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Profile, Proficiency, and Challenges of Teachers in Integrating ICT in Technology and Livelihood Education

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***Abstract*—** This study aimed to determine the profile and perceptions of the teachers on their level of proficiency in Information and Communications Technology (ICT) integration in Technology and Livelihood Education (TLE) in secondary schools of the four districts in Bulan for the school year 2022-2023. It utilized the descriptive-survey method of research since a questionnaire was used in gathering the data. The respondents were the 73 TLE teachers from the four districts in the municipality of Bulan. The statistical tools employed were frequency, percentage, weighted mean, and Chi-square test. This study revealed that TLE teachers are predominantly in the age group of 31 to 35 years old, the majority of them being female and having 6 to 10 years of teaching experience. Most of these teachers hold a bachelor's degree, and a significant portion has received ICT training at the school-based or district level. The TLE teachers are proficient in integrating ICT in Home Economics and ICT. However, they are moderately proficient in Agriculture and Fishery Arts and Industrial Arts. There is a significant relationship between the profile of TLE teachers and their level of proficiency in ICT integration along Home Economics, Agriculture and Fishery Arts, Industrial Arts, and ICT. Recommendations were given based on the findings of this study.

***Keywords*—** Agriculture and Fishery Arts, Home Economics, ICT, Industrial Arts, TLE teachers

I. INTRODUCTION

In today's situation, the integration of technology in the teaching-learning process has been a necessity in the use of technology in order to enhance the learning experience of students. Likewise, the utilization of technology in the classroom usually allows learners to actively engage with the learning objectives.

The twenty-first century provided us an era of globalization which brought huge impacts on several fields such as economy, science, society, information, and education with the help of Information and Communications Technology (ICT). ICT has been extensively used in the modern world, particularly in developed countries (Murgor, 2015) because societies have tended to be more multilingual and diverse in terms of thoughts and cultural norms. As a result, people began to use ICT to break the barriers from the idea of otherness to cope with these differences in communication (Marczak,2013). The responsibility to help the citizens to communicate with members of other societies belongs to the country's education system especially the foreign language teachers as foreign language teaching improves intercultural communication competence (Ellis, Ginns, & Piggott, 2009).

ICT has been recognized as a catalyst for change. As observed, ICT plays a great factor in advancing working conditions, developing modes of communication, improving the teaching and learning process, advancement in research and scientific studies, and convenient retrieval and access to information. In the study of Raja about the Impact of Technology in Modern Education, the researcher cited the aggressive and interactive impact of technology in the field of education as part of the curriculum, as a system for instructional delivery, as instructional support, and as a device to enhance the entire learning process.

On the other hand, UNESCO (2016) recognized the importance of digital technologies and innovations that transformed modes to complement, augment, and link people across the world, and helped address personal to global challenges in education. These technologies established universal access to quality and relevant learning, promoted inclusivity, and improved education management and administration.

As such, Information and Communications Technology (ICT) is directly associated with educational technology specifically in the education sector. Teaching innovations and technological integration are pragmatic in curriculum implementation. Ratheeswari supported

how technology is considered vital to education and pointed out that the use of ICT has increased the effectiveness of quality teaching.

Educators need to cope with the fast-paced changing world. Both developed and developing countries were adapting to the trends in education. Locally, the Philippine government amended the educational system of the country and implemented the K-to-12 curriculum to enhance the educational system of the country to satisfy the demands of the global market standards and to produce globally competitive graduates equipped with master skills and developed core competencies.

In the Philippine education setting, the performance management of the educators determines the organizational performance of its governing agency. The Department of Education (DepEd) is mandated to manage the country's system of basic education by ensuring access to, promoting equity in, and improving the quality of basic education which followed CSC Memorandum Circular RPMS ins. 2012, or the implementation of the Strategic Performance Management System (SPMS) that aims "To ensure efficient, timely and quality performance among personnel," implemented the Results-based Performance Management System (RPMS) under DepEd issued Order No. 2, s. 2015 or also known as "Guidelines on the Establishment and Implementation of the Results-based Performance Management System (RPMS) in the Department of Education." Thus, the alignment of the RPMS with the Philippine Professional Standards for Teachers (PPST) has led to the application of results-based tools. Through the RPMS, the DepEd makes sure that work activities are directed toward realizing its vision, mission, values, and strategic priorities for providing Filipino students with high-quality educational services. The creation of new results-based assessment tools was a result of the harmonization of the RPMS with the Philippine Professional Standards for Teachers.

The teaching performance, strategies, practices, or materials used by the teachers during the actual classroom observation were measured with the COT rubric as an assessment tool. Each evident indicator of the PPST measures the classroom performance of the teachers in each learning area or grade level they teach. One of the observable indicators that focus on selecting, developing, organizing, and using the appropriate teaching and learning resources including ICT to address learning goals, that encourage the aid or application of ICT during the teaching and learning process making every discussion effective, innovative, interactive, and interesting for the learners.

Hence, ICT technologies including gadgets such as computers, laptops, and printers became a necessity for the teachers' jobs. These technologies aid the teachers in lesson planning, creating instructional materials, and using different learning strategies for effective lesson delivery. Based on the researcher's observation, all TLE teachers in the four districts in Bulan, a municipality in the Schools Division of Sorsogon, are using these technologies in teaching. As observed by the researcher, most of the teachers learned to use computers through self-exploration or seeking assistance from their colleagues since the Department of Education offers a limited number of trainings and professional development opportunities for TLE teachers. UNESCO (2016) stresses the importance of using diverse ICT tools in daily classroom settings thus replacing the traditional teaching method which further enhances managing information, communication, creation, storage, and retrieval. In an unstructured interview, TLE teachers notably suggested the need for other ICT tools or technologies that will be useful in teaching the subject and more learning opportunities for ICT and educational technology integration.

This study focused on the profile and proficiency of the TLE teachers in the four districts of Bulan in their ICT integration to effectively equip their students with the right skills and knowledge based on the pedagogical competencies, content, and performance standards by utilizing appropriate utilization of educational technologies and ICTs. The expertise of the TLE teachers on the usefulness and advantages of ICT integration as well as pondering on the challenges faced by integrating ICTs, educational technologies, and innovations into their daily crafting of lessons, planning and instructional design, lesson execution and delivery, classroom management and professional development converging on the ICTs constituted on their daily or weekly lesson logs. The study also probed the teachers' ICT proficiency, previous, current, and to-be-implemented ICT integrations, or innovations with the aim of providing the appropriate in-service training in order to address the gap as reflected in the results of this study.

Generally, this study aimed to determine the profile, proficiency, and challenges of teachers in integrating Information and Communication Technology (ICT) in

Technology and Livelihood Education (TLE) as inputs to the development of an in-service training program in secondary schools of the Municipality of Bulan for the school year 2022-2023. Specifically, it sought to answer the following questions: (1) What is the profile of the TLE teachers in terms of age, sex, length of service, educational attainment; and highest level of ICT training attended? (2) What is the level of proficiency as perceived by the teachers in ICT integration in TLE along Home Economics, Agriculture and Fishery Arts, Industrial Arts; and Information and Communications Technology (ICT)?

II. METHODOLOGY

Research Design

This study aimed to determine the profile, proficiency, and challenges of teachers in integrating Information and Communication Technology (ICT) in Technology and Livelihood Education (TLE) as inputs to the development of an in-service training program in secondary schools of the Municipality of Bulan for the school year 2022-2023. It made use of the descriptive-survey research method in which a questionnaire was the instrument in gathering the data from the target respondents.

Similarly, the respondents of this study were 73 Public Secondary TLE Teachers from the four Districts of Bulan namely Bulan I, II, III, and IV. The statistical tools employed were the frequency, percentage, and weighted mean.

The Sample

The primary source of data was taken from 73 Junior High School TLE Teachers from the four districts of Bulan. The researcher used a complete or total enumeration sampling method. Complete enumeration purposive sampling means a full count of all the population since the subject of this study was the TLE teachers. The data were collected from all the elements of the population.

Table 1. *The Respondents*

Districts	Frequency (f)	Percentage (%)
I	18	25
II	17	23
III	19	26
IV	19	26
Total	73	100

The distribution of TLE teachers per district is presented in the table. Bulan I is composed of 18 TLE teachers equivalent to 25% of the total sample, 17 teachers, which is 23% of the total sample came from Bulan II, and both Bulan III and IV had 19 teachers, each comprising 26%.

The Instrument

This study utilized a descriptive-survey design in which a questionnaire was devised in gathering the data. The contents of it were based on research questions.

Initially, the researcher drafted the questionnaire which was shown to the adviser. It was composed of three parts in which the first part included the profile of the TLE teachers in terms of age, sex, length of service, educational attainment, and highest level of training attended. The second part contained the perception of the level of proficiency of TLE teachers in ICT integration along Home Economics, Agriculture and Fishery Arts, Industrial Arts, and Information and Communications Technology. The third part covered the challenges met by the TLE teachers in ICT integration.

Similarly, the indicators included in determining the level of proficiency of TLE teachers in ICT integration were adopted from the Curriculum Guide and DepEd Most Essential Learning Competencies (MELCS) which were rephased in order to suit the most essential contents and performance standards in the new normal learning. After the completion of the questionnaire, it was sent to the members of the panel for comments and approval.

Upon approval of the final form of the instrument, the researcher conducted a dry run to the TLE teachers at the private schools in Bulan with the intent of validating the face of the questionnaire. After the dry run, the researcher incorporated the suggestions given by the teachers and prepared the final form of the questionnaire for administration to the target respondents.

Data Analysis Procedures

The collected data from the respondents were subjected to appropriate statistical analyses depending on their nature and level of measurement. Descriptive statistics were utilized in treating the data.

The frequency and percentage were used in determining the profile of TLE teachers in terms of age, sex, length of service, educational attainment, and highest level of ICT training attended. Similarly, the weighted mean was utilized to determine the perception of the teachers on their level of proficiency in ICT integration along Home Economics, Agriculture and Fishery Arts, Industrial Arts, and Information and Communication Technology. The scale below was used in order to interpret the values obtained: 1.00 - 1.49 (Least proficient); 1.50 – 2.49 (Less proficient); 2.50 – 3.49 (Moderately proficient); 3.50 – 4.49 (Highly proficient0; 4.50 – 5.00 (Very highly proficient).

III. RESULTS AND DISCUSSION

The presentation of data included the following: 1) profile of TLE teachers in terms of age, sex, length of service, educational attainment, and the highest level of ICT training attended; 2) perception of the TLE teachers on their level of proficiency in ICT integration along Home Economics, Agriculture and Fishery Arts, Industrial Arts, and ICT.

1. Profile of TLE Teachers

Table 2 contains the frequency and percentage of the profile of the TLE teachers along age, sex, length of service, educational attainment, and highest level of training attended.

Table 2. *Profile of the TLE teachers*

Variables	f (n=73)	%
Age (in years)		
30 and below	15	21
31 to 35	19	26
36 to 40	9	12
41 to 45	17	23
46 and above	13	18
Sex		
Male	21	29
Female	52	71
Length of Service (in years)		
5 and below	14	19
6 to 10	34	47
11 to 15	12	16
16 to 20	6	8
21 and above	7	10
Educational Attainment		
Bachelor's degree	39	53
CAR	31	42
Master's degree	3	5
Highest level of training attended		
District	37	51
Division	15	21
Regional	9	12
National	12	16

Age. The age distribution of TLE teachers in the study is quite diverse. The largest proportion of teachers falls within the age group of 31 to 35 years old, accounting for 26% of the total sample. This is followed closely by teachers aged 41 to 45 years old, constituting 23% of the sample. The age groups of 26 to 30 years old and 46 years old and above each represent around 18% of the sample. Teachers aged 36 to 40 years old made up 12%, and the smallest group is those aged 21 to 25 years old, at 3%.

The age diversity among TLE teachers suggests that the study includes educators from various stages of their careers, ranging from early-career teachers to more experienced ones. The higher percentages of teachers in the 31-35 and 41-45 age groups may imply that there is a substantial number of mid-career teachers with several years of teaching experience. These teachers may potentially offer a heap of pedagogical experience to the study. The presence of teachers in the 21-25 and 26-30 age groups indicates the inclusion of younger educators. These teachers may bring a fresh perspective and potentially be more tech-savvy, which could impact their approach to ICT integration in TLE. The relatively smaller percentage of teachers aged 36-40 may reflect a potential gap in terms of teaching experience and familiarity with newer educational technologies. Bridging this gap through training and collaboration may be beneficial.

Sex. The data shows that the majority of TLE teachers in the sample are female, accounting for 71% of the total sample. In contrast, male TLE teachers make up a smaller percentage, at 29%.

The significant imbalance in sex distribution among TLE teachers raises questions about diversity within the field. This may indicate a potential sex disparity in career choices within the education sector, with more females opting for TLE teaching roles. The higher representation of female TLE teachers may have implications for the diversity of perspectives and role models available to students. It's important to ensure that both male and female students have access to educators of both sexes as mentors. Sex distribution may also influence teaching approaches and classroom dynamics. Different sexual identities may bring unique teaching styles, approaches, and perspectives that can benefit students' learning experiences.

Having a mix of male and female TLE teachers can provide students with a broader range of role models and career options, potentially encouraging more inclusive and diverse career choices. Consideration should be given to tailoring professional development opportunities to address the specific needs and interests of both male and female TLE teachers. For example, providing training in gender-inclusive teaching methods can be valuable. The sex distribution data may also reflect broader societal stereotypes and expectations regarding career choices. Encouraging diversity and breaking down gender-based stereotypes can be a focus in teacher training and curriculum development.

This claim was supported by Barker (2012) that ensuring equitable opportunities and support for both male and female TLE teachers is essential to fostering a positive and inclusive educational environment.

The distribution across age groups suggests a relatively balanced representation, which can help in drawing more comprehensive conclusions about ICT integration practices among TLE teachers. Given the varying levels of experience and potential differences in comfort with technology among different age groups, the study may need to consider tailoring support and training strategies to meet the specific needs of each group (Ahmadi, Keshavarzi, & Foroutan, 2021).

Length of Service. The data reveals that the majority of TLE teachers have been in service for 6 to 10 years, accounting for 47% of the total sample. The next most significant group is teachers with 1 to 5 years of service, constituted 19%. There are smaller percentages of teachers with 11 to 15 years (16%), 21 years and more (10%), and 16 to 20 years (8%) of service.

The concentration of teachers in the 6 to 10 years of service category indicates that a significant portion of the TLE teaching workforce is in the mid-career stage. These teachers likely may acquired substantial experience and expertise, which can be valuable for mentoring newer teachers. Teachers with 11 years and more of service, as well as those in the 21 years and more category, represent a valuable resource for mentorship and knowledge sharing. They may play a crucial role in helping less experienced teachers adapt to the profession. The presence of teachers with 1 to 5 years of service highlights the continuous influx of new educators into the TLE teaching field. They may bring fresh perspectives and a willingness to adopt innovative teaching practices.

According to Bingimlas (2019), the distribution across different service lengths could also reflect the level of retention and career satisfaction among TLE teachers. Understanding the reasons behind teachers' decisions to stay or leave the profession can be essential for workforce planning. Tailoring professional development opportunities to cater to the needs of teachers at different stages of their careers is important. Newer teachers may require more foundational training, while experienced teachers may benefit from advanced courses or leadership development. Schools and educational authorities should consider succession

planning to ensure a smooth transition of knowledge and expertise as more experienced teachers approach retirement.

Educational Attainment. The data reveals that the majority of TLE teachers in the sample hold a bachelor's degree, accounting for 53% of the total sample. A significant portion of teachers (42%) have attained a master's degree, specifically a CAR (Creditable Academic Requirements) master's degree. A smaller percentage (5%) holds a traditional master's degree.

The presence of teachers with diverse educational backgrounds suggests that TLE departments may benefit from a mix of perspectives and expertise. Teachers with bachelor's degrees bring subject-specific knowledge, while those with master's degrees can contribute advanced pedagogical insights. Teachers with master's degrees, especially those with CAR master's degrees, may have gone through specialized trainings that can position them as potential leaders or specialists in TLE curriculum development and instructional design. It is essential to offer ongoing professional development opportunities for both groups. Bachelor's degree holders can benefit from training that enhances their pedagogical skills, while master's degree holders can engage in advanced training, research, and curriculum innovation.

Teachers with master's degree may have a deeper understanding of educational theories and methodologies, which can positively impact students' learning experiences. Their advanced training can potentially lead to improved student outcomes. This claim was supported by Bruniges (2013) that the presence of teachers with master's degree indicates a willingness among educators to pursue further education. This may be encouraged by opportunities for career advancement or a desire to enhance their teaching abilities. Efforts should be made to ensure that both bachelor's and master's degree-holding teachers have opportunities for professional growth and leadership roles, promoting inclusivity and equal access to career development.

Highest level of training attended. Based on the data presented, the majority of TLE teachers have attended ICT training at the school-based or district level, with 57 teachers (the highest frequency) having participated in such programs. The next most common level of ICT training attended by TLE teachers is at the division or provincial level, with 45 teachers having participated. Twelve teachers have attended ICT training at the national level, making it the third most common category. The fewest number of TLE teachers, only eight, have attended ICT training at the regional level.

This implies that the high participation rate in school-based or district-level ICT training suggests that these programs are more accessible to TLE teachers. This accessibility may be due to proximity or lower barriers to entry. Policymakers and education authorities may need to consider resource allocation to ensure that teachers in more remote or less-funded regions have equitable access to higher-level ICT training opportunities. The variety of training levels suggests differences in the quality and depth of training experiences for TLE teachers. Higher-level trainings may offer more advanced and specialized content. The lower participation in regional-level training could indicate regional disparities in ICT training access or the perceived need for such training. Further investigation is needed to determine whether the level of training attended aligns with the specific needs and goals of TLE teachers, as training effectiveness may depend on its relevance.

This claim was supported by Chaamwe (2020) that educational institutions and authorities may need to develop a more comprehensive professional development plan that considers the diverse needs and circumstances of TLE teachers across different regions. The level of ICT training can impact a teacher's ability to effectively integrate technology into their teaching. Higher-level training may empower teachers to leverage ICT more effectively in their classrooms.

2. Perception of the TLE teachers on their level of proficiency in ICT integration

This portion presents the perception of the TLE teachers on their level of proficiency in Information and Communications Technology (ICT) integration along Home Economics, Agriculture and Fishery Arts, Industrial Arts, and Information and Communication Technology.

Home Economics. Table 3A contains the weighted mean and interpretation on the perception of the TLE teachers on their level of proficiency in Information and Communications Technology (ICT) integration along Home Economics.

Table 3A. *Level of Proficiency of TLE teachers in ICT integration along Home Economics*

Indicators	WM	I
1. Incorporates a variety of digital resources to enhance the Home Economics lessons.	4.67	VHP
2. Design assessments that leverage technology to evaluate students' understanding and progress.	4.78	VHP
3. Uses flipped classroom model to allow class time to be focused on application and discussion in topics that maximizes the potential of ICT.	3.45	HP
4. Utilize collaborative tools to facilitate group projects and real-time collaboration among students in lessons.	3.45	HP
5. Teach digital literacy skills, ensuring that students can navigate and use digital tools effectively and responsibly.	2.45	MP
6. Adapt various technology devices to reach students who may not have access to specific devices.	2.34	MP
7. Educate students about online safety, ethical behavior, and responsible use of technology.	3.6	HP
8. Evaluate students' capacity to troubleshoot independently which minimize disruptions to the learning process.	1.89	MP
9. Participates actively in professional learning networks by sharing ideas and best practices with colleagues.	2.5	MP
10. Assess the level of student engagement in technology-integrated lessons.	2.67	P
Composite Mean	3.18	P

Legend: VHP-Very Highly Proficient; HP-Highly Proficient; MP-Moderately Proficient; P-Proficient; WM-Weighted Mean; I-Interpretation

The provided data presented the level of proficiency of TLE (Technology and Livelihood Education) teachers in ICT (Information and Communication Technology) integration specifically in the context of Home Economics. A scale was used to interpret each indicator. TLE teachers demonstrated a relatively very high level of proficiency (VHP) in both designing assessments that leverage technology to evaluate students' understanding and progress and in incorporating a variety of digital resources to enhance Home Economics lessons. This suggests that the teachers are effective in tracking students' understanding by using online quizzes, interactive assignments, or creating digital portfolios in lessons such as creating menus, drafting designs, or creating clothes patterns by utilizing graphics design tools. Also, Home Economics teachers are using e-books, online simulations, and multimedia content in teaching preparation of dishes and setting up buffets or bulk cooking. TLE teachers demonstrate a high level of proficiency (HP) in educating students about online safety, ethical behavior, and responsible use of technology, promoting good digital citizenship. This indicates that the TLE teachers are solely responsible for managing students' personal information and media consumption since digital citizenship ensures online safety and promotes respect in digital interactions.

On the other hand, the Home Economics teachers' proficiency in evaluating students' capacity to troubleshoot, maintain, or enhance technical issues is at a moderate proficiency level (MP). This means that the teachers may need support in addressing the diverse technological needs of their students which means that the teachers should focus on improving their digital skills and ability to teach these skills to the students to prepare them for the digital age. Similarly, teachers' proficiency in assessing the students' ability to adapt to various technology devices and teaching digital literacy skills such as navigating and using digital tools that indicate there is room for improvement attained at the moderate proficiency (MP) levels. TLE teachers could benefit from further training and support to maximize the potential of ICT in terms of handling and maintenance of different technologies, service equipment, tools, utensils, materials, and supplies as well as technological devices or gadgets effectively and responsibly. Teachers may also benefit from hands-on trainings in using variations of tools and equipment used in Home Economics which can be a valuable part of the Home Economics curriculum. Leveraging online collaboration tools can encourage student engagement and active participation.

This claim was supported by Gbenga (2016) that TLE teachers should explore strategies to enhance student engagement in technology-integrated lessons and collect feedback to improve their teaching methods continuously. Providing ongoing support, access to

resources, and training opportunities can help TLE teachers reach higher levels of proficiency in ICT integration. Agriculture and Fishery Arts. Table 3B contains the weighted mean and interpretation on the perception of the TLE teachers on their level of proficiency in Information and Communications Technology (ICT) integration along Home Agriculture and Fishery Arts.

Table 3B. *Level of Proficiency of TLE teachers in ICT integration along Agriculture and Fishery Arts*

Indicators	WM	I
1. Utilize agricultural software and applications to demonstrate concepts.	2.1	MP
2. Evaluate students' ability to access and use online agricultural databases and resources.	2.3	MP
3. Use Geographic Information Systems (GIS) and remote sensing tools to analyze land and crop data.	1.9	MP
4. Assess whether teachers incorporate agricultural simulations and virtual labs.	2.1	MP
5. Utilize mobile apps for real-time weather updates, farm management, or data collection during fieldwork.	4.7	VHP
6. Evaluate students' knowledge of agricultural technology equipment and their ability to demonstrate their use.	1.8	MP
7. Guide students in creating digital farm plans using digital tools.	1.7	LP
8. Assess students' ability to use spreadsheets and financial software to analyze agribusiness data.	2.1	MP
9. Encourage students to collaborate online for agricultural research projects, leveraging platforms for data collection, analysis, and reporting.	3.5	HP
10. Evaluate teachers' capacity to integrate ICT into lessons on sustainable agriculture practices, emphasizing concepts.	3.7	HP
Composite Mean	2.59	MP

Legend: VHP-Very Highly Proficient; HP-Highly Proficient; MP-Moderately Proficient; P-Proficient; WM-Weighted Mean; I-Interpretation

Table 3B provided data that assessed the level of proficiency of TLE (Technology and Livelihood Education) teachers in ICT integration in the field of Agriculture and Fishery Arts. It used a scale to rate their proficiency in various indicators.

TLE teachers are at a very highly proficient level (VHP)in their ability to use mobile apps for real-time weather updates, farm management, and data collection during fieldwork. Teachers also exhibited a high proficiency level (HP) in integrating ICT into lessons on sustainable agriculture practices, emphasizing concepts such as organic farming and conservation agriculture. Similarly, a high proficiency (HP) level in encouraging students to collaborate online for agricultural research projects, leveraging platforms for data collection, analysis, and reporting. The data indicates the need for professional development to enhance Agriculture and Fishery Arts teachers' proficiency in utilizing agricultural software, GIS, and other advanced agricultural technologies. Ensuring access to online agricultural databases and resources can help teachers stay updated on the latest farming practices and trends.

On the other hand, Agri-Crop teachers' proficiency in using Geographic Information Systems (GIS) and remote sensing tools to analyze land and crop data is at a moderately proficient (MP) level. Agri-crop teachers' proficiency in knowledge and demonstration of agricultural technology equipment, such as GPS-guided tractors and drones, is also at a moderately proficient (MP) level and another moderate proficient level (MP) in guiding students to create digital farm plans, including crop rotation schedules and livestock tracking using digital tools.

This implies that the data indicates a need for professional development to enhance TLE teachers' proficiency in utilizing agricultural software, GIS, and other advanced agricultural technologies. Ensuring access to online agricultural databases and resources can help teachers stay updated on the latest farming practices and trends. Teachers may benefit from hands-on training in using agricultural technology equipment, which can be a valuable part of the agricultural curriculum. Leveraging online collaboration tools can encourage student engagement and active participation in agricultural research projects.

This claim was supported by Ghavifekr & Hussin (2011), that the proficiency in integrating ICT into lessons on sustainable agriculture practices is a positive aspect, aligning with the importance of environmentally friendly farming methods. Improving the proficiency of TLE teachers in ICT integration in agriculture and fishery arts can enhance the quality of education and prepare students for modern farming practices and agribusiness.

Industrial Arts. Table 3C lists the weighted mean and interpretation on the perception of the TLE teachers on their level of proficiency in Information and Communications Technology (ICT) integration along Industrial Arts.

Table 3C. *Level of Proficiency of TLE teachers in ICT integration along Industrial Arts*

Indicators	WM	I
1. Create and utilize digital blueprints and design software for industrial projects.	1.7	LP
2. Evaluate students' ability to incorporate 3D printing and prototyping technology into Industrial Arts projects.	1.8	MP
3. Operate Computer Numerical Control (CNC) machines for precision cutting and shaping of materials.	1.8	MP
4. Assess whether teachers use simulation software to teach electronics concepts and circuit design in a virtual environment.	1.4	LP
5. Introduce programming concepts for automation and robotics projects.	1.4	LP
6. Evaluate students' ability to integrate Internet of Things (IoT) devices and sensors into Industrial Arts projects.	1.4	LP
7. Involve incorporating digital resources and simulations to teach students about industrial equipment safety and maintenance procedures.	3.5	HP
8. Assess whether teachers effectively curate and utilize online resources to supplement classroom instruction.	3.5	HP
9. Encourage students to collaborate on design and fabrication projects.	4.5	VHP
10. Evaluate whether teachers use digital portfolios or e-portfolios to assess and showcase students' Industrial Arts projects.	3.5	HP
Composite Mean	2.45	MP

Legend: VHP-Very Highly Proficient; HP-Highly Proficient; MP-Moderately Proficient; P-Proficient; WM-Weighted Mean; I-Interpretation

Table 3C assessed the level of proficiency of TLE (Technology and Livelihood Education) teachers in ICT (Information and Communication Technology) integration specifically in the context of Industrial Arts. It used a scale to rate their proficiency in various indicators. Industrial Arts teachers demonstrate a very high level of proficiency (VHP) in encouraging students to collaborate on design and fabrication projects using digital collaboration tools like Google Workspace or Microsoft Teams. Their proficiency in incorporating digital resources and simulations to teach students about industrial equipment safety and maintenance procedures is at a high proficiency (HP) level which has the same proficiency level in both curating and utilizing online resources like instructional videos, and tutorials; and in using educational websites to supplement classroom instruction and in using digital portfolios or e-portfolios to assess and showcase students' Industrial Arts projects.

While the TLE teachers' proficiency in the use of simulation software like Tinkercad or CircuitLab to teach electronics concepts and circuit design in a virtual environment is at least proficient level (LP) the same assessment in introducing programming concepts for automation and robotics projects, using languages like Arduino, Raspberry Pi, or Python, and in integrating Internet of Things (IoT) devices and sensors into Industrial Arts projects, all falls in least proficient (LP) levels.

The data implies that there is a clear need for professional development to enhance TLE teachers' proficiency in various aspects of ICT integration within Industrial Arts, particularly in areas like 3D printing, CNC machines, and programming. Teachers should have access to training and resources related to IoT, simulation software, and programming languages to better prepare students for modern industrial practices.

The high proficiency in encouraging digital collaboration is a positive aspect that can be leveraged to enhance student engagement and learning. However, there is room for improvement in using digital portfolios for assessment.

This claim was supported by Hamidi, Meshkat, Rezaee, & Jafari (2011) teachers should continue to integrate digital resources effectively into safety and maintenance procedures and seek to improve their skills in curating and utilizing online resources. Improving the proficiency of TLE teachers in ICT integration in Industrial Arts can enhance the quality of education and prepare students for modern industrial and manufacturing practices.

Information and Communication Technology (ICT). Table 3D includes the weighted mean and interpretation on the perception of the TLE teachers on their level of proficiency in Information and Communications Technology (ICT) integration along Information and Communication Technology.

Table 3D. *Level of Proficiency of TLE teachers in ICT integration along Information Communication Technology (ICT)*

Indicators	WM	I
1. Utilize a variety of software and applications relevant to ICT.	4.8	VHP
2. Evaluate teachers' ability to teach coding and programming languages effectively.	2.8	MP
3. Teach student essential digital literacy skills, including online safety, responsible use of technology, and effective internet searching.	3.8	HP
4. Incorporate project-based learning approaches to solve real-world problems, fostering creativity and critical thinking.	3.5	HP
5. Introduce students to cloud computing platforms and data management tools.	2.5	LP
6. Address cybersecurity concepts and best practices, ensuring students understand how to protect themselves and their data online	2.4	LP
7. Guide students in creating multimedia content to enhance their communication and presentation skills.	3.5	HP
8. Teach students about ICT hardware components, troubleshooting common issues, and understanding the principles of computer hardware.	3.5	HP
9. Introduce project management methodologies and tools to help students plan and execute ICT projects effectively.	3.5	HP
10. Assess students' ICT skills and progress through digital portfolios.	3.5	HP
Composite Mean	3.38	P

Legend: VHP-Very Highly Proficient; HP-Highly Proficient; MP-Moderately Proficient; P-Proficient; WM-Weighted Mean; I-Interpretation

Table 3D showed the level of proficiency of TLE (Technology and Livelihood Education) teachers in ICT (Information and Communication Technology) integration, specifically in the context of Information Communication Technology (ICT). TLE teachers demonstrated a very high level of proficiency (VHP) in utilizing a variety of software and applications relevant to ICT. This indicates their effectiveness in using coding tools, graphic design software, and data analysis programs. ICT teachers exhibit a high proficiency (HP) in teaching students the essential digital literacy skills, including online safety, responsible technology use, and effective internet searching. Also, teachers' proficiency in incorporating project-based learning approaches that require ICT use for solving real-world problems, guiding students to create multimedia content for enhancing communication and presentation skills, teaching students about ICT hardware components and troubleshooting common issues, introducing project management methodologies and tools, and assessing students' ICT skills and progress through digital portfolios all falls in a high proficiency (HP) level.

ICT teachers' proficiency in addressing cybersecurity concepts and best practices is at a moderate proficiency level which means teachers need to elaborate more on understanding the concept of protecting themselves and their data online. The capacity to introduce students to cloud computing platforms and data management tools is also at a moderate proficiency (MP) level, indicating a need for further development in this area.

This data suggests that TLE teachers are proficient in some areas of ICT integration but may benefit from

professional development in coding and programming, cloud computing, and cybersecurity concepts. Teachers can leverage their proficiency in project-based learning and teaching digital literacy skills to enhance students' problem-solving abilities and responsible technology use. This claim was supported by Hepp, Hinostroza, Laval, & Rehbein (2014) that improving access to cloud computing platforms and data management tools in schools can facilitate better ICT education. Teachers should prioritize enhancing their ability to address cybersecurity concepts and best practices, given the increasing importance of online security.

IV. CONCLUSION AND RECOMMENDATIONS

This study concluded that majority of the respondents are female, middle-aged teachers who are Bachelor's degree holders relatively new in the teaching position and have attended school-based or district level trainings only. The TLE teachers are proficient in integrating ICT in Home Economics and ICT. However, they are moderately proficient in Agriculture and Fishery Arts and Industrial Arts.

It was recommended that the TLE teachers may continually improve themselves professionally through pursuing advanced education and attending training and seminars relevant to their field of expertise. Likewise, the TLE teachers may attend advanced ICT training in order to upskill their proficiency in their integration of ICT in their teaching-learning process and empower themselves to the use of other ICT infrastructure. Similarly, the TLE teachers may establish a network with other schools in the province which have state-of-the-art technology in order to exchange and share ICT resources.

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