teachers showed strength in identifying problems through observation (4.25), indicating that they are capable of recognizing issues during instructional or operational routines. However, the lowest-rated indicators (3.98) related to developing action plans and presenting recommendations highlight a challenge in formulating and articulating solutions. This suggests a need for targeted development in strategic and evidence-based problem-solving, particularly in formal documentation and presentation of recommendations.

In the area of life-long learning and career skills, teachers received a sub-mean of 4.17, also falling under the highly competent level. Their highest-rated skill was differentiating personal and career goals (4.29), demonstrating self-awareness and clarity in direction. On the other hand, the lowest score (3.92) was in identifying learning styles according to VAK and Kolb’s theories, which may suggest limited exposure to formal theories of learning. While the teachers value continuous learning, further enrichment in metacognitive strategies and applied educational theories could enhance their learning autonomy and capacity to support student learning diversity.

With regard to learning and innovation, the teachers obtained a sub-mean of 4.24, placing them in the very highly competent category. They rated highest (4.35) in recognizing the value of innovative practices, showing strong awareness of its importance in improving work outcomes. However, areas such as reinforcing innovation in others and recognizing obstacles to innovation were the least rated (both at 4.17), implying that while individual innovation is valued, collective implementation and overcoming resistance to change are areas for growth. This highlights the need for fostering a supportive, risk-tolerant environment that encourages innovation at the team level.

In information management, the teachers received a sub-mean of 4.26, indicating very high competence in acquiring, organizing, and utilizing information. The top-rated item (4.36) referred to using techniques to find and share useful information, which emphasizes their strong digital literacy. The lowest-rated item (4.14) was in evaluating information using mathematical or analytical techniques, suggesting that while information gathering is efficient, analytical evaluation needs reinforcement, especially in terms of data-driven decision-making and assessment practices.

Occupational safety and health emerged as the strongest domain, with a sub-mean of 4.50—the highest among all indicators. Teachers demonstrated outstanding knowledge and application of OSH principles, particularly in recognizing hazards (4.57), complying with protocols, and using personal protective equipment appropriately. This reflects a deeply embedded safety culture among TLE teachers, which is vital in technical-vocational contexts where physical risks are present in hands-on learning environments.

In terms of environmental literacy, the sub-mean of 4.35 signifies very high competence. The top indicator (4.46) was recognizing environmental hazards, reflecting heightened awareness of workplace environmental risks. Lower scores (around 4.26–4.30) were noted in executing activities and utilizing resources according to environmental standards. Although still rated VHC, these scores suggest a small implementation gap between knowledge and practice, warranting reinforcement of sustainability-focused instruction and compliance.

Lastly, in entrepreneurial skills, the teachers obtained a sub-mean of 4.31, again within the very highly competent range. The highest-rated competency (4.33) involved identifying entrepreneurial mindsets based on enterprise practices, while the lowest (4.29) referred to seeking clarification from reliable sources on entrepreneurship and corporate culture. These ratings indicate a solid entrepreneurial foundation among TLE teachers, with minor gaps in further industry engagement and professional learning related to enterprise systems and innovation.

Overall, the teachers demonstrated an overall mean of 4.29, interpreted as very highly competent in integrating 21st-century skills into their professional practice. The findings highlight exceptional competence in occupational safety and health, collaboration, and communication, while critical thinking/problem solving and learning theory application emerged as areas for professional development. These results suggest that the TLE teachers in the Division of Northern Samar are well-equipped to deliver technical-vocational instruction aligned with national competency standards and 21st-century demands, yet could benefit from ongoing training in reflective practice, innovation leadership, and advanced problem-solving.

**Table 5. Competencies Integrating 21st Century Skills of Teachers**

|  |  |  |
| --- | --- | --- |
| **Communication** | **Weighted Mean** | **Interpretation** |
| I gather the required information by listening attentively and correctly interpreting or understanding information/instructions | 4.31 | VHC |
| I record the instructions/information in accordance with workplace requirements | 4.30 | VHC |
| I act upon immediately the instructions in accordance with information received | 4.30 | VHC |
| I seek clarification from workplace supervisor on all occasions when any instruction/ information is not clear | 4.39 | VHC |
| I read and interpret the written notices and instructions correctly in accordance with organizational guidelines | 4.37 | VHC |
| I follow in sequence the written instructions. | 4.41 | VHC |
| I give feedback to workplace supervisor based on the instructions/information received | 4.20 | VHC |
| **Sub-mean** | **4.32** | **VHC** |
| **Collaboration and teamwork** |  |  |
| I follow duties and responsibilities in a positive manner to promote cooperation and good relationship. | 4.46 | VHC |
| I seek assistance from workgroup when difficulties arise and addressed through discussions | 4.37 | VHC |
| I encourage, acknowledge and act upon the feedback provided by others in the team. | 4.35 | VHC |
| I respect the differences in personal values and beliefs during interaction. | 4.45 | VHC |
| I provide support to team members to ensure workgroup goals are met | 4.36 | VHC |
| I make constructive contributions to workgroup goals and tasks according to organizational requirements. | 4.30 | VHC |
| I share information relevant to work with team members to ensure designated goals are met. | 4.31 | VHC |
| **Sub-mean** | **4.37** | **VHC** |
| **Critical thinking and problem solving** |  |  |
| I define the nature of the problem by observation on routines | 4.25 | VHC |
| I consider all possible options for resolution of the routine problem. | 4.22 | VHC |
| I specify the possible fundamental causes of problems. | 4.19 | HC |
| I select problem-solving tool appropriate to the problem and the context. | 4.18 | HC |
| I identify possible causes based on experience and the use of problem-solving tools/basic analytical techniques. | 4.17 | HC |
| I identify desired operating/output parameters and expected quality of products/services. | 4.17 | HC |
| I state and specify problems clearly. | 4.10 | HC |
| Solve/address routine problems  | 4.09 | HC |
| I prepare report on recommendations. | 4.03 | HC |
| I determine corrective actions to resolve the problem and possible future causes. | 4.00 | HC |
| I develop action plans identifying measurable objectives, resource needs and timelines in accordance with safety and operating procedures. | 3.98 | HC |
| I present recommendations to appropriate person. | 3.98 | HC |
| **Sub-mean** | **4.11** | **HC** |
| **Life-long learning and career skills** |  |  |
| I describe the difference between personal and career goals. | 4.29 | VHC |
| I develop clear and concise personal and career goals. | 4.25 | VHC |
| I identify characteristics of motivational goals according to Locke & Latham. | 4.08 | HC |
| I describe influence that people, situations and events have on emotions. | 4.21 | VHC |
| I explain the importance of responding with appropriate emotions. | 4.23 | VHC |
| I examine the influences on and consequences of emotional responses in social and work-related contexts. | 4.14 | HC |
| I identify and describe the factors and strategies that assist learning. | 4.19 | HC |
| I identify the preferred learning styles according to VAK Learning Style Model and Kolb’s Theory of Learning Styles. | 3.92 | HC |
| I identify and choose the range of learning strategies appropriate to specific tasks and describe work practices that assist their learning | 4.20 | VHC |
| **Sub-mean** | **4.17** | **HC** |
| **Learning and innovation** |  |  |
| I recognize the value of innovative practices in the workplace. | 4.35 | VHC |
| I maintain the environment conducive for learning and innovating. | 4.31 | VHC |
| I recognize the need for innovation in own scope of work. | 4.26 | VHC |
| I analyze the creative ideas of coworkers pertaining to work practices. | 4.24 | VHC |
| I apply creativity in innovation in one’s scope of work. | 4.24 | VHC |
| I identify opportunities within the team to develop innovation. | 4.23 | VHC |
| I accomplish sharing of best practices using flexible and innovative ways of working. | 4.19 | HC |
| I reenforce individuals and key people to identify innovative ideas to achieve outcomes. | 4.17 | HC |
| I recognize obstacles to progress in implementing flexible and innovative ways of working | 4.17 | HC |
| **Sub-mean** | **4.24** | **VHC** |
| **Information management** |  |  |
| I identify the required information based on requirements. | 4.23 | VHC |
| I identify and access the sources to produce required information. | 4.20 | VHC |
| I collect, organize and record report information. | 4.26 | VHC |
| I collect the organized information in a way that enables easy access and retrieval by other staff. | 4.23 | VHC |
| I use engine in searching, finding and selecting appropriate information. | 4.30 | VHC |
| I use the suitable techniques to make it easier to find useful information and to pass it on to others | 4.36 | VHC |
| I use the records where useful information came from. | 4.34 | VHC |
| I use the results for searches of useful information. | 4.32 | VHC |
| I choose appropriately the search engine for the information that is needed. | 4.34 | VHC |
| I carry out searches as per requirements. | 4.28 | VHC |
| I evaluate information and its sources for relevance and validity to business and/or client requirements. | 4.19 | HC |
| I examine the information as required to identify key issues. | 4.20 | VHC |
| I carry out detailed evaluation of information as required using relevant techniques including mathematical calculations. | 4.14 | HC |
| **Sub-mean** | **4.26** | **VHC** |
| **Occupational safety and health** |  |  |
| I recognize the related occupational safety and health risks and hazards based on OSH work standards | 4.57 | VHC |
| I determine OSH requirements/regulations towards work in accordance to workplace policies and procedures. | 4.52 | VHC |
| I follow the OSH Work instructions in accordance with workplace policies and procedures. | 4.51 | VHC |
| I identify the incident/emergency procedures relevant to workplace based on relevant OSH work standards. | 4.51 | VHC |
| I execute the incident/emergency procedures based on OSH Procedures. | 4.50 | VHC |
| I identify the preventive Control Measures in accordance with OSH work standards. | 4.50 | VHC |
| I check the safety devices in accordance with workplace OSH work standards | 4.48 | VHC |
| I obey the OSH requirements in accordance with workplace policies and procedures. | 4.48 | VHC |
| I utilize the personal protective equipment, materials, tools, machinery, and equipment according to OSH work standards. | 4.47 | VHC |
| **Sub-mean** | **4.50** | **VHC** |
| **Environmental literacy** |  |  |
| I recognize related environmental hazards based on environmental work standards | 4.46 | VHC |
| I interpret the environmental work standards in accordance to relevant policies | 4.41 | VHC |
| I prepare the required resources to minimize effect of environmental hazards based on relevant environmental work standards | 4.41 | VHC |
| I practice environmental protection pre-cautionary activities based on environmental work procedures | 4.29 | VHC |
| I execute work activities in accordance with Environmental work Procedures | 4.26 | VHC |
| I accomplish the environmental Protection Post- Activities based on environmental work procedures | 4.29 | VHC |
| I utilize the required resources in accordance with workplace environmental policies | 4.30 | VHC |
| I store the environmental hazardous and non- hazardous materials in accordance with environmental regulations | 4.37 | VHC |
| I dispose the Hazardous and Non-hazardous Wastes according to environmental regulations | 4.37 | VHC |
| **Sub-mean** | **4.35** | **VHC** |
| **Entrepreneurial skills** |  |  |
| I determine the entrepreneurial mindset in the workplace from enterprise practices and policies | 4.33 | VHC |
| I study and affirm the entrepreneurial mindset in the workplace based on current enterprise practices | 4.30 | VHC |
| I seek clarification from reliable sources regarding entrepreneurial mindset and corporate culture. | 4.29 | VHC |
| I determine the entrepreneurial practices based on enterprise requirements | 4.32 | VHC |
| I perform the entrepreneurial practices following workplace and client requirements | 4.31 | VHC |
| I comply with the cost-effective measures with reference to workplace best practices | 4.30 | VHC |
| **Sub-mean** | **4.31** | **VHC** |
| **Overall mean** | **4.29** | **VHC** |

*Legend:*

*4.20-5.00 very highly competent (VHC)*

*3.40-4.19 highly competent (HC)*

*2.60-3.39 moderately competent (MC)*

*1.80-2.59 fairly competent (FC)*

*1.00-1.79 not competent (NC)*

**Relationship between the Profile of TLE Teachers and Their Extent of Competencies Integrating 21st Century Skills**

Table 6 shows the test of relationship between the profile of TLE teachers and their extent of competencies integrating 21st century skills. In the area of communication, there was a significant negative correlation between both the baccalaureate degree earned (r = -0.300, p = 0.000) and years in teaching TLE subjects (r = -0.304, p = 0.011). This implies that teachers with higher academic degrees or longer years of service tend to rate themselves slightly lower in communication competencies. While this may seem counterintuitive, it could suggest that more experienced or more formally educated teachers are more critical of their communication performance, or perhaps less attuned to newer workplace communication demands. Meanwhile, relevant trainings attended (r = -0.188, p = 0.077) and competency certification (r = -0.128, p = 0.091) had no significant relationship, indicating that these factors do not strongly influence self-perceived communication skills.

Regarding collaboration and teamwork, the only significant relationship was found with years in teaching TLE subjects (r = -0.580, p = 0.031). The negative correlation suggests that the longer the teaching experience, the lower the self-rating in collaboration, possibly reflecting generational differences in teamwork preferences or resistance to collaborative innovations. No significant relationships were found with baccalaureate degree earned, relevant trainings attended, or competency certification, suggesting that educational background and formal qualifications may not directly affect how teachers perceive their collaborative capabilities.

In terms of critical thinking and problem solving, significant relationships were observed with baccalaureate degree earned (r = -0.314, p = 0.034) and competency certification (r = 0.399, p = 0.035). Interestingly, the negative correlation with educational attainment again implies that those with higher degrees are more modest or critical in their self-assessment. On the other hand, the positive correlation with certification indicates that teachers with TESDA or other competency credentials tend to exhibit stronger problem-solving abilities, likely due to applied training and exposure to real-world scenarios. Years in teaching and trainings attended were not significantly related to this domain.

When it comes to life-long learning and career skills, there were significant relationships with both baccalaureate degree earned (r = 0.389, p = 0.021) and years in teaching TLE subjects (r = -0.480, p = 0.004). The positive correlation with academic degree shows that advanced education enhances lifelong learning awareness, while the negative correlation with teaching experience might indicate a complacency or stagnation among those who have been in service longer. Relevant trainings and certifications, however, had no significant impact on this skill set.

For learning and innovation, two different sets of correlations were shown. In the first set, relevant trainings attended (r = 0.580, p = 0.031) and competency certification (r = 0.105, p = 0.059) showed significant and nearly significant relationships, respectively. This suggests that training programs positively influence teachers' confidence and performance in implementing innovative practices. The second set indicated a significant relationship between years in teaching TLE subjects and learning and innovation (r = 0.391, p = 0.035), revealing that experienced teachers may still be capable of embracing innovation, perhaps due to cumulative learning or adaptive capacity. Other variables like baccalaureate degree and training attendance had no consistent significant effect across both tests, possibly indicating a need to standardize training exposure.

For occupational safety and health, none of the teacher profile variables—baccalaureate degree earned, years in teaching, trainings attended, or competency certification—had significant relationships with the competency integration. All p-values were above 0.05, suggesting that teachers' strong performance in OSH (as seen in Table 5) may be a result of system-wide compliance, embedded protocols, or standardized school-based policies rather than individual background characteristics.

In the domain of environmental literacy, the findings also showed no significant relationships with any of the teacher profile variables. This suggests that environmental competencies may be uniformly developed among teachers regardless of their academic degree, experience, training, or certification. It may also reflect that environmental procedures are institutionalized and not highly dependent on personal qualifications or backgrounds.

Regarding entrepreneurial skills, there were significant relationships with both relevant trainings attended (r = 0.391, p = 0.035) and competency certification (r = 0.422, p = 0.001). These findings underscore the value of both formal and non-formal upskilling in fostering entrepreneurial competencies. Trainings and certifications likely exposed teachers to enterprise models, cost-efficiency practices, and industry-aligned applications of entrepreneurship. Meanwhile, no significant correlations were observed with baccalaureate degree and years in teaching, indicating that practical, skill-based learning may be more relevant in developing entrepreneurship than academic background or teaching tenure.

In summary, the data shows that specific aspects of the teachers’ profile—particularly educational attainment, teaching experience, trainings attended, and competency certification—have varying degrees of influence on their integration of 21st-century skills. Notably, teaching experience had significant negative relationships with collaboration, communication, and life-long learning, suggesting a need for reinvigorated engagement strategies for long-serving teachers. Conversely, competency certifications and trainings were significantly linked to critical thinking, innovation, and entrepreneurial skills, highlighting the importance of continuous professional development and alignment with TESDA’s PTTQF standards. These findings suggest that targeted interventions, especially for experienced teachers and those with fewer certifications, could strengthen 21st-century skill integration across all domains.

**Table 6. Profile and Extent of Competencies Integrating 21st Century Skills**

|  |  |  |
| --- | --- | --- |
| **Competencies integrating 21st century skills** | **Parameters** | **Profile of teachers**  |
| **baccalaureate degree earned** | **years in teaching TLE subjects** | **relevant trainings attended** | **competency certification** |
| communication | Pearson Correlation | **-0.300** | **-0.304** | -0.188 | -0.128 |
| Sig. (2-tailed) | **0.000** | **0.011** | 0.077 | 0.091 |
|   | Interpretation | **S** | **S** | NS | NS |
| collaboration and teamwork | Pearson Correlation | -0.104 | **-0.580** | 0.111 | 0.103 |
| Sig. (2-tailed) | 0.063 | **0.031** | 0.540 | 0.240 |
| Interpretation | NS | **S** | NS | NS |
| critical thinking and problem solving | Pearson Correlation | **-0.314** | 0.020 | 0.067 | **0.399** |
| Sig. (2-tailed) | **0.034** | 0.230 | 0.257 | **0.035** |
| Interpretation | **S** | NS | NS | **S** |
| life-long learning and career skills | Pearson Correlation | **0.389** | **-0.480** | 0.111 | 0.109 |
| Sig. (2-tailed) | **0.021** | **0.004** | 0.067 | 0.614 |
| Interpretation | **S** | **S** | NS | NS |
| learning and innovation | Pearson Correlation | 0.055 | 0.104 | **0.580** | **0.105** |
| Sig. (2-tailed) | 0.340 | 0.543 | **0.031** | **0.059** |
| Interpretation | NS | NS | S | **S** |
| learning and innovation | Pearson Correlation | 0.119 | **0.391** | 0.020 | 0.100 |
| Sig. (2-tailed) | 0.065 | **0.035** | 0.230 | 0.090 |
| Interpretation | NS | **S** | NS | NS |
| occupational safety and health | Pearson Correlation | 0.044 | 0.111 | 0.073 | 0.117 |
| Sig. (2-tailed) | 0.270 | 0.240 | 0.171 | 0.231 |
| Interpretation | NS | NS | NS | NS |
| environmental literacy | Pearson Correlation | 0.103 | 0.039 | 0.109 | 0.106 |
| Sig. (2-tailed) | 0.24 | 0.299 | 0.614 | 0.647 |
| Interpretation | NS | NS | NS | NS |
| entrepreneurial skills | Pearson Correlation | 0.102 | 0.119 | **0.391** | **0.422** |
| Sig. (2-tailed) | 0.323 | 0.065 | **0.035** | **0.001** |
| Interpretation | NS | NS | **S** | **S** |
| *\*\*. Correlation is significant at the 0.01 level (2-tailed).* |  |  |

**CONCLUSION**

A majority of the teachers hold TVL-aligned degrees, particularly BTLEd and BS Agricultural Education. Training participation is varied but uneven, with many teachers attending localized in-service and division-level programs, while participation in regional and national training programs remains limited. This implies that while the Division of Northern Samar has a growing pool of TLE teachers with foundational qualifications and varied teaching experience, there remains a pressing need to strengthen the alignment between teachers’ academic backgrounds and the specific demands of the TLE curriculum. This implies that teachers may not yet be fully equipped to meet the evolving standards of technical-vocational education, particularly in the integration of 21st-century skills. Therefore, this underscores the importance of providing targeted, competency-based training, TESDA-aligned certifications, and continuous professional development programs that will empower TLE teachers to deliver relevant, skills-driven, and industry-aligned instruction.

TLE teachers are generally very highly competent in integrating 21st-century skills into their teaching practice. This implies that while TLE teachers in the Division of Northern Samar are generally well-equipped to deliver instruction aligned with 21st-century competencies—particularly in areas such as safety, collaboration, and communication—there is still a need to enhance their critical thinking and problem-solving skills. The consistently high ratings in most domains reflect a strong foundation for effective teaching in technical-vocational contexts. However, the relatively lower performance in analytical and strategic domains suggests that teachers may benefit from targeted capacity-building programs focused on higher-order thinking, decision-making, and innovation. Strengthening these areas will not only improve classroom instruction but also better prepare students for real-world challenges in the workplace and society.

Profile variables have statistically significant relationships with specific 21st-century competencies, while others do not. Notably, baccalaureate degree earned showed significant negative correlations with communication, critical thinking, and problem-solving. Years in teaching TLE subjects was significantly related to collaboration, life-long learning, and learning and innovation. Relevant trainings attended and competency certifications showed significant positive relationships with learning and innovation, entrepreneurial skills, and critical thinking. This implies that a teacher’s academic background, length of teaching experience, and participation in relevant training and certification programs can significantly influence the integration of 21st-century competencies in TLE instruction. The findings emphasize the importance of aligning teacher qualifications and continuous learning opportunities with the evolving demands of technical-vocational education to ensure more effective and relevant instruction across all TLE strands.

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1.

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3.

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