



## Showcasing the Operative Utilization of ICT in the Teaching-Learning Process

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**Abstract:** This research assessed the effectiveness of utilization of ICT in the teaching-learning process and the attitude towards ICT integration to the TLE-ICT Computer Systems Servicing performance of the Grades 7-10 students at identified secondary schools in Cebu City for School Year 2021-2022 as basis for an instruction guide for ICT integration in TLE subject. Findings of this study reveal that in terms of the level of the level of effectiveness of the utilization of ICT in the teaching-learning process, the respondent-groups strongly agree that the teacher-respondents effectively utilized ICT in the teaching-learning process in terms of the delivery of instruction, student-centered learning, communication and interaction and information literacy. In terms of assessing the attitude of secondary school students towards ICT integration, the data implies that the students have a positive attitude with the utilization of ICT in learning inside their classrooms. In terms of the level of performance of the learners, majority of them obtained attained mastery with a grade of 90-100 in all competencies of ICT-TLE. In terms of testing relationship between the level of effectiveness of ICT integration and the level of performance of students in ICT-TLE competencies, it gained a significant relationship which means that effective utilization of ICT in the teaching-learning process of the teachers significantly influence the performance of the high school students in ICT-TLE. In terms of the challenges and barriers experienced by the teacher-respondents in terms of effective integration of ICT in the teaching-learning process, most of them believe that the lack of accessibility to gadgets and lack of effective training and technical support are the main concerns they are currently facing. Based on the salient findings of the study, it can be concluded that the level of effectiveness of ICT integration and the level of performance in ICT-TLE competencies resulted in the rejection of the null hypothesis which means that effective utilization of ICT in the teaching-learning process of the teachers significantly influence the performance of the high school students in ICT-TLE.

**Key words:** Development Education, ICT Integration, ICT-TLE, Instruction Guide for ICT, Cebu City, Philippines

### Introduction

Over the past few decades, governments from all over the world have made large expenditures in technology in an effort to integrate and utilize ICT to enhance learners' expected learning

outcomes. ICT integration in education generally refers to a technology-based teaching and learning process that is directly related to the use of educational technologies in classrooms. It has been proven that a technology-based learning environment has increased student understanding and maximized their learning (Levin & Wadmany, 2005; Nicole, et al., 2018).

The term “technology” has become one of the most talked-about topics in the new millennium. ICT has been crucial to improving students' learning outcomes in the field of education. Thus, it is vital for education to incorporate these tools as digital technologies become more widely available across the country in order to better prepare students for the future (Kilag, et al., 2022). ICT integration and utilization are now more important than ever for producing high-quality learning results.

It is important to note that the goal of education is for students to learn and use what they learn to improve their lives and the communities in which they live. The curriculum's particular goal is to increase students' knowledge, achievements, skills, and attitudes. The use of technology in education contributes significantly to the pedagogical aspects, where the application of ICT will lead to effective learning with the aid and supports from ICT elements and components, as stressed by Mellati & Khademi (2014). This is because, the use of technology in education contributes a lot in the pedagogical aspects in which the application of ICT will lead to effective learning with the help and supports from ICT elements and components (Jamieson-Procter et al., 2018).

Furthermore, ICT provides the help and complementary supports for both teachers and students where it involves effective learning with the help of the computers to serve the purpose of learning aids (Jorge et al., 2018). ICT integration is not a one-step learning process, but it is a continual process of learning that provides proactive teaching-learning environment (Young, 2018).

In this study, the researcher wants to assess the effectiveness of utilization of ICT in the teaching-learning process and the attitude of the secondary school students at Barrio Luz National High School, Cebu City towards ICT integration. As being a school leader in this area, the researcher considers this research to have a great importance for the teachers, parents, learners, and the overall success of the school. This analysis is also carried out to develop a technology instructional guide for teaching-learning improvement.

### **Research Methodology**

This part contains the research methodology which includes the method to be used, the flow of the study, research environment, research respondents, research instruments, data gathering procedures, statistical treatment of data, scoring procedures and definition of terms.

### **Design**

This study aimed to explore and assess the effectiveness and utilization of ICT in the teaching-learning process. The researcher employed descriptive-correlational engaging quantitative approach in assessing the effectiveness of utilization of ICT in the teaching-learning process, as well as the level of attitude towards ICT among the secondary school students of the research environment. Sousa et al.(2007), provide a brief and comprehensive definition of descriptive correlational study as studies describe the variables and the relationships that occur naturally between and among them.

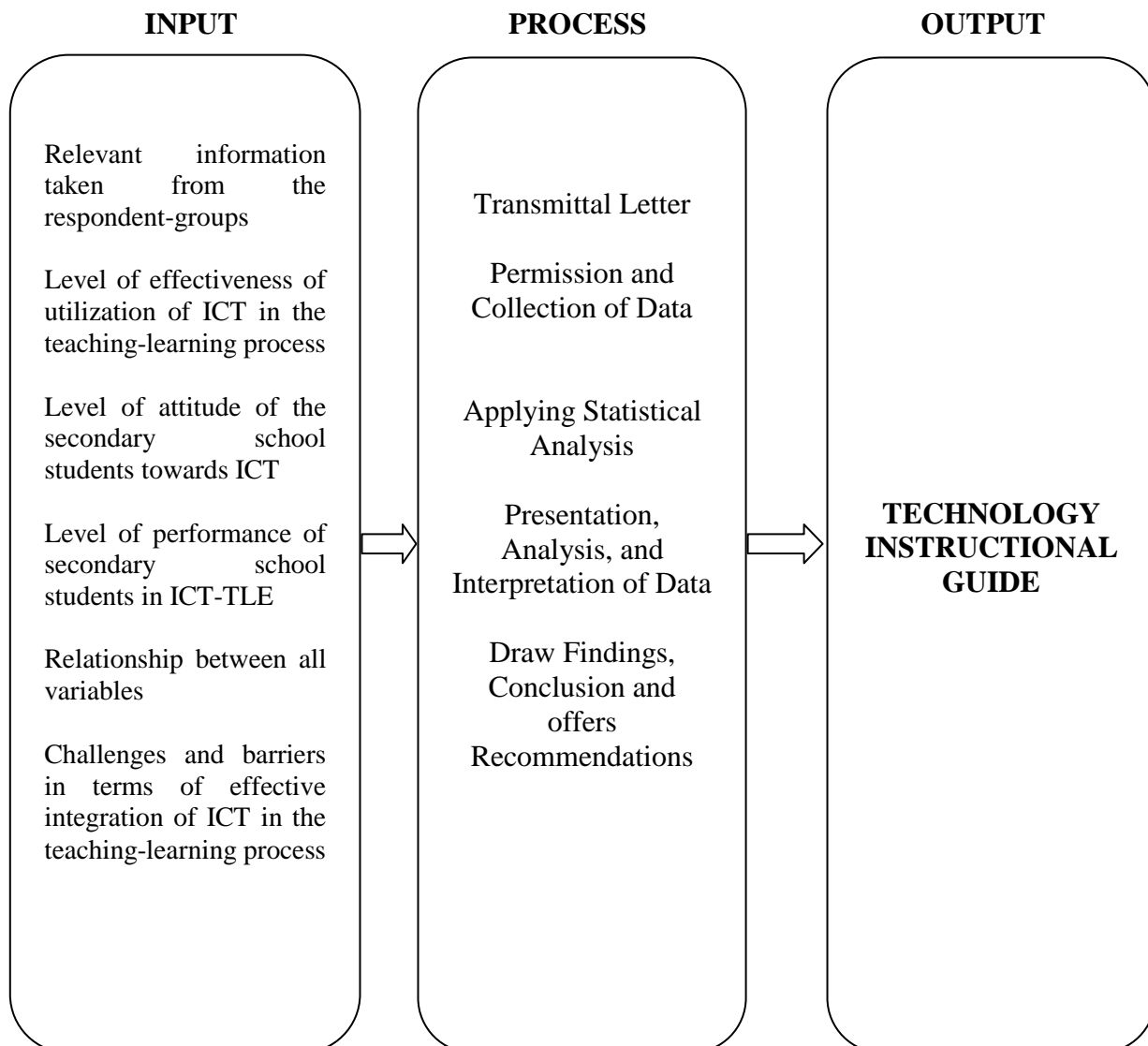
### **Flow of the Study**

The input of the study includes the relevant information of the respondent-groups' age and gender, civil status, highest educational status, length of service, performance rating, relevant trainings, seminars, and workshops attended, technology resources in school. This also covers the level of effectiveness of utilization of ICT in the teaching-learning process in terms of delivery of instruction, student-centered learning, communication and interaction, and information literacy. This

also includes the level of attitude of the secondary school students towards integration of ICT. This is followed by their level of performance in the provided competencies in ICT-TLE. Moreover, this also deals with the testing of relationship between all variables. Lastly, the challenges and barriers experienced by the teacher-respondents in terms of effective integration of ICT in the teaching-learning process will also be taken into considerations.

The process of the study included the research procedure that was strictly followed guided by the research approach it employed which was the descriptive-correlational design of research.

The output of the study was the technology instructional guide for teaching-learning improvement.



### Environment

This study was conducted at Barrio Luz National High school, which is located along Archbishop Reyes Avenue, Barangay Luz, Cebu City. It is located beside the Bureau of Internal Revenue near Luz Barangay Hall and a few blocks away from Cebu Business Park. Found at the heart of Cebu, the school is named after the late President Ramon Magsaysay's wife, Luz Magsaysay. The school is offering both Junior and Senior High School Programs.

Apas National High School was also chosen as it is one of the biggest public schools in Cebu City and it is a part of North District Seven where the researcher is currently working. Apas National High School is located at Omega St, Apas, Cebu City, 6000 Cebu, Philippines. Agsungot was also chosen as part of the research as it is a part of North District Seven and is a DepED

Managed urban public Integrated - Kinder, Elem & Sec school located in Cebu City (Capital), Cebu City.

The respondents are 50 teachers and 150 Students currently at Barrio Luz National High School, Apas National High School, Agsungot Integrated School.

The schools in North District Seven are chosen by the researcher to be the focal venue of the study since he is one of the teachers at the said district. It is where he started and is currently working and has been observing and monitoring the integration of ICT during the new normal education among public school teachers at Barrio Luz National High School and its students.



**Respondents**

The respondents of the study were the 50 teachers at Barrio Luz National High School, Apas National High School, and Agsungot Integrated School. The respondents were chosen using universal sampling. The inclusion criteria were as follows: a) that they are teachers at Barrio Luz National High School, Apas National High School, Agsungot Integrated School; b) that they have been in the profession for more than a year; and c) that they are willing to participate and cooperate in the said undertaking.

The 150 secondary level students also served as respondents of this study as their age, gender, technology used in learning, and ICT-TLE performance were taken into considerations.

Table 1 shows the distribution of respondents.

**Table 1**  
**Distribution of Respondents**

| Cebu City                       | Respondents |          |       |    |
|---------------------------------|-------------|----------|-------|----|
|                                 | Teachers    | Learners | Total | %  |
| Barrio Luz National High School | 30          | 100      | 130   | 65 |

|                            |           |            |            |            |
|----------------------------|-----------|------------|------------|------------|
| Apas National High School  | 15        | 40         | 55         | 28         |
| Agsungot Integrated School | 5         | 10         | 15         | 7          |
| <b>Total</b>               | <b>50</b> | <b>150</b> | <b>200</b> | <b>100</b> |

### **Instrument**

The main questionnaires of this study were modified standardized questionnaires taken from the study of Thieman (2018) in ‘The Use of Technology as a Tool for Learning and Developing 21st Century’; and Rosdy’s (2015) study on ‘Teaching and Learning with Technology: Effectiveness of ICT Integration in Schools’.

This is divided into four (4) parts.

The first part solicits information about the profile of the respondent-groups as to their age, gender, highest educational attainment, length of service, performance rating, relevant training, seminars, and workshops attended, and technology resources used in school.

The second part of the questionnaire was a modified standardized questionnaire taken from the study of Thieman (2018) on ‘The Use of Technology as a Tool for Learning and Developing 21st Century’. This part dealt with the level of effectiveness of utilization of ICT in the teaching-learning process as perceived by the respondent-groups in terms of delivery of instruction, student-centered learning, communication and interaction, and information literacy. This tool consisted of 25 items which was measured using a 5-point Likert scale: 5 for STRONGLY AGREE, 4 for AGREE, 3 for UNCERTAIN, 2 for DISAGREE, and 1 for STRONGLY DISAGREE.

Meanwhile, the third part of the questionnaire was also a modified standardized questionnaire taken from the study of Rosdy’s (2015) on ‘Teaching and Learning with Technology: Effectiveness of ICT Integration in Schools’. This part dealt with the level of attitude towards ICT integration in the teaching-learning process of the secondary school students of the research environment. This comprised of 15-items and was also measured using a 5-point Likert scale: 5 for STRONGLY AGREE, 4 for AGREE, 3 for UNCERTAIN, 2 for DISAGREE, and 1 for STRONGLY DISAGREE.

Moreover, the third part dealt with the level of performance of the secondary school students in the provided competencies in Technology and Livelihood Education in Information Communication Technology (TLE-ICT) for the last grading period.

Lastly, this included the challenges and barriers experienced by the teacher-respondents in terms of effective integration of ICT in the teaching-learning process.

### **Data Gathering Procedure**

This research followed a step-by-step process in the conduct of this research endeavor.

First, a letter was made addressed to the principal of Barrio Luz National High School, for approval of the conduct of the study.

After the letter was approved, the questionnaires were personally distributed to the respondents. The respondents were given ample time of preferably 20-30 minutes to answer the questionnaire.

Data was then collected and submitted to the statistician for statistical treatment. It was subjected to further presentation, analysis, and interpretation with the guidance of the research adviser.

The final draft was submitted for finalization and corrections.

### Statistical Treatment of Data

The following were the statistical procedures that were used by the researcher in the presentation and interpretation of the data.

**Simple Percentage.** This determined the profile of respondent-groups in terms of their age, gender, civil status, and highest educational attainment, length of service, performance rating, relevant training, seminars and workshops attended, and technology resources in school.

**Mean.** Computation of the mean was employed to assess the level of effectiveness of utilization of ICT in the teaching-learning process in terms of delivery of instruction, student-centered learning, communication and interaction, and information literacy; as well as the level of attitude of the secondary school students towards ICT integration.

**Chi-square.** This determined the relationship between level of effectiveness of ICT integration and the level of performance in ICT-TLE among the Grades 7-10 learners.

**Scoring Procedures.** The following were the scoring procedures:

| Weight | Range       | Response Category | Verbal Description  |
|--------|-------------|-------------------|---|
| 5      | 4.21 - 5.00 | Strongly Agree    | this means that one strongly agree with the statement without a little doubt        |
| 4      | 3.41 – 4.20 | Agree             | this means that one agree with the statement  |
| 3      | 2.61 – 3.40 | Uncertain         | this means that one do not agree nor disagree with the statement                    |
| 2      | 1.81 – 2.60 | Disagree          | this means that one disagree with the statement                                     |
| 1      | 1.00 -1.80  | Strongly Disagree | this means that one strongly disagree with the statement without a little certainty |

### Results and Discussion

This chapter presents the data obtained from the respondents of the study with the corresponding analysis and interpretation. The research participants include two groups, the 50 teachers and the 150 learners for a total of 200 respondents at Barrio Luz National High School, Apas National High School, and Agsungot Integrated School, Cebu City.

This section consisted of five (5) parts.

The first part deals with the relevant information of the respondent-groups in terms of teachers' age, gender, civil status, highest educational attainment, number of years in service, performance rating, and relevant trainings, seminars, and workshops attended.

The second part of this chapter assesses the level of effectiveness of the utilization of ICT in the teaching-learning process as perceived by the respondent-groups in terms of delivery of instruction, student-centered learning, communication and interaction, and information literacy.

The third part also measures the level of attitude of the secondary school students towards the integration of ICT in the teaching-learning process.

The fourth part assesses the level of performance of the secondary school students in the provided competencies in ICT as perceived by the respondent-groups.

The fifth part uncovers the testing of relationship between the level of effectiveness of ICT integration and the level of performance of learners in ICT-TLE.

The fifth and last part discloses the challenges and barriers experienced by the teacher-respondents in terms of effective integration of ICT in the teaching-learning process.

### RELEVANT INFORMATION OF THE RESPONDENT-GROUPS

This section reveals the relevant information of the teacher-respondents of the research environment in terms of their age, gender, civil status, highest educational attainment, length of service, performance rating, and relevant trainings, seminars, and workshops attended.

**Age.** Table 2 presents the profile of the respondent-groups in terms of age.

**Table 2**  
**Age Profile**

| Age                    | Respondents |            |
|------------------------|-------------|------------|
|                        | n=50        | %          |
| 51 years old and above | 3           | 6          |
| 41-50 years old        | 14          | 28         |
| 31-40 years old        | 23          | 46         |
| 25-30 years old        | 11          | 22         |
| <b>Total</b>           | <b>50</b>   | <b>100</b> |

In terms of the age profile of the teacher-respondents, majority of them belong to the age group of 31-40 years old, particularly 23 or 46% of them. 14 or 28% of them came after with an age range of 41-50 years old. This is closely followed by respondents who fit in the age bracket of 25-30 years old which comprises of 11 or 22% of them; while three (3) or 6% of them are aged 51 years old and above.

Teaching is an ability of teacher to efficiently impart knowledge. Beginning teachers can be considered as new force of the teaching profession. Based on the findings of Kurian's study (2015), it revealed that younger teachers' (age below 28) perceptions of normative commitment were higher than older (age 35 and above) teachers. This implies that younger teachers feel more obligated to the teaching profession than older teachers.

**Gender.** Table 3 shows the profile of the respondents in terms of gender.

**Table 3**  
**Gender Profile**

| Gender       | Respondents |            |
|--------------|-------------|------------|
|              | n=50        | %          |
| Male         | 16          | 32         |
| Female       | 34          | 68         |
| <b>Total</b> | <b>50</b>   | <b>100</b> |

When dealing with the respondents' gender, the female teacher-respondents outnumbered the male teachers, particularly 34 or 68% of them, while having only 16 or 32% of them are male respondents.

Elementary education is a profession dominated by females. According to the Bureau of Labor Statistics (BLS) (2013), women made up 81% of the elementary and middle school teacher

population while men composed just 19% of the elementary and middle school teacher population in 2013. Meanwhile, according to the World Bank collection of development indicators, compiled from officially recognized sources, Primary education teachers in Philippines was reported at 87.54% in 2017.

**Civil Status.** Table 4 indicates the profile of the respondents in terms of civil status.

**Table 4**

**Civil Status Profile**

| Civil Status  | Respondents |            |
|---------------|-------------|------------|
|               | n=50        | %          |
| Single        | 19          | 38         |
| Married       | 28          | 56         |
| Widow/Widower | 3           | 6          |
| <b>Total</b>  | <b>50</b>   | <b>100</b> |

In relations to their civil status, 28 or 56% of the respondents are already married. 19 or 38% of them are still single teachers; while three (3) or 6% of them are either widow/widower.

The study suggests that indeed, most respondents are in the marriage age of life. They are now settled with work and are prepared to take on the challenge of bringing up their own family. This means that they are now accustomed to responsibility which other than life experiences, teaching has also contributed immensely.

**Highest Educational Attainment.** Table 5 presents the highest educational attainment of the teacher-respondents.

**Table 5**

**Highest Educational Attainment**

| Highest Educational Attainment | Respondents |            |
|--------------------------------|-------------|------------|
|                                | n=50        | %          |
| Doctorate Degree               | 2           | 4          |
| With units in Doctorate Degree | 5           | 10         |
| Master's Degree                | 7           | 14         |
| With units in Master's Degree  | 14          | 28         |
| BSEEd/BSEEd graduate           | 22          | 44         |
| <b>Total</b>                   | <b>50</b>   | <b>100</b> |

Looking into the respondents' highest educational attainment, 22 or 44% of the teacher-respondents are BSEEd/BSEEd graduates. This is followed by respondents who obtained units in their Master's Degree with 14 or 28% of them. Moreover, seven (7) or 14% of them are already Master's Degree holder; while respondents who attained units in their Doctorate Degree; and respondents who are already Doctorate Degree holders comprise of five (5) or 10%; and two (2) or 4% of them.

The level of teachers' educational attainment is a combination of their pre-service training and additional qualifications they may have acquired in-service. The quantity and quality of teachers' initial education is clearly important in shaping their work once they begin teaching in schools and



should influence their further education and training requirements and other aspects of their development.

The teachers in this study surely prepared for the required continuous learning journey of someone who chose this profession. Teachers are expected to never stop learning and pursue learning initiatives that would improve them in their craft. This is also a requirement for ranking among employees of the Department of Education, hence explaining the data.

**Length of Service.** Table 6 reveals the number of years in service of the respondents.

**Table 6**  
**Length of Service**

| Length of Service | Respondents |            |
|-------------------|-------------|------------|
|                   | n=50        | %          |
| More than 6 years | 15          | 30         |
| 4-6 years         | 24          | 48         |
| 1-3 years         | 11          | 22         |
| <b>Total</b>      | <b>50</b>   | <b>100</b> |

In terms of number of years in service, majority of the teacher-respondents have been linked with the institution for 4-6 years with 24 or 48% of them. This is followed by 15 or 30% of them who have been teaching for more than 6 years; while 11 of 22% of them has been associated with the school for 1-3 years.

Job satisfaction is a globally important factor in determining human capital and subsequent worker productivity. The idea is that the knowledge, skills and productivity of workers are increased over time. Teacher experience in educational affairs is probably the main element in the policies of staff that affect existing employees: it is a pillar of the traditional single-salary program; it supports policies for teachers' transfer which prioritize seniority; and is commonly considered to be a major source of inequity amongst schools. Teaching is a truly lifelong career, which is considered by most people as well (Rey, 2017).

**Performance Rating.** Table 7 shows the performance rating of the respondents.

**Table 7**  
**Performance Rating**

| Performance Rating | Respondents |            |
|--------------------|-------------|------------|
|                    | n=50        | %          |
| Outstanding        | 2           | 4          |
| Very Satisfactory  | 45          | 90         |
| Satisfactory       | 3           | 6          |
| <b>Total</b>       | <b>50</b>   | <b>100</b> |

**Relevant Trainings, Seminars, and Workshops Attended.** Table 8 indicates the number of appropriate trainings, seminars, and workshops attended by the respondents.

**Table 8**  
**Relevant Trainings, Seminars, and Workshops Attended**

| Relevant Trainings, Seminars, and Workshops Attended | Respondents |   |      |
|--|-------------|---|------|
|  | n=50        | % | Rank |

|               |           |            |                 |
|---------------|-----------|------------|-----------------|
| Division      | 23        | 46         | 1 <sup>st</sup> |
| Regional      | 17        | 34         | 2 <sup>nd</sup> |
| National      | 5         | 10         | 3 <sup>rd</sup> |
| District      | 3         | 6          | 4 <sup>th</sup> |
| International | 2         | 4          | 5 <sup>th</sup> |
| <b>Total</b>  | <b>50</b> | <b>100</b> |                 |

When it comes to the highest level of appropriate trainings, seminars, and workshops attended, 23 or 46% of them have been into division trainings. This is followed by 17 or 34% of the teachers who have attended regional trainings. National trainings came after which consist of five (5) or 10% of them. Meanwhile, district and international trainings, seminars, and workshops have been joined by three (3) or 6%; and two (2) or 4% of the teacher-respondents, respectively.

The Department of Education (DepEd, 2018) recently noted the importance of relevant trainings to teachers. According to her, relevant teacher trainings will equip educators with proper knowledge and expertise in honing the minds of the Filipino learners and to identify common and unique education problems and needs of Southeast Asian countries and developing innovative and technology-based solutions to address these problems.

**Technology Resources in School.** Table 9 presents the available technology resources in school utilized by teachers in the teaching-learning process.

**Table 9**

**Technology Resources in School**

| Technology Resources in School | Respondents |            |
|--------------------------------|-------------|------------|
|                                | n=50        | %          |
| Television                     | 37          | 74         |
| Computer/Laptop                | 50          | 100        |
| Mobile Phone                   | 50          | 100        |
| Tablets                        | 17          | 34         |
| LCD Projector                  | 42          | 84         |
| Audio Speaker                  | 32          | 64         |
| Printer                        | 50          | 100        |
| Camera                         | 26          | 52         |
| Microphones                    | 25          | 50         |
| <b>Total</b>                   | <b>50</b>   | <b>100</b> |

Lastly, when dealing with the technology resources available to be used in the teaching-learning process of the teacher-respondents, all 50 or 100% of them have computers/laptops, mobile phones, and printers inside their classroom. This is followed by LCD Projectors which comprise of 42 or 84% of the teachers. 37 or 74% of them have television inside their classrooms. Meanwhile, 26 or 52%; and 25 or 50% of them have cameras and microphones that can be utilized in the teaching their students.

Experts say that using technology in teaching and learning can increase children's engagement in class, more than an old school textbook can as devices and apps are where today's students live their lives. This is a benefit for all learners as apps cater to all levels of ability and use various teaching methods to support learning. Apps also help to give teachers new ways of teaching the same thing, from games to virtual field trips.

Technology offers various tools that educators can use in and out of the classroom to enrich student's education. Technology is already integrated in nearly everything we do and nearly every job our students will come across. Technology is a knowledge that is anticipated in higher education and in our economy. It is a common language spoken by the whole world. There is no hesitation that finding the time to integrate technology is an overwhelming task for anyone.

### Profile of the Learners

The following tables present the profile of the learners in terms of their age, gender, and the technology used in learning.

**Age and Gender.** This table reveals the age and gender profiles of the learner-respondents.

**Table 10**

#### Age and Gender Profiles

| Variables     | Frequency<br>(n=150) | Percentage |
|---------------|----------------------|------------|
| <b>Age</b>    |                      |            |
| 18 years old  | 3                    | 2          |
| 17 years old  | 15                   | 10         |
| 16 years old  | 39                   | 26         |
| 15 years old  | 41                   | 27.3       |
| 14 years old  | 21                   | 14         |
| 13 years old  | 19                   | 12.6       |
| 12 years old  | 12                   | 8          |
| <b>Gender</b> |                      |            |
| Male          | 59                   | 39.3       |
| Female        | 91                   | 60.6       |
| <b>Total</b>  | <b>150</b>           | <b>100</b> |

As seen in the table above, most of the learner-respondents are aged 15 years old, specifically 41 or 27% of them. This is closely followed by 16-year-old learner-respondents which comprises of 39 or 26% of them. 21 or 14% of the learners are aged 14 years old. Moreover, 19 or 13%; and 12 or 8% of them are aged 13; and 12-years-old, respectively. Meanwhile, three (3) or 2% of the learner-respondents are aged 18 years old.

Meanwhile, the female learner-respondents outnumbered the male respondents with 91 or 61% of them; while male learners consist of 59 or 39% of them.

Most Filipino families are headed by relatively young people below the age of forty. The young and growing population of the Philippines is one of the major reasons why our country is considered by many outside independent think tanks and institutions to be among the fastest to recover from the economic depression brought about by the pandemic. It is providential that Filipino couples have generally been spared the contraceptive mentality prevalent in many developed countries today and have maintained our fertility rate above the zero population growth level of 2.1 babies per fertile woman.

**Technology Used in Learning.** Table 10 shows the technology used by the learner-respondents in the teaching-learning process.

**Table 11**  
**Technology Used in Learning**

| Technology Used in Learning | Frequency<br>(n=150) | Percentage |
|-----------------------------|----------------------|------------|
| Personal Computer           | 86                   | 57.3       |
| Laptop                      | 25                   | 16.6       |
| Mobile Phone                | 137                  | 91.3       |
| Tablet                      | 39                   | 26         |
| <b>Total</b>                | <b>150</b>           | <b>100</b> |

In terms of technology used in learning of the learner-respondents, 137 or 91% of them own mobile phones. This is followed by 86 or 57% of the learners who have personal computers to be used in learning. Moreover, 39 or 26% of them have tablets; while 25 or 17% of the respondents have laptops that can be utilized in their teaching-learning process.

Technology allows students of all learning styles to adapt easier than traditional school methods. Whether the students are visual, aural, verbal or physical, one computer can satisfy all types. With the addition of technology in classrooms, the role the teacher in the classroom can take on a new and dynamic light. Traditional passive learning is in the past, teachers need to be coaches, encouragers, and advisers to have the biggest impact on students. Not only do students benefit, technology allows teachers and students alike to develop their technology skills becoming more efficient and savvy in teaching and everyday life.

### **LEVEL OF EFFECTIVENESS OF UTILIZATION OF ICT IN THE TEACHING-LEARNING PROCESS**

The following tables present the level of effectiveness of the utilization of ICT in the teaching-learning process as perceived by the respondent-groups in terms of delivery of instruction, student-centered learning, communication and interaction and information literacy.

**Delivery of Instruction.** This refers to instruction delivered via a technological channel such as television, radio, digital cameras, technological toys or a computer and the internet.

**Table 12**  
**Delivery of Instruction**

| Item   | Weighted Mean | Interpretation        |
|--|---------------|-----------------------|
| Technology improves the delivery of instruction among the teachers to their students | 5             | Strongly Agree        |
| Technology makes complex tasks simpler   | 4.86          | Strongly Agree        |
| Technology increases productivity and efficiency in performing tasks                 | 4.92          | Strongly Agree        |
| Use of technology has the power to transform teaching                                | 5             | Strongly Agree        |
| Meets diverse student needs and support tailored approach                            | 4.96          | Strongly Agree        |
| <b>GRAND MEAN</b>  | <b>4.94</b>   | <b>Strongly Agree</b> |

**Legend:** 4.21 – 5.00 Strongly Agree; 3.41 – 4.20 Agree; 2.61 - 3.40 Neutral; 1.81 – 2.60 Disagree; 1.00 – 1.80 Strongly Disagree

In terms of the first variable, it collected a grand mean of 4.94 which means that the respondent-groups strongly agree that teachers' use of ICT in education is effectively utilized in terms of the delivery of instruction.

Technology improving the delivery of instruction among the teachers to their students; and the use of technology having the power to transform teaching obtained the highest weighted mean among all items with a perfect 5. This is closely followed by meeting diverse student needs and support tailored approach with a mean score of 4.96. Moreover, the technology increasing productivity and efficiency in performing tasks got a score of 4.92; while the technology making complex tasks simpler fell last with the lowest weighted mean of 4.86.

Technology ushers in fundamental structural changes that can be integral to achieving significant improvements in productivity. Used to support both teaching and learning, technology infuses classrooms with digital learning tools, such as computers and hand held devices; expands course offerings, experiences, and learning materials; supports learning 24 hours a day, 7 days a week; builds 21st century skills; increases student engagement and motivation; and accelerates learning. Technology also has the power to transform teaching by ushering in a new model of connected teaching. This model links teachers to their students and to professional content, resources, and systems to help them improve their own instruction and personalize learning.

Online learning opportunities and the use of open educational resources and other technologies can increase educational productivity by accelerating the rate of learning; reducing costs associated with instructional materials or program delivery; and better utilizing teacher time.

**Student-Centered Learning.** ICT can facilitate a shift in students' learning approach: from reproducing knowledge conveyed by others to constructing knowledge themselves. In terms of didactical approach, ICT implies a move from teacher-centered to student-centered learning.

**Table 13**

**Student-Centered Learning**

| Item  | Weighted Mean | Interpretation        |
|---|---------------|-----------------------|
| Technology should not replace teachers. Its main use is to enable students learn better through increasing their engagement in educational activities | 5             | Strongly Agree        |
| Technology has to improve the learning process and aim at improving student's grades  | 4.88          | Strongly Agree        |
| Facilitate and stimulate individual learning  | 4.9           | Strongly Agree        |
| Students should use technology to learn on their own with limited help from teachers  | 4.88          | Strongly Agree        |
| It has increased student's engagement and motivation towards learning   | 4.96          | Strongly Agree        |
| <b>GRAND MEAN</b>   | <b>4.92</b>   | <b>Strongly Agree</b> |

Delving into the second indicator, it obtained a grand mean of 4.92 which also means that the respondent-groups strongly agree that teachers' use of ICT in education is effectively utilized in terms of student-centered learning.

Technology should not replace teachers as its main use is to enable students learn better through increasing their engagement in educational activities – gained a perfect weighted mean of 5. ICT having increased student's engagement and motivation towards learning came after with a mean

score of 4.96. This is closely followed by facilitating and stimulating individual learning with a score of 4.9; while technology having to improve the learning process and aim at improving student's grades; and students should be using technology to learn on their own with limited help from teachers – got the lowest weighted mean of 4.88, each.

Teachers are still needed. Computers cannot encourage, motivate and inspire children the way a good teacher can. When we all think back on our education to date, no matter our age, it's always a person who stands out who helped us along the way – not a piece of technology. That is not to say technology is not important or is not valuable to a good education. Removing technology altogether is just confusing for students these days, who are used to having phones, tablets, laptops – all kinds of devices outside of school. To therefore not have them in the classroom is making the gap between school and the real world widen and does nothing to prepare them for life after school.

Because technology is interwoven into our daily lives – and as such should be woven into the fabric of schools – the most important thing is to make sure teachers are digitally literate. This would involve updating teacher training programs to make sure the new generation of teachers are ready to go whilst making sure that already qualified teachers have access to adequate professional development opportunities so they can update their skills and be the best teachers they can be.

**Communication and Interaction.** The ability to talk about and explore possibilities through conversation is a vital part of working collaboratively. The facilitation of inter-student inter-cognitive conversation as a powerful tool for advancing learning and collaborative practice in technology education is essential in the teaching-learning process.

**Table 14**

**Communication and Interaction**

| Item   | Weighted Mean | Interpretation |
|--|---------------|----------------|
| The use of technology improves the ability to communicate issues and problems  | 4.94          | Strongly Agree |
| Technology facilitates interactions where there is an exchange of ideas  | 4.9           | Strongly Agree |
| IT provides basic processing of transactions and services  | 4.88          | Strongly Agree |
| IT system is designed to support decision when the problem is not structured.  | 4.94          | Strongly Agree |
| Information technology facilitates in creating information sharing environment   | 4.96          | Strongly Agree |
| Technology can easily consult each other across different department without any interruption  | 4.76          | Strongly Agree |
| The use of technology makes it possible to use emails, text and chatting services to inquire something related to a given task at work | 5             | Strongly Agree |
| With work group support systems, group decision making becomes easier  | 4.94          | Strongly Agree |
| With the help of database software, an organization stores all its relevant data on  | 5             | Strongly Agree |

|  |             |                       |
|--|-------------|-----------------------|
| database   |             |                       |
| Information technology accounts in the development of communication technology like electronic mail and the like | 4.9         | Strongly Agree        |
| <b>GRAND MEAN</b>  | <b>4.92</b> | <b>Strongly Agree</b> |

Moreover, in terms of the next variable, the respondent-groups also strongly agree that teachers' use of ICT in education is effectively utilized in terms of communication and interaction as it garnered a grand mean of 4.92.

The use of technology making it possible to use emails, text and chatting services to inquire something related to a given task at work; and with the help of database software, an organization stores all its relevant data on database – both attained the highest weighted mean with a perfect 5. Information technology facilitating in creating information sharing environment came next with a mean score of 4.96. Moreover, the use of technology improving the ability to communicate issues and problems; IT system being designed to support decision when the problem is not structured; and with work group support systems, group decision making becomes easier – gained a score of 4.94, apiece. Technology facilitating interactions where there is an exchange of ideas; and information technology accounting in the development of communication technology like electronic mail and the like got a 4.9 score; while technology consulting each other across different department without any interruption fell last with the lowest weighted mean among all items of 4.76.

Technology has made it easy for students to use their computers and mobile devices to continue learning outside of traditional classrooms. The ability to take notes electronically during class results in the conservation of valuable study time. In addition, many students find they are able to use digital notes more effectively than handwritten notes by conducting keyword searches to locate specific information quickly.

Technology enables learning to take place outside of the classroom and the library. Students use technology to meet, collaborate and create content virtually. In many cases, technology helps students research subjects, share ideas and learn specific skills. Technology also helps students make valuable networking connections with others in their field of study.

**Information Literacy.** This requires users to have the skills to use information and communication technologies and their applications to access and create information.

**Table 15**

**Information Literacy**

| Item  | Weighted Mean | Interpretation        |
|---|---------------|-----------------------|
| Technology increases information literacy   | 5             | Strongly Agree        |
| Technology develops proficiency with the use of the tools of technology   | 5             | Strongly Agree        |
| Technology ensures fast, accurate and reliable data   | 4.86          | Strongly Agree        |
| Technology keeps track with the latest information and data   | 5             | Strongly Agree        |
| Teachers and principals expressed a willingness and enthusiasm towards maximizing the benefits of ICT resources | 4.86          | Strongly Agree        |
| <b>GRAND MEAN</b>   | <b>4.94</b>   | <b>Strongly Agree</b> |

On the other hand, when talking about the fourth and last indicator, it achieved a grand mean of 4.94 which also means that the respondent-groups strongly agree that teachers' use of ICT in education is effectively utilized in terms of improving the information literacy of students.

Technology increasing information literacy; technology developing proficiency with the use of the tools of technology; and technology keeping track with the latest information and data – all attained a perfect weighted mean of 5. Meanwhile, technology ensuring fast, accurate and reliable data; and teachers and principals expressing a willingness and enthusiasm towards maximizing the benefits of ICT resources came after with a mean score of 4.86, individually.

Using technology is no longer a choice in our society. People may claim they do not use technology much or find no use for it, but reality is that even checking out groceries utilizes technology. In preparing students to be productive, literate citizens, teachers must use technology to adequately prepare students. Literacy development no longer relies solely on reading and writing skills. People must be literate in technology as well. So, combining the two, literacy development and technology, makes good educational sense.

Literacy development that includes technology can take various forms in educational settings. It can both support traditional literacies and introduce new forms in the classroom. Technology can help students discuss their ideas by bringing readers and writers together in the same classroom, and it can help students work together at different times through google documents and blogging. Another important feature of using technology is that it allows students to remix various media. The resulting product can be a combination of traditional writing and other new technology-driven genres. Technology is the bridge to creating a new form of education where the borders are undefined.

**Summary on the Level of Effectiveness of Utilization of ICT in the Teaching-Learning Process.** Table 15 presents the summary on the level of effectiveness of utilization of ICT in the teaching-learning process as perceived by the respondent-groups in terms of delivery of instruction, student-centered learning, communication and interaction and information literacy.

**Table 16**

**Summary on the Level of Effectiveness of Utilization of ICT in the Teaching-Learning Process**

| Item                          | Weighted Mean | Interpretation        |
|-------------------------------|---------------|-----------------------|
| Delivery of Instruction       | 4.94          | Strongly Agree        |
| Student-Centered Learning     | 4.92          | Strongly Agree        |
| Communication and Interaction | 4.92          | Strongly Agree        |
| Information Literacy          | 4.94          | Strongly Agree        |
| <b>OVERALL GRAND MEAN</b>     | <b>4.93</b>   | <b>Strongly Agree</b> |

**Legend:** 4.21 – 5.00 Strongly Agree; 3.41 – 4.20 Agree; 2.61 - 3.40 Neutral; 1.81 – 2.60 Disagree; 1.00 – 1.80 Strongly Disagree

The level of effectiveness of utilization of ICT in the teaching-learning process as perceived by the respondent-groups is divided into four (4) indicators - delivery of instruction, student-centered learning, communication and interaction and information literacy. This accumulated an overall grand mean of 4.93 which means that the respondent-groups strongly agree that the teacher-respondents effectively utilized ICT in the teaching-learning process in terms of these indicators.

Of the four indicators, teachers' delivery of instruction; and the improvement of information literacy with the use of ICT obtained the highest weighted mean of 4.94, each; while student-



centered learning; and communication and interaction between teachers and students came after with a mean score of 4.92, individually.

Information and Communication Technology can contribute to universal access to education, equity in education, the delivery of quality learning and teaching, teachers' professional development and more efficient education management, governance and administration. UNESCO takes a holistic and comprehensive approach to promoting ICT in education. Access, inclusion and quality are among the main challenges they can address.

Instructional technology provides unparalleled opportunities for collaborative learning. Advances in technology have made sharing information easier than ever before. Today, educators have access to digital tools that allow students to work collaboratively outside of the classroom, discussing ideas or completing projects remotely and eliminating constraints such as standard classroom hours or geographic location.

Instructional technology also provides opportunities for students to work collaboratively with teachers, discussing ideas or asking questions outside of the physical classroom. For example, teachers could hold digital office hours, making themselves available via instant messaging or video chat to support students as they tackle the day's homework.

### LEVEL OF ATTITUDE TOWARDS ICT INTEGRATION

The table below provides the data on the level of attitude of the secondary school students towards the integration of ICT in the teaching-learning process.

**Table 17**  
**Level of Attitude towards ICT Integration**

| Item   | Weighted Mean | Interpretation |
|--|---------------|----------------|
| The student feels confident learning new computer skills                                   | 4.75          | Positive       |
| The student finds it easier to learn by using ICT  | 4.83          | Positive       |
| The student is aware of the great opportunities that ICT offers for effective learning     | 4.90          | Positive       |
| The student thinks that ICT supported teaching makes learning more effective               | 4.81          | Positive       |
| The use of ICT helps student to improve my learning with more updated resources            | 4.75          | Positive       |
| The student thinks the use of ICT improves the quality of learning                         | 4.83          | Positive       |
| The student thinks the use of ICT helps to prepare learning resources and materials        | 4.86          | Positive       |
| The use of ICT enables student to be more active and engaging in the lessons               | 4.86          | Positive       |
| The student have more time to cater to other needs if ICT is used in teaching              | 4.81          | Positive       |
| The use of internet is important for the student to access more information                | 4.74          | Positive       |
| The student uses technology to communicate and share information with my fellow classmates | 4.81          | Positive       |

|   |             |                 |
|---|-------------|-----------------|
| Technology allows the student to have all the information they need for their studies | 4.97        | Positive        |
| Technology gives the student control over things I want to do in my studies           | 4.77        | Positive        |
| The student learns more from technology than I do from books                          | 4.83        | Positive        |
| Studying with the use of technology makes the student happy and motivated to study    | 4.73        | Positive        |
| <b>OVERALL GRAND MEAN</b>   | <b>4.82</b> | <b>Positive</b> |

**Legend:** 4.21 – 5.00 Positive; 3.41 – 4.20 Good; 2.61 - 3.40 Neutral; 1.81 – 2.60 Poor; 1.00 – 1.80 Negative

When dealing with the attitude of the secondary school students of the research environment towards the integration of ICT in the teaching-learning process, it accumulated an overall grand mean of 4.82, which means that the students have a positive attitude with the utilization of ICT in learning inside their classrooms.

Technology allowing the student to have all the information they need for their studies obtained the highest weighted mean among all items with 4.97. This is followed by the student being aware of the great opportunities that ICT offers for effective learning with a mean score of 4.9. Students thinking the use of ICT help to prepare learning resources and materials; and the use of ICT enabling student to be more active and engaging in the lessons gained a score of 4.86 each. Student finding it easier to learn by using ICT; student thinking the use of ICT improves the quality of learning; and student learning more from technology than they do from books – came after with a weighted mean of 4.83, individually. Moreover, student thinking that ICT supported teaching makes learning more effective; student having more time to cater to other needs if ICT is used in teaching; and student using technology to communicate and share information with my fellow classmates – also got the same mean score of 4.81, apiece. Meanwhile, studying with the use of technology makes the student happy and motivated to study fell last with the lowest weighted mean among all items with 4.73.

Importance of IT in our society is enormous as it is not restricted by boundary, language and culture. However, Jammu and Kashmir State (2019) is of an underdeveloped in the field of technology use and it might be due to the risks and high costs. It is important to note that absence of scientific knowledge and IT in any educational system makes such educational system as old as centuries behind the present different types of technology as well as how these attitudes are related to their learning style.

Furthermore, students' performance is one of the key contributing factors determining the student's success in various subjects and areas (Shukakidze, 2018). Generous investments were supported by the strongly held premise that technology can help students learn more efficiently and effectively, and as a result increase student academic performance (Lei, 2020).

In fact, technology becoming a more prevalent part of the education culture with each passing year, the integration of technology into education systems is forcing colleges and universities to make dramatic changes, by increasing the quality, diversity and availability of information, and altering the teacher-student relationship (Inoue, 2017). It is reported that technology impacts students' daily lives and certainly plays an important part in developing students' positive and negative attitudes (Volk, Yip, & Lo, 2018).

Age and gender: There is a need for educators to understand students' attitudes toward the use of

### Recommendations

Based on the conclusions derived from the findings of the study, the proposed instruction guide for ICT is recommended for utilization not just in the schools where this study was conducted, but to any school in the country offering TVL-ICT subjects.

### Conclusion

Based on the salient findings of the study, it can be concluded that the level of effectiveness of ICT integration of the teacher-respondents and the level of performance of the secondary school students in ICT-TLE competencies resulted into rejection of the null hypothesis which means that it gained a significant relationship. This means further that effective utilization of ICT in the teaching-learning process of the teachers significantly influence the performance of the high school students in ICT-TLE.

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