Republic of the Philippines
DEPARTMENT OF EDCUATION

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DEPARTMENT OF EDUCATION

K to 12 BASIC EDUCATION CURRICULUM

TECHNOLOGY AND LIVELIHOOD EDUCATION

TEACHER'S GUIDE

Exploratory Course on

COMPUTER HARDWARE SERVICING

K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

INDUSTRIAL ARTS – COMPUTER HARDWARE SERVICING
(Exploratory)

K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

INDUSTRIAL ARTS – COMPUTER HARDWARE SERVICING
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Teacher's Guide for TLE Exploratory Course on COMPUTER HARDWARE SERVICING

Introduction

This Teacher's Guide is intended for you, the TLE teacher, who teaches any of the more than 24 TLE exploratory courses in the Grades 7 and 8 of the K to 12 curriculum. To ensure that you teach the TLE exploratory courses the way they were intended to be taught, you must see the big picture of the K to 12 curriculum and the teaching of TLE. Some background information is necessary.

Background Information

1. **The Overall Goal of the K to 12 Curriculum**

   The K to 12 Curriculum has as its overarching goal *the holistic development of every Filipino learner with 21st century skills who is adequately prepared for work, entrepreneurship, middle level skills development and higher education.* The over arching goal of the K to 12 curriculum, tells you that the teaching of TLE plays a very important role in the realization of the overall goal of the curriculum. Whether or not the K to 12 graduate is skilled and ready for work, entrepreneurship and middle skills development depend to a great extent on how effectively you taught TLE.

2. **The Conceptual Framework of the Teaching of TLE**

   Below is a schematic diagram of Technology and Livelihood Education (TLE) framework in general secondary schools. This should guide you in the teaching of the TLE exploratory courses.

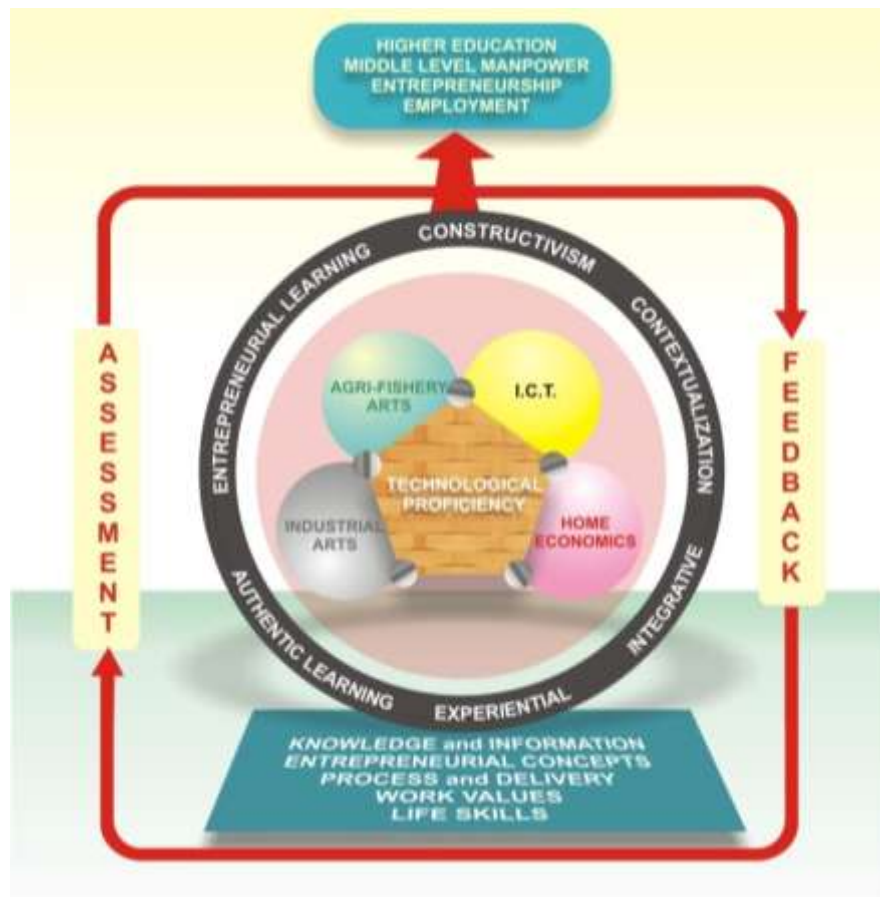## INDUSTRIAL ARTS – COMPUTER HARDWARE SERVICING
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Figure 1.TLE Framework

The diagram shows that Technology and Livelihood Education encompasses the field of Home Economics, Industrial Arts, Agri-Fishery Arts and ICT. The 24 TLE courses can be categorized under any of these fields.

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TLE is geared towards the development of technological proficiency and is anchored on knowledge and information, entrepreneurial concepts, process and delivery, work values and life skills. K to 12 TLE is…

a. one that is built on adequate mastery of knowledge and information, skills and processes, acquisition of right work values and life skills;
b. one that equip students with skills for lifelong learning; and
c. one that is founded on cognitive, behavioral or psychomotor and affective dimensions of human development.

The diagram likewise shows that entrepreneurial concepts also form part of the foundation of quality TLE. It is expected that your TLE students, after using the Learning Module on Entrepreneurship, imbibe the entrepreneurial spirit and consequently set up their own businesses in the areas of Agri-Fishery Arts, Industrial Arts, Home Economics, and Information and Communication Technology.

TLE by its nature is dominantly a skill subject and so you must engage your students in an experiential, contextualized, and authentic teaching-learning process. It is a subject where your students learn best by doing. It is integrative in approach. For instance, it integrates entrepreneurship with all the areas of TLE. It integrates concepts, skills and values.

3. **The TLE Exploratory Courses**

TLE in Grades 7 and 8 are exploratory in nature. Your school will choose at least 4 from the list of 24 courses for which 23 Learning Modules have been prepared. [1]Your school's choice is determined by the availability of its resources (faculty and facilities) as well as the local needs and resources of the community.

The 24 TLE exploratory courses focus on four basic common competencies: 1) use and maintenance of tools and equipment; 2) mensuration and calculation; 3) occupational health and safety procedures, and 4) preparation and interpretation of technical drawing. Why are these competencies called basic? Because they are competencies that you must acquire in order that you can do higher level competencies. They are also described common because these are true to all TR-based TLE courses.

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[1] There are 24 TLE courses but there are only 23 Learning Modules because there is one Learning Module for Tailoring and Dressmaking.

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The Learning Modules and Lessons

There is a Learning Module for each exploratory course. If there are 24 exploratory courses then you have 24 Learning Modules in your hands. But you will use 4 Modules only for the entire year in Grade 7(plus a fifth one on Entrepreneurship) and another 4 Modules in Grade 8 (plus a fifth one on Entrepreneurship).

Each Learning Module consists of 4 to 5 Lessons[2]. The Lessons are focused on the 4 to 5 basic competencies. To avoid meaningless repetition of the teaching of the 5 common competencies, you have to teach them in the context of the TLE course. For example, you teach "use and maintenance of tools" in beauty care when you are teaching the course on Beauty Care. You teach the same competencies - use and maintenance of tools-in Horticulture but in the context of Horticulture and so your tools will not be entirely the same.

New Feature on the Teaching of TLE

What's new in the teaching of TLE in the K to 12 curriculum? In the K to 12 curriculum, the TLE courses are taught based on the learning outcomes and performance criteria stated on the Training Regulations(TR)from Technical Education and Skills Development Authority (TESDA). They are TR-based.

Why is this necessary? To prepare the K to 12 graduate for lucrative work, he/she must earn a National Certificate (NC)I, II or even an NC of higher level that is required by industries. This he/she earns after passing an assessment given by TESDA.

How can you ensure that the K to 12 high school student (Grade 9 to 12) pass TESDA assessment and obtain an NC? By seeing to it that you teach the TLE course in accordance with the performance criteria and learning outcomes laid down in the TESDA Training Regulations.

Do the exploratory courses enable the high school student to earn already an NC? Not yet. Completion of the exploratory courses may not yet qualify a high school student to take an assessment for an NC. Instead, it helps him/her earn a Certificate of Competency (COC) at least in Grade 9 that will lead eventually him/her to an NC. In short, the COC paves the way to the earning of an NC.

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[2] Some Learning Modules combined use and maintenance of tools to make one Lesson, so the number of Lessons amount to 4; others made separate Lessons for use of tools and for maintenance of tools, thus the total is 5 Lessons.

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Student's choice of TLE specialization begins in Grades 9.Afterhaving been exposed to an array of TLE courses during the exploratory phase in the first two years, the student will be most benefited, if in Grades 10,11, or 12 he/she continues with a TLE course in which he/she already has a COC. In that way, he/she will get an NC faster.

About the Learning Module

1. Design of the Module

   a. The Module is designed to be a teacher-assisted learning kit or a self-learning kit on competencies that a Grade 7 TLE ought to possess. It explores the course on Computer Hardware Servicing which helps your student earn a Certificate of Competency in Grade 9which leads to a National Certificate Level I / II (NCI / II)in Grades 10, 11 or 12.

   b. The Learning Module is made up of 4 to 5 Lessons based on the competencies. Each Lesson contains the following:
      1) Learning Outcomes
      2) Performance Standards
      3) Materials/Resources
      4) Definition of Terms
      5) What Do You Already Know?
      6) What Do You Need to Know?
      7) How Much Have You Learned?
      8) How Do You Apply What You Learned?
      9) What Is Your Score?
      10) References

      There are some TLE Modules which have a section on "How Do You Extend Your Learning?", This section is meant for enrichment. It is usually given as an assignment for not everything can be taught and done in the classroom given a limited time.

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    c. The **Self-check** can also serve as the posttest of the lesson.

    2. Parts of the Lesson. -The following explain the parts of each Lesson and describe what your students'- as well as your tasks are.

Part of the Lesson	Students' Task	Teacher's Task
1. **Learning outcomes** are what your TLE student is supposed to know and be able to do after using the module. Since our TLE courses are TR-based, all learning outcomes are lifted from the TESDA TR. In the Curriculum Guide (the matrix which contains Content Standard, Performance Standard, Learning Competencies, Projects/Activities, Assessment, Duration), the identified Learning Outcomes are written in the column of Learning Competencies.	Students acquaint themselves with the learning outcomes and performance standards and make them their personal goals.	You introduce the learning outcomes to your students and make sure that they understand them and make these learning targets their own. Make these your goals for instruction.
2. **Performance Standards** are referred to as "performance criteria" in the TESDA TR. They are more specific descriptions of the student's behavior that serve as evidence that the expected learning outcomes have been realized with the expected level of proficiency or in accordance with established standards. The learning outcomes and performance standards set the direction of your lessons.	Students clearly understand the performance standards and make them their own learning goals.	You introduce the performance standards to your students and make sure that they understand them and make these performance standards their own. Let these standards give your lesson its specific direction.

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These are what you should teach and, in turn, what you should assess. They are identified and are written for you in the Curriculum Guide.		
3. **Materials/Resources and References** To teach effectively, you need **materials** and **references**. Materials may include equipment, hand tools or consumables. The **references** are the books, magazines, articles, websites you yourself and your students will read or refer to in order to gain greater understanding of the lesson. They are either in soft copy or hard copy.	Get to know the materials. They are part of the Lesson. By all means, read the references for lesson mastery.	Prepare the materials you need in advance. For gadget, tool or equipment, it is always wise to prepare, check and try them in advance to ensure that they function when you use them. As the saying goes "forewarned is forearmed." Be resourceful in the preparation of materials. You are strongly encouraged to use appropriate local materials as substitute for listed materials that are not available. For effective teaching, your lesson preparation should include reading the list of references. Do not limit yourself to the list of references. If you discover good reference material/s, add to the list of references. Introduce the references to your students. Motivate them to read these references as they go through the module for mastery of the lesson.
4. The **definition of terms** and **acronyms** will help you understand the meaning of key words in your lesson. Defining key words as they are used in your lesson will	Refer to the definition of terms for greater understanding of the lesson.	Remind your students to refer to the definition of terms and acronyms for clearer understanding of the lesson.

ensure that the key terms in your lesson mean one and the same for everyone in class and so avoid misunderstanding.		
5. The section **"What Do You Already Know"** is intended to determine entry knowledge and skills of your students to find out if you have to teach the lesson, teach some parts of the lesson or skip it entirely because your students already know it. This is done by way of a pretest.	Take the test honestly. Check answers against the answer key provided.	Tell your students to accomplish the pretest. Explain that the purpose of the pretest is to find out how much they already know about the lesson in order to determine your next steps. It is, therefore, necessary that they take the test honestly, if they want to learn or want to be helped. Make it clear to them that their scores will not be recorded for grading purposes and will not be taken against them. If you find out that your students already know what you are about to teach, logic dictates that you do not need to teach it anymore. You may as well proceed to the next lesson. If, however, you find out that they do not yet know what you are about to teach, then by all means teach. Or if you discover that your students have some erroneous concepts, then teach and correct their misconceptions. To know what your students already know and do not yet know will guide you in adjusting your instruction.
6. **"What Do You Need To Know?"- This section contains** one or more Information Sheets and for some modules an Operation Sheet. These are important	Read and understand the Information Sheet/s and /or Operation Sheet. Be prepared For a Self-check which	Make sure students are engaged in reading the Information Sheet/Observation Sheet and in answering the self-check.

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notes for the TLE student to read after which he/she is asked to do a Self-check to determine how much he/she has learned. The self-check functions as a pretest.	serves as a posttest. Correct answers by referring to the answer key.	Give assistance to your students where needed.
7. **"How Do You Apply What You Learned?"** – In this section, you give your student the opportunity to transfer what he/she has learned in another activity or in real life situation. Ideally, this should be a performance test, what you usually call practical test. If "the proof of the pudding is in the eating", then your student must be able to apply what she/he learned in real-life setting or must be able to come up with a product as an evidence of learning.	Do the Activity. To determine level of performance, use the scoring rubrics or check answers against the answer key, which ever is applicable. Reflect on assessment results.	Find a way to test real life application of what your students have learned. Do not hesitate to use ways of determining how your students can apply learned facts and concepts which are more authentic and realistic than that/those given in the Module. Reflect on assessment results. Use assessment results in planning your instruction.
8. **How Do You Extend Your Learning?** – As the word implies, this activity is done outside class hours for enrichment purposes. This can reinforce lesson mastery.	Do the task assigned outside class hours.	Motivate the students to do the task by making clear what the enrichment activity is about –why it is given, how it is done, how it relates to the class lesson .

Reflection

It is a good habit to reflect on your teaching for the day – what went well, what did not go well, why this activity went well with this group, why it didn't work well with the other group. What are your realizations? What are lessons learned? Jot them down in your diary. Commit them to your memory. If you do this consistently, you will find your delivery improve substantially.

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Curriculum Guide for the Exploratory Course on Computer Hardware Servicing

For you to get a complete picture of the complete TLE exploratory course on Computer Hardware Servicing, you are hereby provided with the Curriculum Guide on Computer Hardware Servicing.

Content Standard	Performance Standard	Learning Competencies	Projects/Activities	Assessment	Duration
Lesson 1 - USE HAND TOOLS					
Demonstrate understanding of/on: 1. Tool selection 2. Hardware tools	1. Tasks to be undertaken are properly identified 2. Appropriate hand tools are identified and selected according to the task requirements	**LO1. PREPARE HAND TOOLS**	Activity 1.1 Prepare a plan in maintaining a personal computer.	• Performance-based assessment	2 hrs
1. Operation of hand tools 2. Function of hand tools 3. Common faults of using hand tools 4. Tools preparation	1. Appropriate hand tools checked for proper operation and safety 2. Unsafe or faulty tools identified 3. Marked all tools for repair according to standard company procedures		Activity 1.1 Segregation of tools according to its classification. Self Check 1.1 Knowing functions of hand tools	• Written test	3 hrs

1. Proper use of tools
  • ESO tools
  • handtools
 	
2. Proper use of cleaning
	1. Tools used according to tasks undertaken
	2. All safety procedures in using tools observed at all times
		LO2. USE APPROPRIATE HAND TOOLS AND TEST EQUIPMENT	Activity 2.1 Proper use of tools based on its function
			
			Self Check 2.1
				• Performance-based assessment	3 hrs

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Content Standard	Performance Standard	Learning Competencies	Projects/Activities	Assessment	Duration
materials	3. Malfunctions, unplanned or unusual events reported to the supervisor		Computer cleaning chart		
1. Maintenance of tools and equipment 2. Storage of tools 3. Standard operational procedures, principles and techniques in maintaining a tools	1. Tools used according to tasks undertaken 2. Routine maintenance of tools undertaken according to standard operational procedures, principles and techniques 3. Tools stored safely in appropriate locations in accordance with manufacturers specifications or standard operating procedures	LO3. **MAINTAIN HAND TOOLS**	Activity 3.1 Conduct maintenance of tools Self Check 3.1 Good practices and benefits of proper storage of tools	• Performance-based assessment	2 hrs
Lesson 2: PERFORM MENSURATION AND CALCULATION					
1. Types of components and object to be measured are identified • memory • data storage capacity 2. Correct specifications of the relevant sources	1. Object or component to be measured is identified 2. Correct specifications obtained from relevant source 3. Accurate measurements are obtained for job	LO1. **SELECT COMPONENTS TO BE MEASURED**	Activity 1.1 Identifying type of memory module Activity 1.2 Identifying types of storage drive and their interface	• Performance-based assessment /or • Written test	5 hrs
1. Conversion and calculations	1. Calculation needed to complete work tasks are performed using the four fundamentals operations (addition, subtractions,	LO2. **CARRY OUT MEASUREMENTS AND CALCULATION**	Activity 2.1 Perform conversion of decimal numbers to binary and vice versa	• Written test	5 hrs

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Content Standard	Performance Standard	Learning Competencies	Projects/Activities	Assessment	Duration
	multiplication and division) 2. Numerical computation is self-checked and corrected for accuracy		Activity 2.2 Perform conversion from bytes to kilobytes, megabytes, gigabytes, terabytes		
Lesson 3: PREPARE AND INTERPRET TECHNICAL DRAWING					
• Elements • Benefits • Basic symbols	1. Correct technical drawing selected according to job requirements 2. Technical drawings segregated in accordance with the types and kinds of drawings 3. Components, assemblies or objects recognized as required	**LO1. IDENTIFY DIFFERENT KINDS OF TECHNICAL DRAWINGS.**	1. Preparation of system and program flowcharts	• Performance-based assessment /or • Written test	3 hours
• Skills in interpreting in flowchart. ➢ types of flowchart	4. Dimensions of the key features of the objects depicted in the drawing correctly identified 5. Symbols used in the drawing identified and interpreted correctly 6. Drawing checked and validated against job requirements or equipment in accordance with standard operating procedures	**LO2. INTERPRET TECHNICAL DRAWING.**		• Performance-based assessment /or • Written test	3hours

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Lesson 4 : PRACTICE OCCUPATIONAL HEALTH AND SAFETY PROCEDURES					

• Hazards and risks identification and control
  ➢ for users and technicians
  ➢ equipment damage and data lost
  ➢ environment
	1. Workplace hazards and risks are identified and clearly explained.
	2. Hazards/risks and its corresponding indicators are identified in with the company procedures.
	3. Contingency measures are recognized and established in accordance with organizational procedures.
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		LO1. IDENTIFY HAZARDS AND RISKS.		• Situation analysis
				• Interview
				• Practical examination
				• Written examination
					4 hour

• Computer Work Station Ergonomics	1. Effects of hazards are determined. 2. OHS issues and concerns are identified in accordance with workplace requirements and 3. Relevant workplace OHS legislation.	**LO2. EVALUATE HAZARDS AND RISKS.**	Implement 5s in the computer workplace	• Interview • Written examination • Simulation	3 hour
• Safety regulations in the workplace • OHS Procedures in controlling hazards and risk. • Methods of controlling hazards	1. OHS procedures for controlling hazards and risk are strictly followed. 2. Procedures in dealing with workplace accidents, fire and emergencies are followed in accordance	**LO3. CONTROL HAZARDS AND RISKS.**		• Written examination • Interview • Case/situation analysis • Simulation	3 hours

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Content Standard	Performance Standard	Learning Competencies	Projects/Activities	Assessment	Duration
and risk	with the organization's OHS policies. .				

"By three methods we may learn wisdom: First, by reflection, which is noblest; second, by imitation, which is easiest; and third by experience, which is the bitterest."

- Confucius