



Ethiopian TVET-System



Irrigation and Drainage Design and Construction Supervision NTQF Level IV

Based on Mar, 2017 G.C. Ethiopian Occupational
Standard

Module Title: Migrating to New Technology

TTLM Code: EIS IDS4 TTLM 07 20v1



This module includes the following learning guides

LG 68: Apply Existing Knowledge and Techniques to Technology and Transfer

LG Code: EIS IDS4 M15 LO1-LG-68

LG 69: Apply Functions of Technology to Assist in Solving Organizational Problems

LG Code: EIS IDS4 M15 LO2-LG-69

LG 70: Evaluate New or Upgraded Technology Performance

LG Code: EIS IDS4 M15 LO3-LG-70

Instruction Sheet 1	Learning Guide- 68: Apply Existing Knowledge and Techniques to Technology and Transfer
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying situations where existing knowledge can be used as the basis for developing new skills.
- Reacquiring and using new or upgraded technology skills to enhance learning.
- Identifying, classifying and using new or upgraded equipment where appropriate, for the benefit of the organization.

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:

- Identify situations where existing knowledge can be used as the basis for developing new skills.
- Reacquire and use new or upgraded technology skills to enhance learning.
- Identify, classify and use new or upgraded equipment where appropriate, for the benefit of the organization.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 4.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4” in page 4, 9 and 17 respectively.
4. Accomplish the “Self-check 1, Self-check 2, Self-check 3 and Self-check 4” -” in page 8, 16 and 18 respectively

Information Sheet- 1	Identify Situations where Existing Knowledge can be Used as the Basis for Developing New Skills
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1.1. Introduction

Awareness of the current technology in irrigation and drainage design and construction supervision is very important. Appropriate sources of information concerning the present technologies should be located. By gathering the important information, situations where existing knowledge can be used for developing new skill are identified.

1.2. Determining the Usage of Different Technologies

Technology is the collection of techniques, skills, methods, processes and equipment/ machine used in the production of goods or services or in the accomplishment of objectives. Technology can be the knowledge of techniques, processes, etc. or it can be embedded in machines, computers, devices and factories, which can be operated by individuals.

Whether you are working or resting, you are always using technology. It is used everywhere and all the time. Its use has made life easy. With the application of technology, critical and time-consuming processes can be executed with ease and in less time. Laborious and repetitive tasks are best done by machines (without getting bored!). People do not have to slog as much as they would have had to, if not for technology. With automation come efficiency and speed. They save human effort and time to a great extent and make life easy and comfortable.

In the context of a business, technology has a wide range of potential effects on management:

- Reduced costs of operations.
- New product and new market creation.
- Adaptation to changes in scale and format.
- Improved customer service.
- Reorganized administrative operations.
- Improve productivity

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1.2. Use of Existing Knowledge in Irrigation and Drainage Design and Construction

Local knowledge/existing knowledge in designing and constructing irrigation and drainage systems are the basis to move to new technology. Among the different technology transfer models, the following uses local skills to improve the transferred technology in some stages.

1.2.1. International Technology Transfer Model

The processes include:

- Manufacturing proposal and planning to arrive at decisions regarding location and preparing a business case including good resource assessments.
- Deciding the product design technologies to be transferred.
- Specifying details of the plant to be designed to produce the product and other aspects related to construction and infrastructure development.
- Plant construction and production start-up.
- Adapting the process and product if needed and strengthening production systems to suit local conditions.
- Improving the product technology transferred using local skills.
- Providing external support to strengthen the relationship between the transferor and transferee.

The lessons that can be learnt from this model are the following:

- There is a need for the transferee to be involved right from the beginning in the planning and implementation of a TT project.
- A technology transfer project does not end with commencement of production.
- Unless explicit measures are in place to ensure assimilation of the transferred technology, the technology transfer cannot be said to have been successful.

1.3. Developing New Skills/Transferring Technologies

Based on the existing knowledge of designing and constructing irrigation and drainage systems, new skills could be developed by transferring and using new technologies in the sector. Technology transfer involves the process of movement of technology from one entity to another. The transfer may be said to be successful if the receiving entity, the

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transferee, can effectively utilize the technology transferred and eventually assimilate it. The movement may involve physical assets, know-how, and technical knowledge. Technology transfer in some situations may be confined to relocating and exchanging of personnel or the movement of a specific set of capabilities. Technology transfer has also been used to refer to movements of technology from the laboratory to industry.

Technology transfer could be made by using the following five phases:

- Carrying out a pre-investment and feasibility study
- Developing engineering specifications and design based on the feasibility study
- Commence capital goods production based on the engineering specifications and designs that have been developed.
- Commissioning
- Commence commercial production

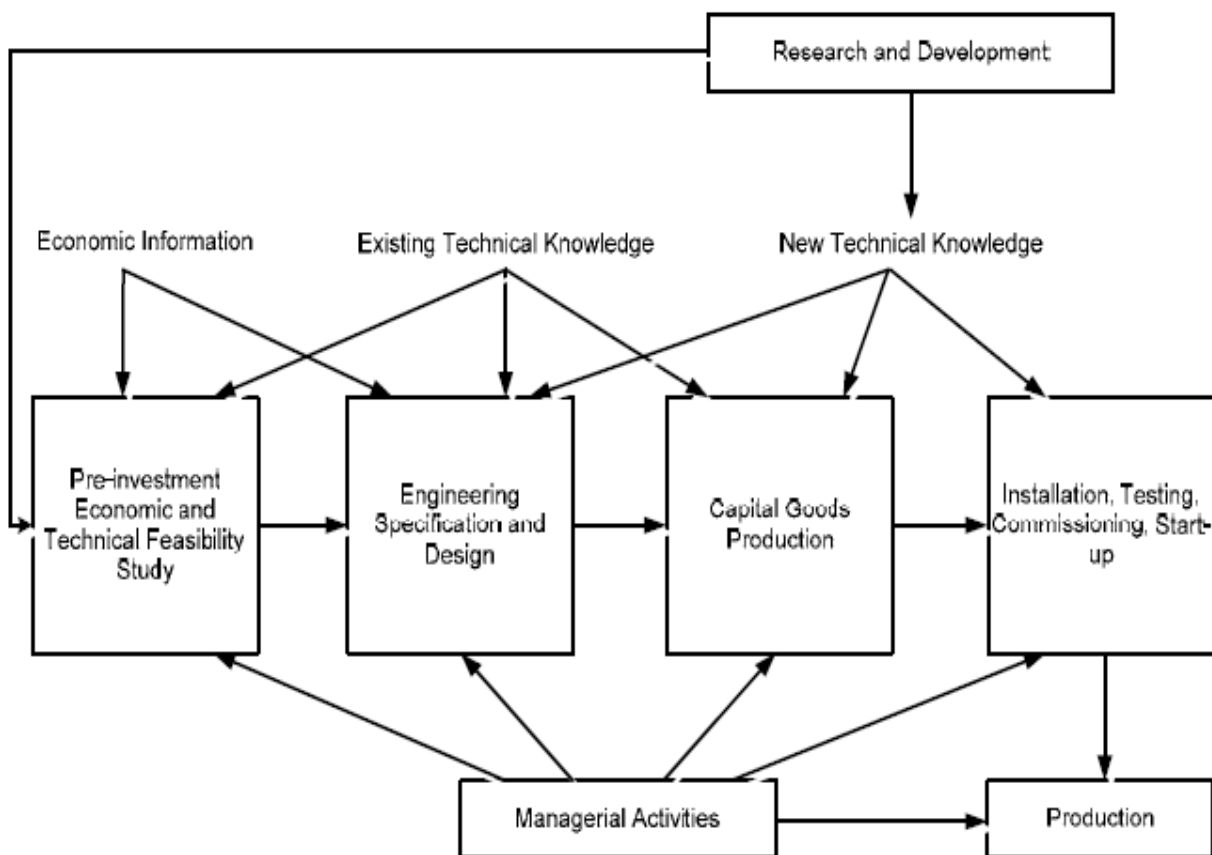


Figure 1: The five-phase model of international technology transfer (Source: Jagoda (2007))

1.4. Emerging New Technologies

The different types of new/upgraded technologies used in irrigation and drainage design and construction now days are:

- **Office technologies:** including personal computers (PCs), slide projectors, movie projectors, overhead projectors, television monitors, videocassettes, videodisc players, multimedia systems, and internet which have had a major impact on the office environment
- **Industrial technology:** is the use of engineering and manufacturing technology to make production faster, simpler and more efficient.
- **System technology:** can refer to material objects of use to humanity, such as machines, hardware or utensils, but can also encompass broader themes, including systems, methods of organization, and techniques.
- **Information technology (IT):** is the application of computers to store, retrieve, transmit and manipulate data, often in the context of a business or other enterprise. IT is considered a subset of information and communications technology (ICT)
- **Training technology:** is a technology used for training purpose. It includes SMART teaching and training classes and the use of different IT technologies for teaching and training purposes.

Self Check 1	Written Test
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Direction I: Multiple choice items

Instruction: Choose the best answer for the following questions and write the letter of your answer on the answer sheet provided in the spaces provided. Use bold letter. (2 pts each)

1. All are the effects of technology on management, except:
 - A. Reduced costs of operations.
 - B. New product and new market creation.
 - C. Adaptation to changes in scale and format.
 - D. Improved customer service E. none

2. ____ can refer to material objects of use to humanity, such as machines, hardware or utensils, but can also encompass broader themes, including systems, methods of organization, and techniques
 - A. System technology C. Training technology
 - B. Information Technology D. Industrial technology

3. The first phase in technology transfer is:
 - A. Developing engineering specifications and design based on the feasibility study
 - B. Carrying out a pre-investment and feasibility study
 - C. Commissioning
 - D. Commence commercial production

Note: Satisfactory rating – 3 and above pts Unsatisfactory - below 3 pts

Answer Sheet-1

Name: _____

Date: _____

Multiple Choice Questions

- 1 _____
- 2 _____
- 3 _____

Score = _____
Rating: _____

Information Sheet- 2	Reacquire and Use New or Upgraded Technology Skills to Enhance Learning
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2.1. Introduction

First, new or upgraded technologies used in irrigation and drainage design and construction are acquired/ obtained to enhance learning. Then, these technologies should be utilized effectively in the industry.

2.2. Using New or Upgraded Technology Skills Effectively

Implementation often determines whether an initiative is successful. New technology may require installation and setup by specialists, but involving the people who have to work with it wherever possible helps them understand its operation. Ideally, you incorporate training within some of the implementation tasks. Employees who set up their own systems are better able to keep them running and operate them for maximum efficiency. When the stakeholders help with implementation, they can identify unexpected problems and find solutions.

The irrigation and drainage design and construction processes the system of controls that optimize the design, construction and procurement processes. The construction process is key to the ability of the construction industry to capitalize on technological innovations. The process of planning, scheduling, and cost control must address the interfaces between all disciplines and provide the framework that allows new technological developments to be assimilated efficiently into a construction project.

Based on the selection criteria of technologies (Technical feasibility, Economical feasibility, Social acceptability and environmentally safety and sustainability),the appropriate technologies are selected based on their relevance with respect to the organization standard. Finally, these technologies are used effectively. Use technology that helps you accomplish course goals and meet organization standard.

To use technologies effectively:

- Use technology that is appropriate for and reflects the role of technology within the discipline

- Use technology that is appropriate for the task
- Use the technology at appropriate time and place
- Give training about the technology for the staff

2.3. Reacquiring and Using Software and Hardware in Designing and Constructing Irrigation and Drainage

The use of application software in water works site construction management has made the management system more interesting. Computers enable better storage and presentation of information, thus making the management process easier and more effective.

Since the project management is one of the core functions of a business organization, the project management function should be supported by software. Before software was born, project management was fully done through papers. This eventually produced a lot of paper documents and searching through them for information which was not a pleasant experience.

2.4. Applicable Software in Designing and Constructing Irrigation and Drainage Works

Desktop: There are two types of project management software available for project managers. The first category of such software is the desktop software. Microsoft Project is a good example for this type. You can manage your entire project using MS Project, but you need to share the electronic documents with others, when collaboration is required.

All the updates should be done to the same document by relevant parties time to time. Therefore, such desktop project management software has limitations when it should be updated and maintained by more than one person.

Web Based: As a solution for the above issue, the web-based project management software was introduced. With this type, the users can access the web application and read, write or change the project management-related activities.

This was a good solution for distributed projects across departments and geographies. This way, all the stakeholders of the project has access to project details at any given time. Specially, this model is the best for virtual teams that operate on the Internet.

2.5. Characteristics of Project Management and Supervision Software

When it comes to choosing project management software, there are many things to consider. Not all the projects may utilize all the features offered by project management software. Therefore, you should have a good understanding of your project requirements before attempting to select one for you.

Following are the most important aspects of project management software:

Collaboration: The project management software should facilitate the team collaboration. This means that the relevant stakeholders of the project should be able to access and update the project documents whenever they want to. Therefore, the project management software should have access control and authentication management in order to grant access levels to the project stakeholders.

Scheduling: It is one of the main features that should be provided by project management software. Usually, modern project management software provides the ability to draw Gantt charts when it comes to activity scheduling. In addition to this, activity dependencies can also be added to the schedules, so such software will show you the project critical path and later changes to the critical path automatically.

Base lining is also a useful feature offered by project management software. Usually, a project is base lined when the requirements are finalized. When requirements are changed and new requirements are added to the project later, project management team can compare the new schedule with the baseline schedule automatically to understand the project scope and cost deviations.

Issue Tracking: During the project life cycle, there can be many issues related to project that needs constant tracking and monitoring. Software defects are one of the good examples for this. Therefore, the project management software should have features to track and monitor the issues reported by various stakeholders of the project.

Project Portfolio Management: Project portfolio management is one of the key aspects when an organization has engaged in more than one project. The organization should be able measure and monitor multiple projects, so the organization knows how the projects progress overall. If you are a small company with only a couple of projects, you may not want this feature. In such case, you should select project management software without project portfolio management; as such features could be quite expensive for you.

Document Management: A project has many documents in use. Most of these documents should be accessible to the stakeholders of the project. Therefore, the project management software should have a document management facility with correct access control system. In addition to this, documents need to be versioned whenever they are updated. Therefore, the document management feature should support document versioning as well.

Resource Management: Resource management of the project is one of the key expectations from project management software. This includes both human resources and other types. The project management software should show the utilization of each resource throughout the entire project life cycle.

2.6. Application of Management and Supervision Software

The common types of management concepts used in application of management software are:-

KAIZEN or continuous improvement: kaizen refers to activities that continuously improve all functions and involve all employees from the project manager to the daily laborer workers. It is a philosophy that sees improvement in productivity as a gradual and methodical process. The concept of Kaizen encompasses a wide range of ideas: it involves making the work environment more efficient and effective by creating a team atmosphere, improving everyday procedures, ensuring employee satisfaction and making a job more fulfilling, less tiring and safer.

It is based on the following guiding principles.

- Good processes bring good results

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- Go see for yourself to grasp the current situation
- Speak with data, manage by facts
- Take action to contain and correct root causes of problems
- Work as a team
- Kaizen is everybody's business

5S: One of the methods of determining an organization approach to its business is to evaluate its workplace organization capability & visual management standards. 5S engages people through the use of 'Standards' and 'Discipline'.

The 5 Steps are as follows:

Sort: Sort out & separate that which is needed & not needed in the area.

Systematize/set in order: Arrange items that are needed so that they are ready & easy to use. Clearly identify locations for all items so that anyone can find them & return them once the task is completed.

Shine: Clean the workplace & equipment on a regular basis in order to maintain standards & identify defects.

Standardize: Revisit the first three of the 5S on a frequent basis. Protect the first three S's not to go back.

Sustain: Keep to the rules to maintain the standard & continue to improve every day.



Figure 2 (a): Explanations of the 5S's

Total Quality Management: Total Quality Management, TQM, is a method by which management and employees can become involved in the continuous improvement of the production of goods and services. It is a combination of quality and management tools aimed at increasing business and reducing losses due to wasteful practices.

TQM processes are divided into four sequential categories: plan, do, check, and act (the PDCA cycle). In the planning phase, people define the problem to be addressed, collect relevant data, and ascertain the problem's root cause; in the doing phase, people develop and implement a solution, and decide upon a measurement to gauge its effectiveness; in the checking phase, people confirm the results through before-and-after data comparison; in the acting phase, people document their results, inform others about process changes, and make recommendations for the problem to be addressed in the next PDCA cycle. TQM efforts typically draw heavily on the previously developed tools and techniques of quality control.

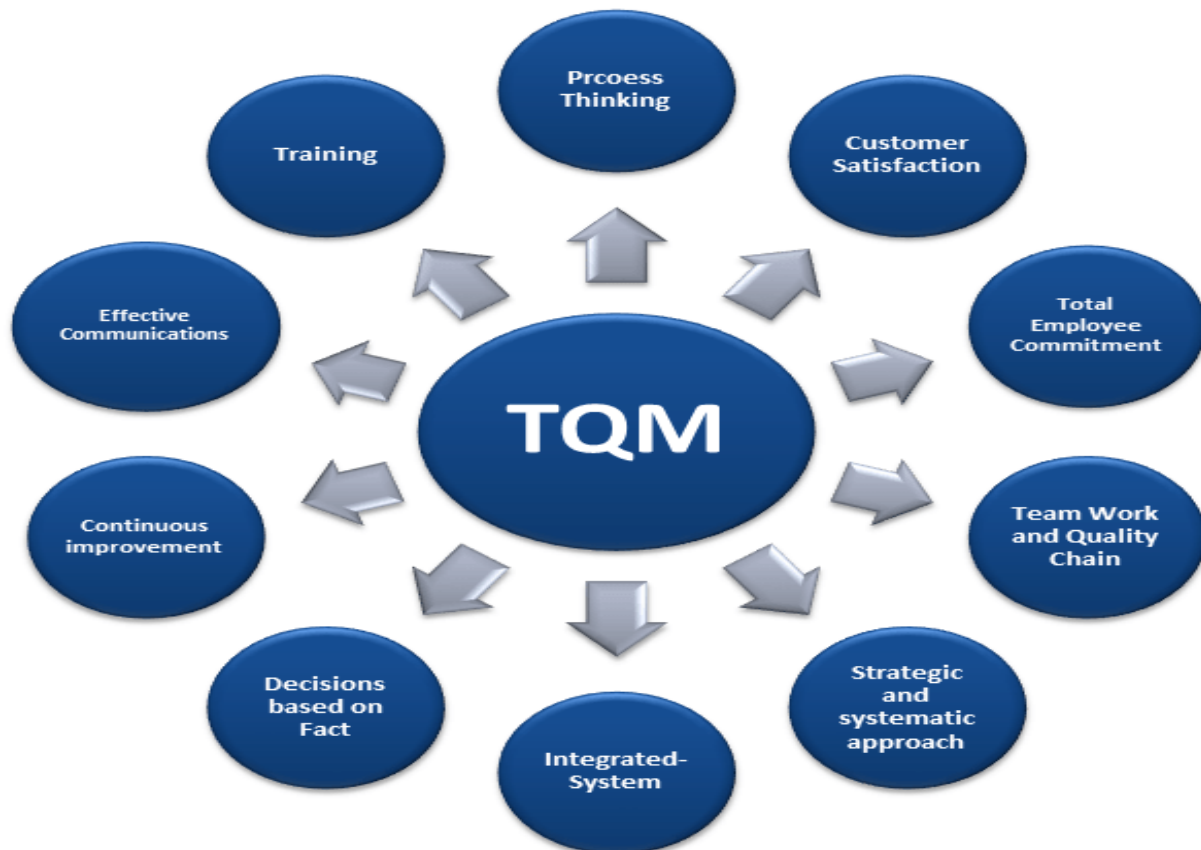


Figure 2 (b): Total quality management components

2.7. E-Learning

When training materials, course interactions and course delivery are enabled by and mediated through technology, your firm is engaging in e-learning or e-teaching. The business drivers behind e-learning include:

- **Reducing training costs:** Organizations implementing e-learning can realize dramatic savings, ranging from 40 to 50 percent within a couple of years. Increasing employee flexibility and control over learning.
- **Employees value the flexibility:** e-learning provides, because it can reduce travel and time away from the office and family.
- **Better tracking and management of employee training:** Specific training often is required by regulators, and documenting successful course completion can be a major burden for organizations.

Self Check 2	Written Test
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Direction I: Matching items

Instruction: Match items under heading A with items under item b. Use bold letter. (2 pts each)

A	B
1 Effective communication	A When in doubt, move it out
2 Microsoft project	B Revisit the first three of the 5S on a frequent basis
3 Base lining	C Total quality management component
4 Sort	D Used to compare the new schedule with the baseline schedule automatically to understand the project scope and cost deviations
	E Project management software

Note: Satisfactory rating – 8 and above pts

Unsatisfactory - below 8 pts

Answer Sheet-1

Name: _____

Date: _____

Multiple Choice Questions

1 _____

2 _____

3 _____

4 _____

Score = _____
Rating: _____

Information Sheet- 3	Identify, Classify and Use New or Upgraded Equipment for the Benefit of the Organization
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3.1. Identifying New or Upgraded Equipments

Selecting appropriate equipments in designing and constructing irrigation and drainage systems is very crucial in facilitating the work in more quality way. For example, if heavy equipment for use at the job site, such as cranes, conveyors, and earth movers, are appropriately identified, continues to become more efficient. When selecting new or upgraded equipments appropriateness should be defined within the scope of:

Technical Feasibility: Technical feasibility is what can be achieved within the holistic environment of the construction site; this is not limited to technical factors only, but also to social, economic, and political factors that affect the organization. Given this situation, what becomes important to organization is whether or not that technology can fit into the system. If the technology can fit, then it is technologically feasible.

Economic Feasibility: The organization resource base, both human and financial, must be considered. Does the organization have the financial resources to purchase the technology and the inputs to derive the benefits from the technology? Will this technology require the hiring of additional labor, and if so, is it available and affordable.

Social Acceptability: Technologies may be technically sound, but may conflict with the social norms of the end users or even cause societal disequilibrium. For instance, with regards to social disequilibrium, in some cases the adoption of technologies by small groups of individuals has resulted in a shift in power relationship within the society.

Environmental Safety: An extension programme must be cognizant of the effects it will have on the environment.

3.2. New Equipments/Technologies Used in Irrigation and Drainage Sectors

There are a number of new technologies utilized in irrigation and drainage systems now days. These technologies are used in: irrigation water application; irrigation water

conveyance; in quality management systems; in water resource management; in designating and construction of water works construction management. They range from process to techno wares.

Examples include:

- Different software
- Drip irrigations
- Sprinkler irrigations
- Pumps
- Water level measuring structures
- Water flow measuring equipments
- Water flow regulating structures
- Remotely controlled gates

Generally, technologies fall into two main categories: those which make better use of available water, that is, water saving options that help to increase water productivity (the benefit derived from each liter of water); and those which make more water available including water storage to cope with seasonality, increasingly variable and unpredictable rainfall, flooding, and drought.

This is often referred to as the 'twin-track' approach, the emphasis depending on local circumstances. In many of the drier regions of the world for example, traditional blue water resources are already over-exploited and the costs of making more water available are becoming increasingly prohibitive.

Decision makers often respond to water needs by building larger versions of familiar technologies larger dams, deeper wells, bigger pumps, or water transfer from one catchment to another. Extending existing technologies alone, however, does not address unsustainable water use; rather appropriate technological solutions must be combined with improved water management and efficient water use. Furthermore, in dry areas, water management can go hand in hand with opportunities to capture more green water locally.

Self-Check 3	Written Test
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Direction I: Short Answer

Instruction: Give short and precise answers to the following questions.

1. Define and explain the following terms (2 points each)
 - A. Technical Feasibility
 - B. Economic Feasibility
 - C. Social Acceptability
 - D. Environmental Safety

2. Give examples of new technologies used in irrigation and drainage sectors now days(4 points).

Note: Satisfactory rating – 6 and above pts Unsatisfactory - below 6 pts

Answer Sheet-1

Name: _____

Date: _____

Multiple Choice Questions

Score = _____
Rating: _____

Short Answer Questions

1. _____

2. _____

Instruction Sheet - 2**Learning Guide - 69: Apply Functions of Technology to Assist in Solving Organizational Problems**

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Conducting testing of new or upgraded equipment according to the specification manual.
- Applying features of new or upgraded equipment within the organization.
- Using features and functions of new or upgraded equipment for solving organizational problems.
- Accessing and using sources of information relating to new or upgraded equipment

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:

- Conduct testing of new or upgraded equipment according to the specification manual.
- Apply features of new or upgraded equipment within the organization.
- Use features and functions of new or upgraded equipment for solving organizational problems.
- Access and use sources of information relating to new or upgraded equipment

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 4.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4” in page 20, 25, 30 and 33 respectively.
4. Accomplish the “Self-check 1, Self-check 2, Self-check 3 and Self-check 4” -” in page 24, 29, 32 and 35 respectively

Information Sheet- 1	Conduct Testing of New or Upgraded Equipment According to the Specification Manual
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1.1. Types of Equipment Specifications

Functional specifications: These are specifications that define the function, duty or role of the goods or services. It nominates what the goods or services are broadly required to do. Functional specifications define the task or desired result by focusing on what is to be achieved rather than how it is to be done. They do not describe the method of achieving the intended result. This enables suppliers to provide solutions to defined problems. For example, a specification for “an accessible device capable of conveying children from their school to their homes” does not limit responses to bus operators alone.

Performance specifications: These are specifications that define the purpose of the goods or services in terms of how effectively it will perform, that is, in capability or performance terms. Performance is a logical extension of function. Performance specifications define the task or desired result by focusing on what is to be achieved. They do not describe the method of achieving the desired result. This enables suppliers to provide solutions to defined problems.

For example, a specification could be written: “An accessible device is required to convey at least 30 children every afternoon of the school week from their school in a safe manner to their homes within a radius of the school of 15 kilometers. The device shall be capable of achieving this within 1 hour. The device shall be capable of maintaining a comfortable environment for the children at an average temperature of 22 degrees Celsius in all types of weather. The device should allow equitable access by all children”. Such a specification does not limit offers to one type of transportation or one type of user.

Technical specifications: These are specifications that define the technical and physical characteristics and/or measurements of a product, such as physical aspects (for example, dimensions, color, and surface finish), design details, material properties, energy requirements, processes, maintenance requirements and operational requirements. They

are used when functional and performance characteristics are insufficient to define the requirement.

Functional and performance specifications preferred to technical specifications because:

- Suppliers can offer alternative and innovative ideas and solutions.
- Offerors can focus on providing the best solution.
- The focus on outcomes should result in better value for money.

1.2. Evaluation Criteria

Whatever methods are used to define the goods or services, there must be criteria to evaluate compliance of offers with the specification, legislative requirements or associated standards. Such evaluation criteria should be developed at the same time as developing the specification. They may be combined with other criteria, for example, price, accessibility, delivery, warranty, to give an overall assessment of the value for money represented by each offer. On the other hand, compliance may be a “pass” or “fail” to meet the mandatory requirements. Value for money may then be assessed on other variables.

1.3. Testing New or Upgraded Equipment

New equipments are tested to ensure that they meet the requirements of the specification. If standards or other documents have been specified, they may list tests to assess certain aspects of the item (e.g. electrical safety).

These tests will have to be performed by the contractor to satisfy those documents. In the specification or “Invitation to Offer” documents be clear about who is responsible for testing. Other tests may need to be specified. These should cover all aspects of the requirement and be designed to prove that the product offered is suitable for its intended purpose. Specifying the tests includes nominating the criteria for passing or failing those tests as well as the implications of failing. Criteria for passing the tests as a package (as opposed to passing each test) should also be stated.

The supplier may develop and conduct tests for some requirements. The right to approve the contractor's testing plans should be specified before they are implemented. Testing may be conducted through an independent organization instead of the supplier.

Acceptance Testing: Acceptance testing (also called performance testing or field commissioning) is conducted during or just after the installation phase.

During acceptance-testing phase the following activities will be conducted:

- Installation verification to confirm that equipment installed is in accordance with the final proposal and with manufacturer's instructions;
- System activation, also called factory startup, in which controls are programmed, calibrated and adjusted to match specifications and site conditions;
- Functional testing to confirm installed equipment operates according to the design intent and achieves stated acceptance criteria;
- Assign deficiencies to a punch list for resolution by the contractor; and
- Owner notification and acceptance of all test reports.

1.4. Detailed Requirements

This section in the specification describes the requirement in detail. The amount of detail provided should reflect the complexity of the requirement. Allow for alternative solutions when defining the requirement.

Detailed requirements are usually best described as:

- Functional characteristics
- Performance characteristics
- Technical characteristics
- Other aspects

Combining performance and functional characteristics provides the opportunity for suppliers to offer solutions tailored to the requirement based on their product and service range. Alternative solutions should be assessed against the evaluation criteria, including an assessment of any desirable features offered as part of each solution.

Self Check 1	Written Test
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Direction I: Matching items

Instruction: Match items under heading A with items under item b. Use bold letter. (2 pts each)

A	B
1 Detailed requirements	A Functional testing to confirm installed equipment operates according to the design intent and achieves stated acceptance criteria
2 Testing new equipments	B Performance characteristics
3 Technical specifications	C To ensure that they meet the requirements of the specification
4 Acceptance-testing phase	D Specifications that define the technical and physical characteristics and/or measurements of a product, such as physical aspects
	E Performance testing or field commissioning

Note: Satisfactory rating – 4 and above pts Unsatisfactory - below 4 pts

Answer Sheet-1

Name: _____

Date: _____

Multiple Choice Questions

- 1 _____
- 2 _____
- 3 _____
- 4 _____

Score = _____
Rating: _____

Information Sheet- 2	Apply Features of New or Upgraded Equipment within the Organization
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2.1. Introduction

Once new or upgraded equipments are obtained, its features are applied in the organization based on organizational requirements. The dramatically accelerating pace of development and adoption of new technologies is likely to continue due to the features which include:

- The cumulative nature of technological change;
- The convergence of technologies into new combinations;
- Dramatic reductions in costs;
- The emergence of digital “platforms of platforms” – most notably the Internet; and
- Declining entry costs

2.2. Common Features of Equipments

Upgraded or new equipments have different features which should be applied in an organization turn by turn to solve organizational problems. Any new or upgraded technology/equipment may have a number of different features.

Most commonly, features of equipment are related to equipment’s:

- ease for usage
- flexibility on purpose
- multifunctionality
- durability
- adaptability
- applicability
- capacity
- modernity
- accuracy and resolution
- strength
- Environmentally friendly, etc.

Example 1: - Concrete Test Hammer

Equipment Name: Concrete Test Hammer

Standards: EN 12504: Part 2 |ASTM C805 |BS1881:202NF P18-417|DIN 1048|UNI 9189

Main Features of the Equipment

- Possibility to store, display on graphic LCD 128x64 and download data to PC over 15000 tests
- Automatic statistical processing and readings
- Automatic conversion of rebound index to equivalent compression strength in psi, N/mm², kg/cm²
- High accuracy and resolution



Figure 3: Concrete test hammer

Example 2: Project Scheduling Software

Basic Features

Any project management software that is selected must have the ability to track and display basic features such as the following:

- Durations
- Relationships
- Milestones
- Start and end dates

- Resource calendars
- Graphic displays using Gantt and network charts

Advanced Features

For more complex projects, look for advanced features, such as the following:

- Issue tracking that tracks problems, actions, and resolutions
- Project portfolio management that tracks and compares groups of related projects
- Automatic resource leveling and alerts when a resource is overscheduled
- Document management feature that tracks contracts, bids, scope changes, and incidents

2.3. Features of Globally Emerging New Technologies

- **Big data analysis:** can help to manage or resolve critical global issues, create new scientific breakthroughs, advance human health and improve decision-making, by providing real-time streams of information.
- **The Internet of Things:** allows the condition and actions of connected objects and machines to be monitored and managed, and allows more effective monitoring of the natural world, animals and people. These two technologies have important applications in health care, agriculture, energy and water management and quality, as well as in monitoring development indicators.
- **Artificial intelligence:** now includes capabilities in image recognition, problem solving and logical reasoning that sometimes exceed those of humans. Artificial intelligence, particularly in combination with robotics, also has the potential to transform production processes and business, especially in manufacturing.
- **3D printing:** can allow faster and cheaper low-volume production of complex products and components, and rapid iterative prototyping of new manufactured products. In addition to offering some potential carbon savings by reducing the need to transport components, 3d printing can offer in health care, construction and education.

- **Nanotechnology:** the manufacture and use of materials at an infinitesimal scale has important application in water supply, irrigation engineering, energy, agriculture, ICT and medicine.
- **Renewable energy technologies:** allow the provision of electricity in remote and isolated rural areas inaccessible to centralized grid systems, while drones could revolutionize the delivery of supplies, enable precision agriculture and replace humans in dangerous tasks.

Self-Check 2	Written Test
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Direction I: Short answer items

Instruction: Give short and precise answers to the following questions.

1. List and explain the features of any technology/new equipment (4 pts)
2. What are the driving forces of dramatically accelerating development of technological innovation? (4 pts)

Note: Satisfactory rating – 4 and above pts Unsatisfactory - below 4 pts

Answer Sheet-1

Name: _____

Date: _____

Score = _____ Rating: _____

Short Answer Questions

1. _____

2. _____

Information Sheet- 3	Use Features and Functions of New or Upgraded Equipment for Solving Organizational Problems
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3.1. Introduction

To remain competitive in a global economy, businesses need to adapt to an ever-changing environment to meet their customer's needs. Staying competitive means continuing to evolve as an organization and making changes to both process and technology to gain a competitive edge over their competition. Organizations must become adept in bringing in new technology and managing the challenges that go along with implementing the change. Changes of this nature can provide significant benefits to an organization but can also present many challenges that need to be managed to yield a positive outcome.

3.3. Features of New Technologies Used in Solving Organizational Problems

The following features of technology/new equipment should be utilized in the organization to solve problems. These features of technologies include:

- Technologies that are able to increase human physical and sensory abilities (examples include: hardware and software)
- Technologies that improve out comes (examples include: analytics software)
- Technologies that are designed to influence very specific social outcomes for man
- Technologies that are designed to work in functional and practical way
- Technologies that will always lead to unexpected results (examples include: robotics used in manufacturing industries)

3.3. Benefits of Using Features of New/Upgraded Equipments

The benefits include:

- Technology change has been beneficial to both organizations and its employees.
- Technology change can bring increased efficiency, improved quality, assist in bringing products to market quicker and expand the skill set of employees.
- Technology can also bring benefits such as improved communication, reduced costs and help foster new innovations.

- New technology can help organizations stay more in touch with their market. Rapid changes in the economic landscape of today’s business environment require action to meet customer expectations.
- Additionally, keeping current on the latest technology could allow an organization to seize any possible opportunities that are not being filled by a competitor.
- The use of new technology can help make a business more agile and adaptable to the changes going on in their particular market.
- The addition of new technology can also benefit an organization by helping to shape its strategic vision as well as helping it to gain a competitive edge on their competition. Having a strategic vision will help to focus an entire organization on what they are trying to achieve and what their goal is. Doing so will create a competitive advantage that will lead to increased sales, profits and an increased market share. This benefit (strategic vision) also extends to the staff of an organization by communicating where it is going and how that technology is going to help them achieve the vision.

Self Check 3	Written Test
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Direction I: Short answer items

Instruction: Give short and precise answers to the following questions.

1. Give brief description of change in technology (6 pts)
2. Why employees should be communicated well when there is a change in technology (6 pts)

Note: Satisfactory rating – 6 and above pts Unsatisfactory - below 6 pts

Answer Sheet-1

Name: _____

Date: _____

Score = _____

Rating: _____

Short Answer Questions

1. _____

2. _____

Information Sheet- 4	Access and Use Sources of Information Relating to New or Upgraded Equipment
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4.1. Sources of Information

The purpose of accessing information related to new or upgraded equipments is used to utilize the equipment appropriately. It also used for operation and maintenance of the new or upgraded equipments.

The information to be accessed concerning the new or upgraded equipments is focused on:

- The capability of the equipment
- The specification of the equipment
- Operating procedure of equipment
- Maintenance procedure of the equipment
- Performance of the equipment
- Usability of the equipment
- Safety of the equipment

Information related to new or upgraded equipment can be accessed from the following sources:

- Internet
- Users
- Specification manuals
- Technical specifications
- Developers of the equipments
- Different websites

4.2. Communicating New Technology to Staffs

The implementation of any new technology or new equipments should be communicated to staff. Items such as status, benefits, training and expectations should be clearly provided. Along with the “what” of the change, the “why” should be emphasized to provide staff with an understanding of the changes that are going to occur and what will be expected of them.

The nature of change should be defined and why it is important to the users and is helpful if this definition explains how the change will affect the individuals both personally and professionally. This message can be provided in various ways depending on the organization and methods they have for communication. Information about the change can be provided through things such as email, newsletters, the company website, staff briefings or town hall meetings.

The communication about the new/upgraded equipment should also be tailored to the different levels and roles within an organization as each will react different to the changes that are being made. Open communication between managers and employees is an important part of making a technology change and should be encouraged.

Demonstrating the “what’s in it for them” aspect of the changes can help improve employees’ outlook on the impending change and reduce some of the anxiety that can come along with the unknown and a new way of doing things. Managers need to provide justifications for why the changes are being made, why they are appropriate and the rationale behind them to create readiness for the change to increase the likelihood of employee acceptance and participation in the changes.

Self Check 4	Written Test
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Direction I: Matching items

Instruction: Match items under heading A with items under item b. Use bold letter. (2 pts each)

A	B
1 Specification manual	A Used for appropriate utilization of new or upgraded equipments
2 Equipment information	B Information to be accessed concerning new or upgraded equipment
3 Equipment Performance	C Source of information
	D The means of production needed to complete a project

Note: Satisfactory rating – 6 and above pts Unsatisfactory - below 6 pts

Answer Sheet-1

Name: _____

Date: _____

Multiple Choice Questions

- 1 _____
- 2 _____
- 3 _____

Score = _____
Rating: _____

Instruction Sheet	Learning Guide - 70: Evaluate New or Upgraded Technology Performance
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Evaluating new or upgraded equipment for performance, usability and against OHS standards.
- Determining environmental considerations from new or upgraded equipment.
- Soughing feedback from users where appropriate.

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:

- Evaluate new or upgraded equipment for performance, usability and against OHS standards.
- Determine environmental considerations from new or upgraded equipment.
- Sough feedback from users where appropriate.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 4.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4” in page 36, 41 and 52 respectively.
4. Accomplish the “Self-check 1, Self-check 2, Self-check 3 and Self- check 4” -” in page 40, 51 and 55 respectively

Information Sheet- 1	Evaluate New or Upgraded Equipment for Performance, Usability and Against OHS Standards
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1.1. Introduction

Equipment evaluation is hard enough for professionals, who must struggle to determine whether systems will function as promised, be acceptably easy to use, work reliably, scale as needed, integrate with other systems, and remain current over time. Challenges faced during technology evaluation include: unclear business needs; relating business needs to system requirements and managing the selection process.

When you face extra challenges in evaluating new or upgraded equipment, you can still follow best practices to identify your requirements in advance, select against those requirements, and plan for an effective deployment. Following those practices will ensure that you select a system that meets your real needs and that you deploy your system effectively.

1.2. Technology Evaluation Best Practices

Define your goals: The selection process begins with business needs. Clear definitions are needed to assess the value of the proposed equipment. The goals should be expressed in specific, quantifiable terms. But, equally important, the processes associated with reaching the goals should be spelled out so you can understand exactly what the new equipment needs to do to make the goals achievable.

Specify system requirements: It should be clear by now that detailed system requirements are essential to an effective selection process. To build these requirements, design the actual processes needed to execute the tasks defined as business goals for the new equipment.

Consider a wide range of vendors: In most situations, marketers can choose among many types of equipment that might meet their needs. Once you've built your requirements list, you'll fairly quickly learn which features are found in every product, which are not found

anywhere, and which fall into the critical middle of being available in some systems only. You'll want to screen vendors against this middle set.

The point here is to consider a large number of options and narrow it down quickly. This isn't much more work than starting with a small list of industry leaders and is much more likely to yield a less well-known solution that is actually the best fit for your needs.

Select against requirements: It's not enough to present a detailed requirements list to a vendor. You need to see for yourself how well the vendor can perform. This means transforming your process definitions into use cases or scenarios that vendors can demonstrate against. An effective demonstration requires you to provide the scenarios to the vendors in advance and then have them walk through the steps while you watch. This gets beyond yes/no checklists to seeing what it's like to use a system, which will address important but difficult-to-quantify questions about ease of use, speed, and flexibility.

Look beyond features: The equipment that can't meet your functional requirements isn't worth further consideration. But assuming several products meet your functional needs, you'll want to assess them against other factors such as customer support, training programs, industry experience, underlying technology, future direction, and financial viability.

Plan for deployment: If you've done a good job defining how you expect to use the new equipment, you have a strong head start on planning for the training, program development, and process changes you 'll need for deployment. Be sure to carry through these plans so the system implementation goes smoothly.

Define a long-range plan: You should define your strategy and then make sure that each technology/new equipment acquisition supports it.

Consider organizational context: Technology does not exist in a vacuum. The kinds of new equipment your company can deploy depend on business strategy, financial resources, staff skills, and corporate culture. Openness to change is a critical consideration:

companies that find it difficult to execute complex changes must move slowly when deploying technologies/ new equipments that depend on new processes, skills, and measurements.

Generally, any new or upgraded technologies should offer the prospect of solutions and opportunities that are:

- **Better**, in that they solve problems more effectively, provide new capabilities and opportunities, and allow much more efficient use of natural and human resources;
- **Cheaper**, in that the cost of technologies such as microchips and renewable energy has fallen exponentially as they have become more powerful and/or efficient.
- **Faster**, in that the new technologies are diffusing ever more rapidly around the world, propelled by Internet connectivity and sharply falling prices;
- **scalable**, in that they often offer small-scale solutions that can be rapidly scaled up to meet human needs for energy, food, clean water, health care and education; and
- **easy to use**, in that they have rendered previously complex, laborious and/or time-consuming tasks, such as searching for patterns in huge data sets, almost effortless, while becoming increasingly transparent to users.

1.3. Evaluate Technology Against OHS

New/upgraded equipment should be evaluated against OHS practices (whether it fulfills the OHs requirements or not). Conventions and Recommendations on occupational safety and health may serve several purposes, acting as:

- Fundamental principles to guide policies for promotion, action and management;
- General protection measures, for example, guarding of machinery, medical examination of young workers or limiting the weight of loads to be transported by a single worker;
- Protection in specific branches of economic activity, such as mining, the building industry, commerce and dock work;
- Protection of specific professions (for example, nurses and seafarers) and categories of workers having particular occupational health needs
- Protection against specific risks (ionizing radiation, benzene, asbestos);

- Prevention of occupational cancer; control of air pollution, noise and vibration in the working environment; measures to ensure safety in the use of chemicals, including the prevention of major industrial accidents;

Self Check 1	Written Test
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Direction I: Short answer items

Instruction: Give short and precise answers to the following questions.

1. Explain the different technology evaluation best practices (8 pts)
2. List and discuss those qualities that any new or upgraded technologies should offer (8 pts)

Note: Satisfactory rating – 8 and above pts Unsatisfactory - below 8 pts

Answer Sheet-1

Name: _____

Date: _____

Score = _____ Rating: _____

Short Answer Questions

1. _____

2. _____

Information Sheet- 2	Determine Environmental Considerations from New or Upgraded Equipment
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2.1. Introduction

By product materials should be recycled or disposed appropriately based on material properties by authorized body to lessen environmental pollution.

2.2. Recycling

Recycling is the process of collecting and processing materials that would otherwise be thrown away as trash and turning them into new products. Recycling can benefit your community and the environment.

Benefits of recycling include:

- Reduces the amount of waste sent to landfills and incinerators
- Conserves natural resources such as timber, water and minerals
- Increases economic security by tapping a domestic source of materials
- Prevents pollution by reducing the need to collect new raw materials
- Saves energy
- Supports American manufacturing and conserves valuable resources
- Helps create jobs in the recycling and manufacturing industries in the United States

Steps to recycling materials are:

Recycling includes the three steps below, which create a continuous loop, represented by the familiar recycling symbol.

Step 1: Collection and processing

Step 2: Manufacturing

Step 3: Purchasing new products made from recycled materials



Figure 4 (a): the recycling process

The basic phases in recycling are the collection of waste materials, their processing or manufacture into new products, and the purchase of those products, which may then themselves be recycled. Typical materials that are recycled include iron and steel scrap, aluminum cans, glass bottles, paper, wood, and plastics.



Figure 4(b): Plastic, glass, and metal containers in a recycling bin (© Brand X Pictures/Jupiter images Corporation)

The materials reused in recycling serve as substitutes for raw materials obtained from such increasingly scarce natural resources as petroleum, natural gas, coal, mineral ores, and trees. Recycling can help reduce the quantities of solid waste deposited inland fills, which have become increasingly expensive. Recycling also reduces the pollution of air, water, and land resulting from waste.

There are two broad types of recycling operations: internal and external. Internal recycling is the reuse in a manufacturing process of materials that are a waste product of that process. Internal recycling is common in the metals industry, for example. The manufacture of copper tubing results in a certain amount of waste in the form of tube ends and trimmings; this material is remelted and recast.

External recycling is the reclaiming of materials from a product that has been worn out or rendered obsolete. An example of external recycling is the collection of old newspapers and magazines for repulping and their manufacture into new paper products. Aluminum cans and glass bottles are other examples of everyday objects that are externally recycled on a wide scale.



Figure 4(c): Recycling bins set side by side with rubbish bins (© *Eva Blanda/Fotolia*)

2.3. Commonly Recycling Materials

Plastics: Plastics account for almost 10 percent by weight of the content of municipal garbage. Plastic containers and other household products are increasingly recycled, and, like paper, these must be sorted at the source before processing. Various thermoplastics may be remelted and reformed into new products.

Thermosetting plastics such as polyurethane and epoxy resins, by contrast, cannot be remelted; these are usually ground or shredded for use as fillers or insulating materials. So-called biodegradable include starches that degrade upon exposure to sunlight (photo degradation), but a fine plastic residue remains, and the degradable additives preclude recycling of these products.



Figure 4(d): Plastic items being sorted at a recycling centre (© Dragon Images/Stock.com)

Rubber: Though much used rubber was formerly burned, this practice has been greatly curtailed in most countries in order to prevent air. Internal recycling is common in most rubber plants; the reprocessed product can be used wherever premium-grade rubber is not needed. External recycling has proved a problem over the years, as the cost of recycling

old or worn-out tires has far exceeded the value of the reclaimed material. Shredded rubber can be used as an additive in asphalt pavements, and discarded tires may be used as components of swings and other assorted recreational climbing equipment in “tire playgrounds” for children.

Paper and other cellulose products: One of the most readily available materials for recycling is paper. The stream of waste paper consists principally of newspaper; office, copying, and writing paper; computer paper; colored paper; paper tissues and towels; boxboard (used for cereal and other small boxes); corrugated cardboard; and kraft paper (used for paper bags).

These papers must usually be sorted before recycling. Newsprint and cardboard can be repulped to make the same materials, while other types of scrap paper are recycled for use in low-quality papers such as boxboard, tissues, and towels. Paper intended for printing-grade products must be de-inked (often using caustic soda) after pulping; for some uses the stock is bleached before pressing into sheets. Smaller amounts of recycled paper are made into cellulose insulation and other building products.

Glass: Glassmakers up about 6 percent by weight of the material in municipal waste streams. Glass is an easily salvageable material but one that is difficult to recover economically. Though enormous numbers of glass containers are used throughout the world, much of this glass is still not recycled, because the raw materials are so inexpensive that there is scant economic motive to reuse them. Even those glass containers that are returned by consumers in their original form sooner or later become damaged or broken.

One problem in recycling glass is separating it from other refuse. Another problem is that waste glass must be separated by color (i.e., clear, green, and brown) before it can be reused to make new glass containers. Despite these difficulties, anywhere from 35 to 90 percent of cullet (broken or refuse glass) is currently used in new-glass production, depending on the country.

2.3. Disposal of Waste Materials

If the waste is not a common chemical with known characteristics, enough information about it must be supplied to satisfy the regulatory requirements and to ensure that it can be handled and disposed of safely. Often, information on only the components present in amounts greater than 1% is required, but confirmation is needed from the treatment/disposal facility. The information needed to characterize a waste also depends on the method of ultimate disposal.

2.3.1. Disposal Options

Decisions on the ultimate disposal method are an important part of the on-site planning for handling of waste. The method of collection has an impact on, for example, how waste will be stored so as to most efficiently accomplish its transfer to the treatment, storage, and disposal facility (TSDF). Waste generators often use several disposal options because each has its own advantages for specific wastes.

Incineration: Incineration is becoming the disposal method of choice for several reasons. It promises to give the generator the best assurance of long-term safety from liability. It also leads to a minimum amount of residues that must be disposed of in landfills. However, at this time, incineration is still one of the more expensive disposal options. It is becoming increasingly difficult to obtain a permit to establish a commercial incinerator because of local opposition (the "not in my backyard" syndrome) and environmental concerns centering on questions regarding the effectiveness of the incineration process.

Disposal in the Normal Trash: Laboratory workers may be surprised to learn the number of wastes they generate that can be disposed of in the normal trash. However, because the disposal of trash from households and businesses is normally controlled by the local municipality, the local agency should be approached to establish what is allowed.

Disposal in the Sanitary Sewer: Disposal in the sewer system (down the drain) had been a common method of waste disposal until recent years. However, environmental concerns, the viability of publicly owned treatment works (POTW), and a changing disposal culture

have changed that custom markedly. In fact, many industrial and academic laboratory facilities have completely eliminated sewer disposal. Again, like trash disposal, most sewer disposal is controlled locally, and it is therefore advisable to consult with the POTW to determine what is allowed.

Release to the Atmosphere: The release of vapors to the atmosphere, via, for example, open evaporation or fume hood effluent, is not an acceptable disposal method. Apparatus for operations expected to release vapors should be equipped with appropriate trapping devices.

2.4. Safe Disposal of Packaging

Bark, woodchips, and lignin from sawmills, pulp mills, and paper mills are returned to the soil as fertilizers and soil conditioners. The process of papermaking produces a variety of liquid wastes that are sources of such valuable chemicals as turpentine, methyl alcohol, dimethyl sulfide, ethyl, and acetone. Sludges from pulp and paper manufacture and phosphate slime from fertilizer manufacture can be made into wallboard.

2.5. Disposal of Nonhazardous and None regulated Waste

If different types of waste are combined, then the total must be treated as hazardous waste and the price for disposal of the nonhazardous portion increases markedly. When safe and allowed by regulation, disposal of nonhazardous waste via the normal trash or sewer can substantially reduce disposal costs.

2.6. Disposal of Spills

General guidelines for cleaning up spills are as follows:

- Assess the potential hazard presented by the spill to personnel within the work area as well as within other parts of the facility and the outside environment.
- Remove possible sources of ignition if the spilled material is flammable:
 - ✓ Turn off hot plates, stirring motors, and flames.
 - ✓ Shut down equipment in the area that could increase danger.

- Secure the area so that no one will walk through the spill or interfere with the cleanup efforts.
- Choose appropriate personal protection devices:
 - ✓ Always wear protective gloves and goggles or a face shield.
 - ✓ If there is a chance of body contact with the spill, wear an apron or coveralls.
 - ✓ Wear rubber or plastic (not leather) boots if there is a chance of stepping into the spill.
 - ✓ Wear a respirator if there is danger of inhalation of toxic vapors, though only when proper training has preceded its use.
 - ✓ Note that protective devices must be chosen carefully to be appropriate for the anticipated hazard. Often training is appropriate or required (e.g., with respirators) prior to their use.
- Locate a spill control kit or other appropriate absorbent and cleanup supplies.
- Confine or contain the spill:
 - ✓ Do not let any of the spilled material enter the sewer system, for example, through a floor drain.
 - ✓ Cover the spill with an absorbent material; paper towels may be appropriate for small, un reactive materials.
 - ✓ Sweep up or in other ways collect the absorbed materials and place them in a container that can be securely closed.
- If the spilled material is an acid or a base, use a neutralizing material; sodium bicarbonate is commonly used for acids, and sodium bisulfate for bases. Spill control kits are commercially available for the cleanup of many kinds of chemical spills. Dispose of the absorbed spill appropriately as hazardous or nonhazardous waste.

2.7. Disposal of Wastewater

Treated wastewater (domestic sewage) can be reclaimed and reused for a variety of purposes, including golf course and landscape irrigation. With achievement of appropriate (secondary) treatment levels, it may be reused for the irrigation of certain agricultural crops. After very high levels of advanced (or tertiary) treatment and purification, it may even be used to supplement drinking water supplies. However, because of public resistance to the

direct reuse of treated sewage for domestic purposes, recovered water must be recycled indirectly. This is done by injecting it into the ground or storing it in ponds and allowing it to seep into naturally occurring aquifers so that it is further purified as it slowly moves through the geologic strata.

2.8. Disposal of Domestic Refuse

Domestic refuse (municipal solid waste) includes garbage and rubbish. Garbage contains highly decomposable food waste (e.g., kitchen scraps), while rubbish is the dry, non putrescible component of refuse. Once glass, plastics, paper products, and metals have been removed from domestic refuse, what remains is essentially organic waste. This waste can be biologically decomposed and turned into humus, which is a useful soil conditioner, and kitchen scraps, when decomposed with leaves and grass in a compost mound, make an especially useful soil amendment. These practices help reduce the amount of material contributed by households to landfills.

Self Check 2	Written Test
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Direction I: Multiple choice items

Instruction: Choose the best answer for the following questions and write the letter of your answer on the answer sheet provided in the spaces provided. Use bold letter.
(2 pts each)

1. One of the following is no recommended disposal options for wastes

A. Incineration	C. Disposal in the normal trash
B. Disposal in the Sanitary Sewer	D. Release to the streams
2. ____ includes garbage and rubbish.

A. Domestic refuse	B. Spills	C. Waste water	D. Chemicals
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3. All are returned to the soil as fertilizers and soil conditioners, except:

A. Bark	B. Woodchips and lignin from sawmills	C. Pulp mills	D. None
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4. The initial step in recycling is:

A. Disposing	C. Collection and processing
B. Manufacturing	D. Purchasing new products made from recycled materials

Note: Satisfactory rating – 4 and above pts Unsatisfactory - below 4 pts

Answer Sheet-1

Name: _____

Date: _____

Multiple Choice Questions

- 1 _____
- 2 _____
- 3 _____
- 4 _____

Score = _____ Rating: _____

3.1. Introduction

One method through which you can collect information about new or upgraded equipments is by collecting feedback from users/ customers by different methods. This is because these users have used and are using these new equipments prior and tested their performance.

When you think about collecting customer feedback, it's easy to get overwhelmed by the sheer volume of possibilities. With so many customers and so many ways to connect with their feedback it's hard to know where to start. One thing is clear though: taking a proactive approach to collecting customer feedback ensures you never stray too far from the needs of your community, even as those needs evolve.

3.2. Receiving Feedback

There is no point in asking others to give you feedback unless you are prepared to be open to it and to consider comments which differ from your own perceptions. As receiver:

- **Be explicit:** make it clear what kind of feedback you are seeking. If necessary, indicate what kinds you do not want to receive. The feedback from others is entirely for your benefit and if you do not indicate what you want you are unlikely to get it.
- **Be attentive:** concentrate fully on what is being said. Focus on what the person wants you to know, not on what you would like to hear.
- **Be aware:** notice your own reactions, both intellectual and emotional. Particularly notice any reactions of rejection or censorship on your part. If the viewpoint from which the other is speaking is at variance with your own do not dismiss it: it can be important to realize the misapprehensions of others. Some people find it useful to partially dissociate or distance them in this situation and act as if they were witnessing feedback being given to someone else.
- **Be silent:** refrain from making a response. Don't even begin to frame a response in your own mind until you have listened carefully to what has been said and have considered the implications. Don't use the excuse of correcting factual errors to avoid hearing and resonating with the substance of what has been said. Don't be distracted by the need to explain: if you continue to feel that you need to give an explanation do

it later after the feedback session once you are sure you have attended to all that has been said.

There is no difference in principle between feedback given in written form and that in person.

- With written feedback there is normally no opportunity to resolve the misunderstandings and it is necessary to be very explicit in specifying what types of feedback are desired and in formulating responses.
- In the written form more attention needs to be given to tone and style, as there is no opportunity to adjust your response in the light of the immediate reactions of the other person.

3.2. Effective Customer Feedback Collection Methods

Before you begin collecting feedback from the users of new equipments, you need to pinpoint why you're seeking their input. Identifying your desired outcomes and outlining the process for getting there sets the groundwork for a worthwhile investment of your time and your customers' time. Without a clear intention, your feedback may not serve anyone. The most effective customer feedback methods include:

- Customer feedback surveys
- Email and customer contact forms
- Usability tests
- Exploratory customer interviews
- Social media
- On-site activity (via analytics)
- Instant feedback from your website

Customer feedback surveys: Developing a useful customer survey may be more challenging than you think. There are a ton of questions you could ask customers/users. The good news: you can choose between short slider surveys (which help you target specific issues) that pop up on your site or longer, traditional surveys.

If you want customers/users to follow through on completing a survey, make sure you follow some simple best practices.

- Only ask questions that help you meet your goals.
- Write thoughtful open-ended questions.
- Create consistent rating scales.
- Avoid leading or loaded questions.

Email and customer contact forms: Email is one of the easiest ways to gather candid customer feedback. Because it's a support channel for most companies, you can use each interaction as an opportunity to gather feedback. To maximize the likelihood of hearing back from a customer, do these three things:

A. **Set clear expectations:** Sometimes, customers don't offer important feedback because they don't think anyone cares. Is it any wonder most companies don't? Many of those same customers may be willing to leave feedback if they knew they'd hear back and exactly when to expect a response.

Consider adding a short sentence to your emails that tells people how soon they can anticipate hearing back from you. "We'll get back to within X hours/days" will go a long way to set expectations and build trust with your community.

B. **Organize email feedback:** This system enables you to keep tabs on requests and their requestors, as well as ideas you've already passed on. The process also gives employees a clear roadmap to guide future customer interactions.

C.

D. **Send personalized responses:** The best way to get a candid response from a customer is to simply ask for one. Since email enables you to send a one-to-one request, you can ask for more personal feedback than in a survey.

Usability tests: Used to collect information concerning how the new equipments are used and to know the operation procedures of the equipments. Even though most of us associate user testing with web-based products, the fundamentals apply to any business.

Let's say you run a gym. Offer a customer a free month to visit your gym three to five days a week and keep a diary about their experiences. Learning about the business from their perspective uncovers small tweaks that make a huge difference to the customer experience.

Exploratory customer interviews: Reaching out to customers directly opens up conversations that otherwise wouldn't happen. Qualitative stories from customers bring color and nuance to quantitative feedback (data). These personal experiences help a team understand the feelings behind customer decisions and the community response to a company's brand or decisions. When you conduct customer, you create the opportunity to challenge false assumptions that developed over time.

Consider the following during interview.

- **Start an open-ended dialogue:** -When you're talking to customers, open-ended questions are your best friend. These queries give your customers the flexibility to dig into their experiences with more detail. Plus, they're less likely to be biased or leading questions.
- **Get more specific as you go:** - Begin the conversation with wider impressions and get more detailed in your questions as the dialogue evolves. Every piece of feedback they give you is an opportunity for another more specific follow-up.
- **Practice active listening:** To receive insights that can help your team, you need to be open and receptive. Maintain eye contact and mirror back the key takeaways you're hearing from clients, always keeping the spotlight on them.

Social media: Social listening can give you access to an otherwise untapped reservoir of candid feedback from customers. Direct comments or mentions on social networks aren't the only way for your business to collect customer feedback either many networks include built-in polling tools.

On-site activity (via analytics): Analytics reveal what customers don't know about how they use your product. Especially if you sell a digital product or service, you benefit from leveraging analytics to understand how users interact with your company.

Self Check 3	Written Test
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Direction I: Multiple choice items

Instruction: Choose the best answer for the following questions and write the letter of your answer on the answer sheet provided in the spaces provided. Use bold letter.
(2 pts each)

1. One of the following is not recommended when talking with users of equipment to collect data.

A. Start an open-ended dialogue	C. Get more specific as you go
B. Practice active listening	D. None
3. The best practices to be followed during conducting customers/users survey about new or upgraded equipments is:

A. Only ask questions that help you meet your goals	C. Create consistent rating scales
B. Write thoughtful open-ended questions	D. Avoid leading or loaded questions
E. All	
3. The most effective customer feedback is obtained by:

A. Customer feedback surveys	C. Email and customer contact forms
B. Usability tests	D. Exploratory customer interviews
4. What you have to be when receiving feedback?

A. explicit	B. attentive	C. aware	D. silent	E.All
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Note: Satisfactory rating – 4 and above pts Unsatisfactory - below 4 pts

Answer Sheet-1

Name: _____

Date: _____

Multiple Choice Questions

- 1 _____
- 2 _____
- 3 _____
- 4 _____

Score = _____

Rating: _____

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