REPUBLIC OF KENYA

LEARNING GUIDE

FOR

BASIC COMPETENCIES

LEVEL 6

TVET CDACC
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FOREWORD

The provision of quality education and training is fundamental to the Government's overall strategy for social economic development. Quality education and training will contribute to achievement of Kenya's development blueprint and sustainable development goals. This can only be addressed if the current skill gap in the world of work is critically taken into consideration.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector should be aligned to the Constitution and this has triggered the formulation of the Policy Framework for Reforming Education and Training (Session Paper No. 4 of 2016). A key provision of this policy is the radical change in the design and delivery of the TVET training which is the key to unlocking the country's potential in industrialization. This policy document requires that training in TVET be Competency Based, Curriculum development be industry led, certification be based on demonstration and mastery of competence and mode of delivery allows for multiple entry and exit in TVET programs.

These reforms demand that industry takes a leading role in TVET curriculum development to ensure the curriculum addresses and responds to its competence needs. The learning guide in Basic Competencies enhances a harmonized delivery the competency-based curriculum for Basic Competencies Level 6. It is my conviction that this learning guide will play a critical role towards supporting the development of competent human resource for all sectors' growth and sustainable development.

PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING
MINISTRY OF EDUCATION

PREFACE

Kenya Vision 2030 is anticipated to transform the country into a newly industrializing, "middle-income country providing a high-quality life to all its citizens by the year 2030". The Sustainable Development Goals (SDGs) further affirm that the manufacturing sector is an important driver to economic development. The SDGs number 9 that focuses on Building resilient infrastructures, promoting sustainable industrialization and innovation can only be attained if the curriculum focuses on skill acquisition and mastery. Kenya intends to create a globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through life-long education and training.

TVET has a responsibility of facilitating the process of inculcating knowledge, skills and attitudes necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency Based Education and Training (CBET). The Technical and Vocational Education and Training Act No. 29 of 2013 and the Sessional Paper No. 4 of 2016 on Reforming Education and Training in Kenya, emphasized the need to reform curriculum development, assessment and certification to respond to the unique needs of the industry. This called for shift to CBET to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labor force.

The TVET Curriculum Development, Assessment and Certification Council (TVET CDACC), in conjunction with industry/sector developed the Occupational Standards which was the basis of developing competency-based curriculum and assessment of an individual for competence certification for Basic Competencies level 6. The learning guide is geared towards promoting efficiency in delivery of curriculum.

The learning guide is designed and organized with clear and interactive learning activities for each learning outcome of a unit of competency. The guide further provides information sheet, self-assessment, tools, equipment, supplies, and materials and references. I am grateful to the; Council Members, Council Secretariat, Basic Competencies experts and all those who participated in the development of this learning guide.

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ACKNOWLEDGEMENT

This learning guide has been designed to support and enhance uniformity, standardization and coherence in implementing TVET Competency Based Education and training in Kenya. In developing the learning guide, significant involvement and support was received from various organizations.

I recognize with appreciation the critical role of the participants drawn from technical training institutes, universities, private sector and consultants in ensuring that this learning guide is in-line with the competencies required by the industry as stipulated in the occupational standards and curriculum. I also thank all stakeholders in the Basic Competencies area for their valuable input and all those who participated in the process of developing this learning guide.

I am convinced that this learning guide will go a long way in ensuring that workers in all sectors acquire basic competencies that will enable them to perform their work more efficiently and make them enjoy competitive advantage in the world of work

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ACRONYMS

BC	Basic Competency
CC	Core Competency
CDACC	Curriculum Development, Assessment and Certification Council
CO	Common Units
CRM	Customer Relationship Management
CSR	Corporate Social Responsibility
CU	Curriculum
ERM	Enterprise Resource Management
ERP	Enterprise Resource Planning
FIFO	First In First Out
ICT	Information Communication Technology
IPR	Intellectual Properties Rights
KCSE	Kenya Certificate of Secondary Education
KNQA	Kenya National Qualifications Authority
LIFO	Last In First Out
LPO	Local Purchase Order
LSO	Local Service Order
OS	Occupational Standard
OSHA	Occupational Safety and Health Standards
PPE	Personal Protective Equipment
QMS	Quality Management System
SOP	Standard Operating Procedures
SSAC	Sector Skills Advisory Committee
SWOT	Strength Weaknesses Opportunities and Threats
TVET	Technical and Vocational Education and Training

CHAPTER 1: INTRODUCTION

1.1. Background Information

This learning guide has been developed in line with the functions of TVET CDACC as stipulated in Article 45 (1a) of the Technical and Vocational Education and Training (TVET) Act No. 29 of 2013 and the Sessional Paper No. 2 of 2015 that embraces Competency Based Education and Training (CBET) system. It is therefore, the sole intent of this document to provide guidelines for a Competency-Based Basic Competencies curriculum for level 6.

Basic Competencies are personal attributes that enhance an individual's interactions, job performance and career prospects. Unlike common and core unit of competencies, which are about a person's skill set and ability to perform a certain type of task or activity, basic competencies are interpersonal and broadly applicable. This guide emphasizes on communication skills, numeracy skills, digital literacy, entrepreneurship skills, employability skills, environmental skills and occupational health and safety.

This learning guide consists of interactive learning activities, content, further reading, self assessment and relevant and related references that enhances implementing of Basic Competencies Level 6 qualification. It enables the trainee to acquire the competencies that enable him/her to undertake the various processes. The Guide further provides illustration, web links, case studies, exambles and resources on how to implement all the learning outcomes/elements described in the Curriculum and Occupational Standards with a particular focus to a trainee.

1.2. The Purpose of Developing the Learning Guide

Basic Competencies Level 6 curriculum development process was initiated using the DACUM methodology where jobs/occupations were identified. Further, job analysis charts and occupational standards were generated in collaboration with the industry players under the guidance of TVET CDACC (Curriculum Development Assessment and Certification Council). The result of the process was a Basic Competencies Level 6 Occupational Standard (OS) and curriculum. The curriculum was further broken down to end up with units of learning. To effectively implement Basic Competencies Level 6 Occupational standard and curriculum, learning guides are required to provide training content and guide the learners and trainers on the learning process aimed at imparting the relevant knowledge, requisite skills and the right work behaviour/attitude to the industry. Learning guides are part of the training materials.

1.3. Layout of the Trainee Guide

The learning guide is organized as per chapters. Chapter one presents the background information, and purpose of developing the trainee guide. Each of the units of learning/unit of competency is presented as a chapter on its own. Each chapter presents the introduction of the unit of learning/unit of competency, performance standard and list of the learning outcome/elements in the occupational standards.

Learning Activities

For each learning outcome, the learning activities are presented by covering the performance criteria statements and trainee's demonstration of knowledge in relation to the range in the occupational standard and content in the curriculum.

Information Sheet

The information sheet is section under each learning outcome that provides the subject matter into definition of key terms, method, processes/procedures/guidelines, content, illustrations (photographs, pictures, video, charts, plans, digital content, and simulation) and case studies.

Self-Assessment

Self-assessment is to the performance criteria, required knowledge, skills and the range as stated in the occupational standards. The section further provides questions and assignments in which trainees demonstrate that they have acquired the required competences and an opportunity to reflect on what they have acquired. It is expected that the trainer keeps a record of their plans, their progress and the problems they encountered which will go in trainee's portfolio. A portfolio assessment consists of a selection of evidence that meets the pre-defined requirements of complexity, authenticity and reliability. The portfolio starts at the beginning of the training and will be the evidence for the development and acquisition of the competence (summative and formative) by the trainee. It is important to note that Portfolio assessment is highly emphasized in the learning guide.

Finally, the guide presents tools, equipment, supplies and materials for each learning outcome as guided by the performance criteria in occupational standards and content in curriculum. References, relevant links and addendums are provided for further studying. The units of competency comprising this qualification include the following common and core unit of learning:

Core Units of Learning

Table 1: Summary of Core Units of Competencies

Unit of Learning Code	Unit of Learning Title	Duration in Hours	Credit Factors
BC/01/6	Communication Skills	40	4.0
BC/02/6	Numeracy Skills	60	6.0
BC/03/6	Digital Literacy	60	6.0
BC/04/6	Entrepreneurship Skills	100	10.0
BC/05/6	Employability Skills	80	8.0
BC/06/6	Environmental Skills	40	4.0
BC/07/6	Occupational Safety and Health Practices	40	4.0

CHAPTER 2: COMMUNICATION SKILLS/DEMONSTRATE COMMUNICATION SKILLS

2.1 Introduction

Communication Skills/demonstrate communication skills is one of the seven basic competencies unit of learning/unit of competency offered in all the TVET level 6 qualifications. The unit covers the competencies required in meeting communication needs of clients and colleagues as well as developing, establishing, maintaining communication pathways and strategies. It also covers competencies for conducting interviews, facilitating group discussions and representing the organization in various forums. The significance of communication skills to TVET level 6 qualification is to enable learners get along well and avoid conflict in workplaces and organizations.

The critical competency to be covered includes communication strategies in organizations and communication pathways in workplaces. The basic resources required include: Access to relevant workplaces and relevant materials. The unit of competency covers seven learning outcomes. Each of the learning outcomes presents; learning activities that cover performance criteria statements, thus creating an opportunity for the trainee to demonstrate knowledge and skills in the occupational standards and content in curriculum. Information sheet provides; definition of key terms, content and illustration to guide in training. The competency may be assessed through written test, demonstration, practical assignment, interview/oral questioning and case study. Self assessment is provided at the end of each learning outcome. Holistic assessment with other units relevant to the industry sector workplace and job role is recommended.

2.2 Performance Standard

Meets communication needs of clients and colleagues in organizations and workplace and develops effective, efficient communication strategies and pathways in accordance to the organizational standards, procedures, message communicated and the time available.

2.3 Learning Outcomes

2.3.1 List of learning outcomes

a) Utilize specialized communication skills processes
b) Develop Communication Strategies
c) Establish and maintain communication pathways
d) Promote use of communication strategies
e) Conduct Interview
f) Facilitate group discussion
g) Represent the organization

2.3.2 Learning Outcome No 1: Utilize specialized communication skills processes

2.3.2.1 Learning Activities

Learning Outcome No 1: Utilize specialized communication skills processes	
Learning Activities	**Special Instructions**
1.1. Identify and met the specific communication needs of clients and colleagues. 1.2. Use different approaches to meet communication needs of clients and colleagues. 1.3. Address conflicts promptly and in a timely way without compromising the standards of the organization.	Role play the use of different communication approaches. Simulate a conflict resolution mechanism.

2.3.2.2 Information Sheet No 2/LO1: Utilize specialized communication skills processes

Introduction

This learning outcome involves identifying the specific needs of the clients and colleagues, using different approaches to meet communication needs and addressing conflicts promptly and in a timely way without compromising the standards of the organization.

Definition of key terms

Communication: Communication refers to the process of sending and receiving messages between the sender and the receiver. The messages can be sent through verbal, non-verbal, writing, graphical representations, signals, sign and behavior.

Communication Process: Communication process consists of some interrelated steps or parts through which messages are sent from sender to receive. It is the sharing of meaningful information between two or more people with the goal of the receiver understanding the sender's intended message.

Mode of communication: It is the channel through which messages are passed and received. It is the medium used by the sender and the receiver to communicate.

Content/procedures/methods/illustrations

1.1 Specific communication needs of clients and colleagues are identified and met

For communication to take place there is need to understand the communication needs of colleagues and clients. This requires identification of the needs and meeting them. In order to identify needs, it is important to ask and record how colleagues wish to receive communication. This must be done upon first contact or later as soon as practicable. The communication needs must be identified opportunistically and proactively but not retrospectively.

Methods of identifying communication needs

- Self-definition of communication needs that clients and colleagues are asked to define their communication needs. This ensures reception of information in a format that can be best understood by the client/colleague.
- Asking for any communication or information support needs.
- Asking for a minimum of two options or ways in which they can explain their needs.
- Asking the clients or colleagues to advice the organization of their communication or information needs.
- Including a standard line in all correspondence in order to encourage people to contact the organization, should they have any information.
- Considering people who are unable to read letters or any information either blind or illiterate thus can be contacted through telephone.
- Using existing data about information needs to serve the clients and colleagues in the organization.

Therefore, in order to identify the communication needs and preferences of clients and colleagues, there is need to;

- Assess client's/colleague's information about language and communication needs.
- Use different strategies and sources to identify the needs.
- Observe the colleague's/client's behavior and get the communication.
- Pay attention to the colleagues/clients when communicating.
- Seek appropriate/suitable ways to understand/interpret client's/colleagues' communication.
- Record and report communication needs according to the workplace requirements.

NOTE: In order to meet the needs of the clients and the colleagues, effective communication must be realized. Effective communication refers to a communication where the intended information is delivered successfully and understood clearly by the two parties (sender and the receiver). Effective communication must therefore be clear, coherent, courteous, complete, focused, and sensitive to emotions and must be listened to keenly.

Communication process

For communication to happen, it must be composed of a sender, receiver, message, feedback, medium and contextual factors. The figure below illustrates the same;

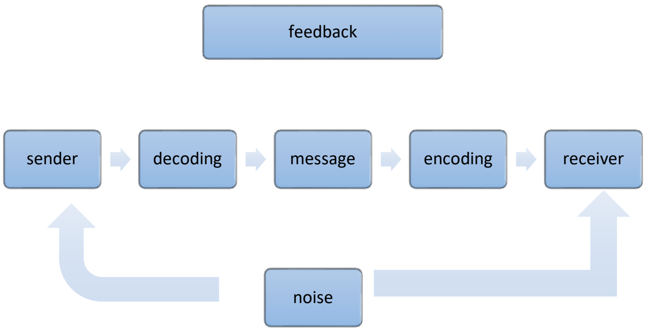

Figure 1. Communication cycle

1.2 Different approaches to communication

Effective communication builds relationships between colleagues, clients and organizations. Meeting communication needs of colleagues/clients is a sign of respect. The following approaches can be used to meet communication needs of clients/colleagues in an organization:

- One-on-one time with the client/colleague
- Total respectfulness i.e. demonstrates the respect you have for a person comprehensively.
- Writings/letters I.e. very powerful and are treated seriously.
- Clarification and bringing light to a situation i.e. it is important to clearly state what you/organization wants.
- Understanding the importance of others.
- Total listening i.e. this prioritizes the client/colleague and the issue at hand.
- Patience and calmness.

Means of communication

Communication simply refers to the creation and exchange of meaning. This can happen through the following means as illustrated in table below.

Table 2: Means of communication

Means of communicating	**Examples**
Verbal	Speech, oral communication
Non-verbal	
Written	
Graphical representation	Maps, charts, info graphics
Signals	
Signs	
Behaviours	

Modes of communication

There are three modes of communication namely:

i. **Interpretive communication:** Is a one-way communication without getting feedback for active negotiation of the meaning with the producer, speaker or the writer. The listener, viewer or the reader interprets whatever the speaker/writer wants the receiver to get/understand.

ii. **Interpersonal communication:** Is a two-way communication with active negotiation of meaning between the sender and the receiver. It is spontaneous, involves exchange of information and meaningful because of its two way, adjustments and clarifications are made accordingly.

iii. **Presentation communication:** Is a one-way communication meant for audience (viewers, listeners or readers). It does not involve exchange of information and there is no direct opportunity for active negotiation of meaning.

The following is a table showing the differences.

Table 3. Differences between different modes of communication

Interpersonal	Interpretive	Presentational
1. Two-way communication that allows active negotiation of meaning among individuals.	One-way communication without room for negotiation of meaning.	One way communication that is intended for an audience.
2. Spontaneous and involves information exchange, thus very meaningful.	There is individual interpretation of information from the sender by the receiver.	Information is presented and there is no exchange hence no negotiation for meaning.
3. Participants may monitor and observe one another for common meaning.	Interpretations differ depending on the receiver's understanding.	The presenter of the message gives direction.

1.3 Addressing conflicts using communication

Conflicts are inevitable at workplaces where people of different personalities and backgrounds meet daily. At workplace, conflicts may occur in different ways e.g. between two colleagues an employee and a client, teams of supervisor's etc. irrespective of the different ways/types of conflicts. The root cause of conflicts in an organization is poor communication. Therefore, conflicts can be solved/addressed amicably, promptly and without compromising the standards of the organization.

Types of conflicts in an organization

The following types of conflicts are likely to happen in an organization:

- Conflict within the individual e.g. role conflict, value conflicts etc.
- Interpersonal conflicts i.e. conflict between two or more individuals.
- Conflict between an individual and a group.
- Intergroup conflict e.g. between groups, departments etc.
- Inter-organizational conflict i.e. occurs between organizations.

Handling/addressing conflict in an organization

For day to day smooth running of organizations, the following steps need to be taken promptly to address conflicts if any:

i. Embrace conflict - We should not avoid conflict or pretend that it has not happened. We must deal with these uncomfortable issues as soon as possible to avoid bad feelings and more problems. Colleagues should be encouraged to find a solution to their differences.

ii. Talk together - Create time and place to speak to each other. This should be in a place without interruptions and enough time should be spared for this.
iii. Listen carefully - Give full attention to the person speaking to you /you are talking to. Ask for clarifications for better understanding.
iv. Find agreement -Resolutions are always possible, when agreements are reached. Finding an agreement shows the willingness to establish common ground and build trust elements again.
v. Provide guidance -Give directions on the next step and suggest further actions after an agreement is reached.
vi. Be quick to forgive -With resolutions, no grudges/tension should be kept.

Barriers to effective communication

These include;

- Physical barriers
- Personal barriers
- Semantic/language barriers
- Status barriers
- Organizational structure barriers
- Barriers due to inadequate attention
- Premature evaluation
- Emotional evaluation
- Resistance to change

Conflict is addressed promptly and in a timely manner and in a way that does not compromise the standards of the organization.

Conclusion

This unit has addressed ways of identifying and meeting communication needs of clients and colleagues. It has also investigated ways of addressing conflict promptly and in a timely way in an organization.

Further Reading

Cheney, G ETAL (2004) Organizational communication in an age of globalization; Issues, Reflections, Practices. Long Grove IL: Waveland Press
Mutua R (1992) study and communication skills, London Macmillan Press Ltd

2.3.2.3 Self-Assessment

Written Assessment

1. Which one of the following is not part of the communication process?
    a) Sender
    b) Message
    c) Receiver
    d) None of the above
2. Which one of the following is a verbal means of communication?
    a) Speech
    b) Maps
    c) Signs
    d) Behavior
3. Identify among the choices given, what is not a mode of communication
    a) Interpersonal Communication
    b) Intrapersonal Communication
    c) Interpretive Communication
    d) Presentational Communication
4. The following are characteristics of effective communication except one. Which one?
    a) Coherence
    b) Clear
    c) Concise
    d) Shallow
5. Which of the following is not an approach to communication?
    a) Listening
    b) Writing
    c) Clarification
    d) None of the above
6. What is communication?
7. Explain an effective communication.
8. Name two ways of identifying communication needs.
9. Name two modes of communication you know.
10. Name three barriers of communication.

Oral Assessment

1. What is an organization?
2. How can you handle/address conflicts in an organization?

Practical Assessment

1. Using a diagram, illustrate the communication process in the workplace.
2. There has been a conflict between two colleagues in your workplace. Demonstrate the skills you will use to handle this situation.

2.3.2.4 Tools, Equipment, Supplies and Materials

- Desktop Computers/Laptops
- Internet Connections
- Projectors
- Telephone

2.3.2.5 References

Afeloyan, A & Newsum, H.E (1986) *The use of English Communication Skills for Univ. students*. London Language

Muchiri M (1993) *Communication Skills*, Nairobi Longman

Stanton N (1982) *Mastering Communication* Macmillan

2.3.3 Learning Outcome No 2: Develop Communication Strategies

2.3.3.1 Learning Activities

Learning Outcome No 2: Develop Communication Strategies	
Learning Activities	**Special Instructions**
2.1. Develop strategies for effective internal and external dissemination of information to meet the organization’s requirements. 2.2. Consider special communication needs in developing strategies to avoid discrimination in the workplace. 2.3. Analyze, evaluate and revise communication strategies where necessary to make sure they are effective.	Provide samples of communication strategies. Role play special communication needs.

2.3.3.2 Information Sheet No2/LO2 Develop Communication Strategies

Introduction

This unit involves developing communication strategies that are effective in disseminating of information internally and externally, considering special communication needs while developing the strategies. The unit also involves analyzing, evaluating and revising communication strategies where necessary to make sure they are effective.

Definition of key terms

Communication: This is a process through which information is exchanged between groups, individuals etc. by use of common systems of symbols, signs or behavior.

Communication Strategy: This is the plan of achieving the set communication objectives.

Communication Pathway: This refers to an established connection between two endpoints, with each endpoint on a separate zone or server.

Content/Procedures/Methods/Illustrations

2.1 Developing Strategies for effective Communication

Communication strategy is the plan to achieve the set communication objectives. Strategies for effective internal and external dissemination of information are developed to meet the organization’s requirements.

Characteristic of a communication strategy

- Brief summary of the situation analysis.
- Segmentation of audience.
- Theory informing the strategy development.
- Approaches to be used in achieving the objectives.
- The desired change’s position.
- Benefits of the desired change.
- Communication channels to be used in disseminating information.
- The strategy implementation plan.
- The monitoring and evaluation plan to be used.
- Budget

Importance of a communication strategy

- Improves workplace communication.
- Increases employee/client satisfaction.
- Positively affect absenteeism and turnover rates at workplace.
- Sparks innovation.
- Improves employee productivity.
- Attracts top talents/ideas.

Developing a communication strategy

In order to develop an effective communication strategy, a ten-step process is undertaken. This involves;

i. Analysis of the big picture: Understanding what has to be accomplished before embarking on the strategic communication plan.
ii. Clearly define the goals of the organization: Before the planning stage, make sure the organization’s goals are well defined in order to formulate a successful plan.
iii. Clearly define the individual program’s goals in the organization: Program goals are more specific than the organization’s goals and must be well defined.
iv. Clearly define the specific means of each program’s communication: Different programs may require different means, so clearly define the means of communication for each program.
v. Clearly define the target audience: Clearly identify the groups/people/clients to be communicated to.
vi. Clearly and carefully develop the messages/information to be portrayed: This will give the target audience a better understanding.
vii. Set a timeline: This gives an organization a strict guideline thus keeping it on track to execute its tasks in a timely manner.
viii. Develop an initial plan: This gives the organization a direction to proceed in. This is a step-by-step process that must be followed to achieve its objectives.
ix. Implement the plan/ elements of the plan: Specific elements of the plan are put into action as they follow each other.

x. Assess/evaluate elements of the communication strategy: This helps to determine what is working and the adjustments to be made.

2.2 Consideration of Special Communication Needs

Special communication needs are considered in developing strategies to avoid discrimination in the workplace. When developing communication strategies, communication needs of different stakeholders of the organization must be considered.

- Group Dynamics. Consider different abilities and special requirements of different stakeholders. A special consideration to the interactions and forces that operate between the groups. This will enable a strategy to be very effective in communicating to a group of employees, clients
- Styles of group leadership. You must also consider the leadership styles employed by different groups. Thus, the group norms must be well understood when developing communication strategies. Consider authoritarian leadership style and its implications, democratic leadership style and Laissez-faire leadership style and their implications.
- Openness in communication. Communication strategies must be able to reveal information about organization/people, willingness to listen and react honestly. However, openness must be applied with caution.
- Flexibility in communication. Strategies sometimes have to vary messages based on the unique situations. Due to fact that people and things change, flexibility in communication is inevitable.
- Communication skills. Consider specific communication skills when developing strategies. These skills may include; clarity and conciseness, confidence, empathy, respect, open-mindedness, friendliness etc.

NOTE: When developing and implementing strategies, we must beware of bias and discrimination. Thus, different communication skills must be considered, the group dynamics, leadership styles, flexibility, openness among other factors must be considered. This will ensure effectiveness of the strategies.

2.3 Analyzing, Evaluating and Revising Communication Strategies

Communication strategies are to be analyzed, evaluated and revised where necessary to make sure they are effective. After an initial communication strategy plan has been implemented, it is good practice to analyze, evaluate and revise it for its effectiveness. Through this, all the elements will be assessed, and their visibility established. It will also necessitate adjustments for elements that won’t work well.

Steps in analyzing a communication strategy

In analyzing a strategy, people/organizations must consider SWOT analysis thus measuring the strength, weaknesses, opportunities and strength of strategy.

- Identify the strength. Check on the level of engagement, the interests developed, attitudes and how people visit your organization/the sites. Consider this from both internal and external perspective and capitalize on them.
- Identify the weakness. Check on the weakness, faults and defects of the communication strategy.
- Identify the opportunities. Check on the development trends, possible changes in the market and alternative ways of combating the weakness identified.
- Identify threats. Identify the red flags and obstacles, competitors, technology, new requirements and demands and act on them appropriately.

Evaluating a communication strategy

After analyzing the communication strategy, evaluate it by measuring;

- Activity metrics i.e. check on what you/organization is doing to implement the strategy and process of disseminating information and its compatibility with the work plan and practices.
- Reach metrics i.e. check on the size of the audience and whether it is the right audience for the information.
- Engagement metrics i.e. check on the effects on the communication by checking the level of interaction.
- Impact metrics i.e. check on the behaviors and attitudes shifted.

Revising a communication strategy

After analysis and evaluation of communication strategy has been done, it is prudent to revise it and make it more effective and viable. Thus, the following should be checked;

- If the goals are realistic and achievable.
- Timeline set is realistic.
- The adequacy of the resources allocated.
- Make a comparison between actual and projected results.
- Check on the legal requirements and update.
- Internal reorganization in the organization.
- Product changes.
- Audit discoveries.
- Input from major stakeholders.
- Organization procedures etc.

Conclusion

This learning outcome effectively covered the intended aspects of strategies for effective communication including those that avoid discrimination in the workplace. Appraising the strategies to ensure they are effective in any given organization has also been covered...

Further Reading

Afoloyan, A & Newsum, H. (1986). The use of English communication skills for University students, London; Longman.

Stanton N. (1982) Mastering Communication. Macmillan.

2.3.3.3 Self-Assessment

Written Assessment

1. Which among the following factors should not be considered when developing a communication strategy?
    a) Business location.
    b) Target audience.
    c) Theory to be used.
    d) Group dynamics.
2. Which is not a significance of a communication strategy among the following?
    a) Improves workplace communication.
    b) Sparks innovation.
    c) Improves employee productivity.
    d) None of the above.
3. Among the following steps in communication strategy development, which one comes first?
    a) Revision.
    b) Implementation.
    c) Analysis.
    d) Evaluation.
4. Among the following, which one should not be considered when evaluating a communication strategy?
    a) Reach metrics.
    b) Impact metrics.
    c) Activity metrics.
    d) None of the above.

5. What is a communication? Communication strategy.
6. Briefly explain two significance of a communication strategy.
7. Name the steps in developing communication strategy.

8. Name four facts to consider when developing a communication strategy.
9. Briefly explain how to revise a communication strategy.

Oral Assessment

1. What is communication pathway?
2. Briefly explain how to develop a communication strategy.

Practical Assessment

1. Using a flow diagram, demonstrate the strategy communication process in communication.
2. Assess and evaluate any communication strategy of a company you know.
3. You can have been given a role to develop an effective communication strategy of an organization, demonstrate how you will consider the special communication needs of the stakeholders.

2.3.3.4 Tools, Equipment, Supplies and Materials

- Desktop computers/laptops
- Internet Connection
- Projectors
- Telephone

2.3.3.5 References

Cheney, G. et al (2004) *Organizational Communication in an Age of Globalization: Issues, Reflections, Practices. Long Grove, IL*: Waveland Press.

Ludlow, R. & Panton F. (1992) *The Essence of Effective communication*. Pretence Hall. London.

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2.3.4 Learning Outcome No 3: Establish and maintain communication pathways

2.3.4.1 Learning Activities

Learning Outcome No 3: Establish and maintain communication pathways	
Learning Activities	**Special Instructions**
3.1. Establish pathways of communication to meet requirements of organization and workforce 3.2. Maintain and review pathways to ensure personnel are informed of relevant information	Role play different types of pathways of communication

2.3.4.2 Information Sheet No2/LO3. Establish and maintain communication pathways

Introduction

This learning outcome involves establishing, maintaining and reviewing pathways of communication to meet requirements of organization and workforce.

Definition of key terms

Communication pathways: This refers to an established connection between two endpoints, with each endpoint on a separate zone or server.

Content/Procedures/Methods/Illustrations

1.1 Pathways of communication are established to meet requirement of organization and workforce.

Communication pathways involve ways of better engagement with colleagues and clients in an organization. Through communication pathways, a more inclusive and diverse workplace is realized. It is therefore important to establish internal communication arrangements on communication channels like messages, telephone calls and meetings among others. Such arrangements create structured connections between the organizations and the employees.

Importance of establishing communication Pathways

- To improve the effectiveness of the organization.
- To keep everyone informed of what is happening in the organization.
- To allow quick and efficient response to changes and emergencies.
- To create an openness in the organization.
- To promote collegiality thus making the organization a good workplace.

- To create a sense of ownership of the organization.
- To create equity and fairness within the organization.
- To show respect for every individual in the organization.

How to establish communication pathways.

Effective communication between the organization and its employees is essential to fully tap into the unique talents, insights and knowledge of people. The benefits of effective communication within an organization go beyond the profits. A strong community within an organization is realized thus allowing employees to be happy and confident. In such a state, it is possible to outperform the set expectations. In order to establish communication pathways, the following steps should be taken:

- Enabling organization's wide conversations i.e. creates ways through which employees can exchange information, ideas and questions. This can be realized through chat rooms and list servers. Through this, employees are empowered to seek answers from their colleagues thus strengthening their connections and transfer of knowledge.
- Improve both horizontal and vertical connections. In order to establish effective communication pathways, peer-to-peer communications must be improved i.e. horizontal communication. This can be realized through hip chat, slack and other internet retry chat services.
- Programs that connect employees at all levels must be put in place when establishing effective communication pathways i.e. vertical communication. Through these employees get empowered to voice their issues and topics that matter to them.
- Establishing vertical and horizontal communication pathways increases transparency and helps in tracking employee suggestions and harness the wisdom of the crowd. This also makes managers and owners to be more accountable upon investment of energy and time in brainstorming ideas. Also improves customer service
- Plan a budget. Communication pathways cannot be established successfully without resources. Thus, an evaluation must be done on how to build stronger relationships through sharing concerns and getting constructive feedbacks. An honest consideration on the use of these pathways must be taken.
- Measure the effectiveness and the impacts of the pathways established. Analyze the productivity changes, profits and sales realized. Check on the employee's satisfaction i.e. fulfillment at work and their happiness. Check on the retention rates of the staff.
- Create change through leadership. Through organization leadership, change in communication pathways can be realized. Top leadership of the organization should feel free to share rates, engage other workers and be transparent. They can also give direction and advice. Most employees feel free when they are engaged by the top leadership in a free and transparent manner.

Types of Communication pathways

There are two types of communication pathways in an organization, namely;

- Formal
- informal

i. **Formal communication pathway**

Communication takes place through the channels of message that are officially designated between positions in organizations. Types of formal communication pathways include;

- Downward communication (vertical communication)
- Upward communication. (vertical communication)
- Horizontal communication (lateral communication)

Downward communication refers to where information flows from upper level of organization to the lower level e.g. managers to subordinates.

Upward communication refers to where communication flows from the lower levels to the higher levels in an organization i.e. initiated by the junior staff to the senior staff in an organization.

Horizontal communication refers to the pathway where communication flows from one functional area to the other at the same level in the organization e.g from manager to manager etc.

ii. **Informal communication pathway**

This pathway involves episodes of interaction which do not follow the officially designated communication channels in an organization.

Involves 'grapevine' which emerges from personal and social interests of the employees.

This communication pathway creates a comfortable climate in an organization.

3.2 Pathways are maintained and reviewed to ensure personnel are informed of relevant information

Communication flow in an organization should be maintained and reviewed when necessary to foster productivity and effectiveness of the employees. This can be achieved by;

- Researching on the communication pathways in an organization and understanding them. In so doing, the effectiveness of each pathway must be a pathway determined. Thus, it is possible to review/adjust a pathway based on its effectiveness.
- Maintaining and reviewing communication pathways require clearly set objectives and plan. Thus, it is easy to determine whether a pathway is effective or not.
- It is also prudent to address the business problem in the communication pathways/flows. This will keep the employees informed and engaged in the problem-solving process. Through this means the communication pathways will remain active.

- There is need to identify and assemble the key champions and stakeholders in the pathways. The key stakeholders and champions of communication in an organization should be utilized to effectively reach communication aims.
- Understand the available communication tools. It is important to assess and understand tools at disposal that can be used for communication purposes. Insisting on communication pathways that require tools which are not at the organization's disposal won't be viable. Thus, maintaining communication flow channels require clear understanding and assessment of tools.
- Creating consistency in communicating i.e. obeying organizational standards and procedures. Thus, a sense of ownership among employees will be realized and maintained.
- Catering for two-way communications. Maintaining communication flows require feedback. This must be encouraged to make the pathways live and active.
- Ensuring the communication plan of an organization is inclusive. Through this, every employee is brought on board and their interests and differences are catered for.
- Aligning internal and external communication plans.
- Planning for emergencies i.e. contingencies and disaster. The communication flow in an organization can be maintained and reviewed as long as crisis has been catered for.

Conclusion

This covered establishment of communication pathways to meet the requirements of the workplace. It has also looked into the skills of maintaining and reviewing of the communication flows. It has equally demonstrated different types of communication pathways.

Further Reading

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2.3.4.3 Self-Assessment

Written Assessment

1. Which of the following is not a formal type of communication pathway?
    a) Vertical communication.
    b) Grapevine communication.
    c) Upward communication.
    d) Horizontal communication.
2. One of the following is not a reason to have communication paths in an organization. Which one?
    a) To promote ownership and collegiality.
    b) To promote equity and fairness.
    c) To promote effectiveness of the employees.
    d) None of the above.
3. How can you establish a communication pathway in an organization?
    a) Planning a budget.
    b) Measuring the effectiveness of the pathways.
    c) Improving horizontal and vertical communications.
    d) All of the above.
4. Communication pathways are maintained and reviewed by?
    a) Researching on the communication pathways.
    b) Clearly setting the objectives and plan.
    c) Addressing the business plan.
    d) All of the above.
5. Which of the following communication pathways in wrongly defined?
    a) Downward communication-from bottom to top.
    b) Horizontal communication-between departments of the same level
    c) Grapevine-lateral communication
    d) Upward communication-from top to bottom
6. What is a communication pathway?
7. What is the difference between vertical and horizontal communication?
8. Mention two steps to take in maintaining communication pathways.
9. Name three formal communication pathways.
10. What is grapevine?

Oral Assessment

1. Name an example of informal communication pathway in an organization.
2. When can a pathway of communication be lateral?

Practical Assessment

1. Demonstrate how you will establish a communication pathway in an organization of your choice.
2. You have been asked to give tips on how to maintain communication pathways in a college. How will you handle this?

2.3.4.4 Tools, Equipment, Supplies and Materials

- Desktop computers/laptops
- Internet Connection
- Projectors
- Telephone

2.3.4.5 References

Bruce Berges (2008) *Employee/organizational communications*. Blog (institute for pr.org/employee organizational communication.

Lynn K. (2009) *Internal communication in Organizations an Employee Engagement. University of Nevada, Las Vegas*. Research Thesis.

2.3.5 Learning Outcome No 4: Promote use of communication strategies

2.3.5.1 Learning Activities

Learning Outcome No 4: Promote use of communication strategies	
Learning Activities	**Special Instructions**
4.1. Provide information to all areas of the organization to facilitate implementation of the strategy 4.2. Articulate and model effective communication techniques to the workforce 4.3. Give personnel guidance about adapting communication strategies to suit a range of contexts	Role play different types of pathways of communication

2.3.5.2 Information Sheet No2/LO4. Promote use of communication strategies

Introduction

This unit involves provision of information to all areas of the organization to facilitate implementation of the strategy, articulating effective communication techniques and guiding personnel to adapt communication strategies to suit in arrange of contexts.

Definition of key terms

Communication Strategy: This is a plan of achieving the predetermined communication objectives.

Effective communication: This is communication where both parties i.e. the sender and the receiver assign similar meanings to the intended message.

Content/Procedures/Methods/Illustrations

4.1 Provision of information to facilitate implementation of strategy.

Communication strategies are vital in realization of communication objectives. Therefore, communication strategies must be developed, implemented and evaluated for effective communication to take place. Before implementing the communication strategies, it is prudent for the organization to carry out three basic steps leading to the strategic decision making about the strategy. This include:

- Getting the right information.
- Making a good decision.
- Implementing the decision.

The information stage involves knowing the types of information needed for the decision making, finding the information and transmission of the information to the decision makers.

The information required /needed for the decision-making process involves knowledge of the organization, knowledge of the scope of operations of the organization and the competitors of the organization. However, gathering information alone is not enough. Infrastructure must be put in place to ensure that information reaches the decision makers. The decision makers must regularly meet in order to narrow on important issues. It is good practice to identify alternative courses of action. This is very crucial for decision making purposes. The implementation of a communication strategy should be planned in order to allow for appropriate resources to be secured. The following must be considered during the implementation phase:

- Adequate resources and facilitation must be provided to ensure full participation.
- All participating staff/employees must be trained and supervised.
- Need for exchange of common experience between organizations or experts.
- Setting of technical committees to guide the strategy implementation.
- Verification of data appropriate for the strategy.
- Obtaining feedback from stakeholders on the impact of the strategy.
- Periodical appraisal and adjustments of the strategy's needs and resources change.
- Getting information for strategic implementation.
- Look at both internal and external factors.
- Conduct a research on the implementation of the strategy.
- Getting primary data on implementation.
- Getting secondary data on implementation.

Implementation of the strategy

It does not just refer to the application or installation of the new strategies. Some old strategies that may need adjustments /reinforcement are also part of this activity. The basic activities in this stage include:

i. Establishing the strategy objectives.
ii. Formulation of policies to execute the strategy.
iii. Allocation of resources.
iv. Leading and controlling of the performance of tactics and activities in the various organizational levels.
v. Sometimes planning activities have to be done for implementation.

Factors that support implementation of a communication strategy

- People: Availability of the right and enough people to carry out the implementation will ensure a successful implementation.
- Resources: Enough resources must be allocated to ensure a successful implementation. This involves both financial and non-financial resources.
- Organizational structure: The structure should be well outlined with clear lines of authority, defined responsibilities and hierarchy.
- Systems i.e. tools, systems and capabilities in place to facilitate implementation.
- Culture i.e. the organizational culture and the general atmosphere of the stakeholders

Causes of failure in communication strategy implementation.

- Inadequate understanding of the strategy due to inadequate communication. This could be due to lack of ownership by the implementers or having a strategy that is confusing.
- A disconnected strategy i.e. when there is disconnect in budgeting, employee incentives and compensation etc.
- Little attention to the strategy by the organizational management.

Implementation process

The following steps are vital in ensuring successful implementation.

i. **Evaluation and communication of the strategy**. This involves: -
   - Aligning the strategy with the initiatives.
   - Aligning the budget with the objectives and goals.
   - Clarifying and communicating goals, objectives and strategies to members of the organization.

ii. **Developing an implementation structure**. This step involves: -
   - Establishing a link between /among departments.
   - Formulating work plans and procedures for implementation.
   - Determining tasks and responsibilities of the managers.
   - Determining task and responsibilities of operation.
   - Assigning tasks to different departments.
   - Evaluating the staffing structure.
   - Communicating the details to the organization's members.

iii. **Developing implementation support policies and programs**. This stage involves:-
   - Establishing a monitoring and tracking system of performance.
   - Establishing a management system of performance.
   - Establishing of information and feedback.
   - Communicating the policies and programs to the organizations members.

iv. **Budgeting and allocation**. This step involves: -
   - Allocation of resources.
   - Disbursement of resources.
   - Maintenance of a system of checks and balances.

v. **Discharging functions and activities**. This involves:
   - Continuous engagement of stakeholders.
   - Application of control measures.
   - Evaluation of performance at different levels.

4.2 Articulating and Modeling Effective Communication Techniques

Articulation and modeling communication techniques involve expressing an idea in an explicit and a clear manner. It establishes a very strong base of developing the core organizational processes, structure, capabilities, management system and workforce.

Rationale for articulating and modeling Communication Techniques

i. To translate and communicate the techniques/ strategies in the best form accepted by the stakeholders.
ii. To maximize the strengths and minimize weaknesses of an organization.
iii. To cover the purpose, scope and strengths of business.
iv. To establish a strong foundation of developing the workforce, capability, structure and the systems of the organization.

Effective communication Techniques

- Listening
- Expression
- Taking criticism positively
- Avoiding arguments
- Understanding the audience
- Getting feedback

How to articulate and model communication techniques

i. Understand the strategy /technique.
    - Be in a position to understand the rationale of the strategy
    - Understand the scope of the technique i.e. activities it involves.
    - Understanding the advantages of the organization in terms of maximizing its strength, minimizing the weakness and mitigating the challenges.
    - Understanding the present techniques /strategy used by the organization.
    - Understand the challenges and opportunities that the organization faces.
    - Conceive the dynamic environment of the organization.
ii. Summarize the strategy /technique.
    - Consolidate and distil the essence of the firms strategy /technique into a form that is easy to be understood and communicated.
    - Establish a readable and clear statement which communicates the organizations strategy /technique.
    - Establish the strategy /technique narrative which should be relatively brief.
    - Define the strategy in the eye of executives beyond the current /present position.

NOTE: Articulation of a communication technique requires a clear understanding or rationale for the articulation, a deep understanding of the strategy of the organization and ability to summarize the strategy into capturing the organization’s essence.

4.3 Personnel are given guidance about adapting communication strategies to suit a range of contexts.

Personnel are given guidance about adapting communication strategies to suit a range of contexts. It is important for the organization to recognize the importance of adopting communication strategies for every employee and every situation. Ways of addressing one employee/colleague/situation at workplace vary depending on the employee /colleague /situation. Thus, by appreciating the unique personalities, understanding the organizational culture and learning a different communication technique, it creates a good workplace and improves performance. Guiding your personnel and adapting communication strategies require:

i. Knowledge of the colleagues/employees of the organization during the interactions. It is easy to establish the dos and don’ts of the colleagues /employees. However, in some organizations, the don’ts are clearly stipulated.
ii. Choice of the channel i.e. the channel of communication is also key in guiding the employees and colleagues in an organization.
iii. The best communication technique to be used; This allows swift and non-resistance to communication techniques.
iv. Effective communication is very critical in the event of change in organizations. Communications should be made regularly and clearly about the change. This should be done in a manner that is informative, user friendly, relevant and easy to access.

Considerations when adapting a communication strategy

- Honest, timely, consistent and accurate information about the strategy.
- Clear explanation of the plans, vision and the expected benefits and the progress of the strategy to be communicated.
- Issues and questions concerning the strategy must be addressed and captured well.
- Maximize the participation in the adoption process by involving everybody.
- Encourage discussions and dialogues about the strategy.
- Ensure the strategy adapted addresses the unforeseen issues.
- Ensure effective communication.

When guiding the personnel on the organization’s communication strategy, the organization manager needs to:

- Keep the message simple though with deep meaning.
- When the relevance of the strategy is established by the employees, adapting it will be easy and fast.
- Build behavior based on the organization and clients’ insights
- Use the; inspire, educate, and reinforce framework in mapping and delivering the strategy.
- Think broader than just guarding and stay with the employees /clients and never disappear.
- Be real in matters pertaining the strategy.

Conclusion

This unit has covered skills to provide information to all areas of the organization in facilitation of implementation of communication strategies, articulating effective communication techniques and guiding personnel to adopt communication strategies that suit a range of contexts.

Further Reading

Cornelissen, J (2014), *Corporate Communication* –A Guide to Theory and Practice, 4th Edition, Sage Publications

Cowan, D (2017) *Strategic Internal Communication, How To Build Employee Engagement And Performance* Kogan Page Ltd.2nd Ed.

2.3.5.3 Self-Assessment

Written Assessment

1. Which of the following is not a stage in the strategy development process?
    a) Formulation
    b) Articulation
    c) Interviewing
    d) Budgeting
2. The following must be considered at the implementation stage of a communication strategy. Which one is the odd one out?
    a) Adequate resources for implementation.
    b) Setting technical committee to steer the implementation.
    c) Feedback from the stakeholders.
    d) Summary of the strategy.
3. These factors are necessary for the implementation of the strategies .Which one is not?
    a) Politics
    b) Organizational structure
    c) Resources
    d) People

4. Among the following, which one of the following is not a cause of failure in implementing a strategy?
    a) Little attention by the management.
    b) Inadequate understanding of the strategy.
    c) An articulated strategy.
    d) A disconnected strategy.
5. Why do organizations need to articulate and model their communication techniques?
    a) To cover the purpose, scope and strength of the business.
    b) To establish a foundation of developing workforce.
    c) To minimize strengths and maximize weakness.
    d) All of the above.
6. Which of the following activities is necessary during articulation of communication techniques?
    a) Understanding the rationale of articulation
    b) Understanding the scope or articulation
    c) Conceiving the dynamic environment or articulation
    d) All of the above.
7. When adapting a communication strategy, which of the following is not necessary?
    a) Employing new employees.
    b) Effectively communicating about the strategies.
    c) Addressing issues and concerns about the strategy.
    d) Maximizing participation of the employees.
8. What is a communication strategy?
9. Name 3 factors to consider when implementing a communication strategy.
10. Identify 3 causes of failures in implementing a communication strategy.
11. What is the rationale of articulating communication strategy?
12. What should be summarized when articulating a communication strategy?

Oral Assessment
1. Briefly explain how to get information for implementing a communication strategy.
2. In developing an implementation structure, what are the considerations?

Practical Assessment
1. Demonstrate how you will articulate and model a communication strategy for implementation.
2. You have been asked as a communication expert to lead the implementation process of new communication strategy. How will you carry on the duty?
3. With adequate explanation, identify some of the effective communication skills you know.

2.3.5.4 Tools, Equipment, Supplies and Materials
- Desktop computers/laptops
- Internet Connection

- Projectors
- Telephone

2.3.5.5 References

Holtzhausen,D& Zerfass,A(2014).The Routledge Handbook Of Strategic Communication

Madu B,(2013)'Vision :*The Relationship Bewteen A Firms Strategy And Business Model;*Journal Of Behaivoral Studies In Business.

Mckinsey & Compnay(2015)*Corporate Strategy* ,Web.14 Sep 2015.

2.3.6 Learning Outcome No 5: Conduct Interview

2.3.6.1 Learning Activities

Learning Outcome No 5: Conduct Interview	
Learning Activities	**Special Instructions**
5.1. Employ a range of appropriate communication strategies in interview situations. This may include; establishing rapport, eliciting facts and information, facilitating resolution of issues, developing action plans, diffusing potentially difficult situations. 5.2. Make and maintain records of interviews in accordance with organizational procedures. 5.3. Use effective questioning, listening and nonverbal communication techniques to ensure that required message is communicated.	Role play the interview situation and apply appropriate communication strategies

2.3.6.2 Information Sheet No2/LO5. Conduct Interview

Introduction

This learning outcome involves employing a range of communication strategies in interviews, making and maintaining interview records in accordance with organizational procedures and using effective questioning, listening and non-verbal communication techniques to ensure that the intended message is communicated.

Definition of key terms

Interview: It refers to a formal meeting where someone is asked questions in order to establish some issues related to them.

Non-verbal Communication techniques: These are gestures, tone of voice, facial expressions, eye contact, posture, body language and any other ways that people use to communicate without using language.

Content/Procedures/Methods/Illustrations

5.1 Communication Strategies in interview situations

A range of appropriate communication strategies (Establishing rapport, eliciting facts and information, facilitating resolution of issues, developing action plans, diffusing potentially difficult situations) are employed in interview situations.

There are several types of interviews i.e;

- Face-to-face interview i.e. between two or more people.
- Panel interview.
- Group interview.
- The case interviews.
- Telephone/Skype interview.
- Sequential interview.
- Lunch/Dinner interview.
- Competency based interviews.
- Formal/informal interview.
- Portfolio based interviews.
- Second interview.

Importance of interviews

- Helps in selecting the most suitable candidate or team.
- Helps in knowing a lot of details on the personality of the candidate.
- It gives the candidate a chance to know more about the job/course applied for and the organization.
- The interviewee and the interviewer get to know each other.
- Interviews are also helpful in promotions and transfers.
- Interviews increases goodwill.

Communication Strategies for interviews

i. Creating a rapport in an interview

Rapport refers to the connection between two people i.e. the spoken and unspoken words that elicit the feeling of being on the same page. It is important in an interview since the immediate impression of a person is very critical. It thus should be a priority to any interviewee. A good rapport creates more similarities and minimizes the differences.

Tips to developing a rapport;

- Smile.
- Establish and maintain eye contact.
- Deliver sincere greeting.
- Use the person’s name (interviewer’s name).
- Listen more and talk less.
- Check on your/mind your body postures.

NOTE: In developing rapport always remember that the first impression counts. Take a genuine interest in the interviewer, organization and the job. Remember to match the interviewer's style in language and talk.

ii. **Eliciting information and facts in interviews**

- Getting information and facts is the main idea behind interviews.
- Interviewers need to use the questions, language and means to get the right information and they should avoid sarcasm or obscure humor.
- Through use of questions, interviewers get the information they want and as well guide the interview along productive lines.
- Leading questions should also be avoided as they are not effective.
- Double negative type of interrogation should be avoided as well.
- In order to get the required information, interviews should be conversational and not confrontational. Thus, interviews should be welcomed positively.
- Careful reviewing of the interviewee's resume helps to know more about him/her. This helps in getting important information that can be explained further by the interviewer.
- As soon as the interview begins, it is prudent to explain the interview process well. This will allow the interviewee to know what is expected of him/her.

iii. **Developing interview action plans**

Interview action plans are beneficial and can help throughout the interview process. It needs to be carried out before any interview in preparation of the interview at hand. Interview action plans are beneficial as they give the interviewee chance to prepare for questions, look into the organization and sell themselves in the best way possible. Interview action plans require;

- Preparation for common questions (general questions).
- Researching into the company.
- Researching into the industry.
- Selling oneself.
- Revealing one's network.
- Prepare for any concerns i.e. if you anticipate any concerns.
- Prepare for the gist i.e. why you want the job/course/opportunity.
- Prepare for, "Any questions?" part of the interview.
- Close on a positive note i.e. to make the interview memorable.

NOTE: In interviews, non-verbal communication cues matter a lot. In addition to the spoken words, both the interviewer and the interviewee need to take charge of them and act appropriately. They include;

- Eye contact.
- Confident handshake if possible.
- Effective gestures.

- Authoritative facial expressions.
- Appropriate facial expressions.
- Initiating interactions.
- Voice tones.
- Giving full attention.
- Response to other's non-verbal cues.

5.2 Records of interviews are made and maintained in accordance with organizational procedures

It is necessary to document and keep the interview records. This should be done accurately and carefully in accordance with the organizational procedures. Maintaining interview records is important as it gives chance for follow-up on the employee even after he/she has been absorbed in the organization. It also gives chance for production should their records be required for exhibits.

5.3 Effective questioning, listening and non-verbal communication techniques are used to ensure that required message is communicated

In conducting interviews, questioning techniques is key. Interviewees answer questions that they are asked; therefore, should an interviewer ask a wrong question, he/she will get a wrong answer. Asking the right questions during an interview is at the core of eliciting facts and information required by the interviewer.

Tips to use in questioning during an interview.

- Use open ended questions in finding more details, opinions and developing conversations.
- Closed questions are good in frame setting, testing understanding and making conditions.
- Funnel questions should be used in finding more details about a specific point or when gaining interest in an issue.
- Use probing questions to gain clarifications and draw information.
- Leading questions should be used with care because they don't elicit much information.

NOTE: Listening during an interview is just as important as answering questions. Without being attentive, it is possible not to give the best response or not to get the question right. Listening skills are also very essential in building a rapport between the interviewee and the interviewer.

Tips to use in listening during an interview

- Listen to the hidden question.
- Listen to the actual question i.e. the actual thing being asked.
- Ask for more information i.e. when you actively listen, you will know when to ask for more information.

- Listen in order to get interviewer’s/interviewee’s attention.

Non-verbal communication plays a big role during interviews. This non-verbal communication matters as soon as one walks into the interview room and are sometimes even more important than verbal communication.

Tips to use in non-verbal communication during an interview

- Make/maintain eye contacts with the interviewer.
- Smile and nod appropriately. Do not overdo it.
- Listen.
- Be polite and stay calm.
- Use appropriate facial expressions.
- Initiate interactions if possible.
- Use of voice i.e. be audible enough.
- Give full attention to the interviewer.
- Sit upright, do not lean back.

Conclusion

This unit has covered skills of conducting interviews emphasizing on the questioning, listening and non-verbal communication techniques that are essential in communicating messages.

Further Reading

Gyrfaoedd Aber Careers (2014) *All about interviews*. Aberystwyth University www.aber.ac.uk/careers

2.3.6.3 Self-Assessment

Written assessment

1. Which of the following is not a non-verbal communication for interview?
    a) Clapping
    b) Maintaining eye contact
    c) Listening attentively
    d) Smiling and nodding appropriately
2. Which among the following is not a type of interview?
    a) Face-to-face interview
    b) Panel interview
    c) Text interview
    d) Telephone interview
3. Why are interviews important for job opportunities?
    a) Increase goodwill.
    b) Both interviewee and interviewer get to know each other well.
    c) Chance to know more about the personality of the interviewee.
    d) All of the above.
4. One of the following practices is not appropriate during interviews. Which one?
    a) Asking for Clarification
    b) Recording interviews
    c) Perusing through your documents
    d) Listening keenly
5. Which of these is required by an interviewee before an interview?
    a) Researching into the company
    b) Researching into the industry
    c) Preparing for any anticipated question
    d) All of the above
6. Which of this type of question is not recommended for interviews?
    a) Leading questions
    b) Probing questions
    c) Close questions
    d) Open questions
7. Listening in an interview entail?
    a) Listening to the hidden questions
    b) Listening to the actual question
    c) Asking for clarification
    d) All of the above

8. What is an interview?
9. Give two reasons for conducting an interview.
10. Give three examples of non-verbal communication skills for interviews.

11. Briefly explain how you will develop a rapport during an interview.
12. Name any one thing that an interviewee should not do during an interview.

Oral Assessment

1. What are non-verbal communication cues?
2. How will you use listening as a skill during interview?

Practical Assessment

1. You have been invited for an interview. Briefly demonstrate how you will prepare for it.
2. As the human resource manager of Dalap investment, elaborate how you will get the required information/facts from your interviews.
3. As one of the candidates for an advertised post, you are required to develop a rapport. Elaborate how you will develop a rapport with your interviewer.

2.3.6.4 Tools, Equipment, Supplies and Materials

- Desktop computers/laptops
- Internet Connection
- Projectors
- Telephone

2.3.6.5 References

Abhinow K. (2002) 15 *Tips on how to nail a Face-to Face interview*. Pluralsight.com/blog/careers/

Dipboye, R. et.al (2012). *The selection interview from the interviewer and applicant perspectives: Can't have one without the other*. New York City: Oxford University.

2.3.7 Learning Outcome No 6: Facilitate group discussion

2.3.7.1 Learning Activities

Learning Outcome No 6: Facilitate group discussion	
Learning Activities	**Special Instructions**
6.1. Define and implement mechanisms which enhance effective group interaction, this may include; • Identifying and evaluating what is occurring within an interaction in a nonjudgmental way • Using active listening • Making decision about appropriate words, behavior • Putting together response which is culturally appropriate • Expressing an individual perspective • Expressing own philosophy, ideology and background and exploring impact with relevance to communication 6.2. Use Strategies which encourage all group members to participate 6.3. Set and follow objectives and agenda for meetings and discussions 6.4. Provide relevant information to group to facilitate outcomes 6.5. Undertake evaluation of group communication strategies to promote participation of all parties 6.6. Identify and address specific communication needs of individuals	Simulate group discussion activities

2.3.7.2 Information Sheet No2/LO6

Introduction

This learning outcome involves defining and implementing mechanisms that enhance effective group interactions, using strategies which encourage all group members to participate in setting and following objectives and agenda for discussions. It also involves provision of relevant information to group, undertaking evaluations of the group communication and identifying and addressing specific communication needs of individuals in the group.

Definition of key terms

Group discussion: Refers to the systematic exchange of ideas, views and information about a problem topic, situation or issue among members of a group who have some common objectives.

Group members: Refers to the people who typically belong to a specific group of people involved in attempting to achieve a common goal.

Agenda: Refers to a list of items that are discussed in a formal meeting.

Content/Procedures/Methods/Illustrations

6.1 Defining and implementing mechanisms to enhance group interactions.

Group interactions refer to dynamics of a team of people and the way they interact with one another. Due to different personalities and views, conflicts are inevitable in groups since certain individuals may have the potential of causing distractions to the tasks to be undertaken. Therefore, there is need to establish and arrange clear ways of working together in order to get things done. In defining group mechanisms, group members have to take the following steps:

i. Organize the effort i.e. they have to establish the protocols for decision making as well as conflict resolution.
ii. Support the member's i.e. They have to establish the protocols for decision making as well as conflict resolution. They also have to create a communication plan.
iii. Definition of group mechanisms is essential as it creates a collaborative team that is task focused and cohesive. When the group mechanisms are defined and adopted, the group members must implement them and adhere to them. Thus, they become a team with a common purpose. In so doing, the group members accept to:
    - Identify and evaluate what is occurring amongst them in a nonjudgmental way. Members of the group must treat themselves equally and with respect.
    - Use active listening skills when engaging in group discussions.
    - Make decision concerning appropriate words and behaviors while engaged in group activities.
    - Adopt response which is appropriate to the group.
    - Make/Express individual contributions /give individual opinion concerning an issue.

6.2 Strategies that encourage group participation.

The need to improve group performance and interactions is of great concern to any group or organization. Group effectiveness can be improved by:

- Goal congruence i.e. members should develop the same goals that will pull them to the same direction.
- Deliberation i.e. members must learn to think, reflect and calculate in a creative but structured manner for effectiveness.
- Communication i.e. members should talk and listen actively and purposely.

- Information access i.e. members must be able to get information for group effectiveness.
- Distractions i.e. members should desist from interruptions especially when group businesses are underway.

In order to encourage group participation, the following strategies should be adopted to allow the group to tap into potentials, ideas and views of its members:

- Groups should develop and build teams with appropriate members. This will focus common purpose, strength and unity.
- Group should undertake techniques /steps that enhance and improve team creativity.
- Group members should be coached and trained to improve behavior, thinking and communication skills.
- Effective facilitations and interventions of group meetings and events should be planned.
- Group members should utilize the appropriate in attempts to improve communication, generation of ideas as well as group memory.
- Group members should know each other well thus knowing how to handle each other.
- Clear roles and responsibilities must be defined.
- Group members must break the barriers by asking, explaining or offering help whenever appropriate.
- Group members should pay attention keenly and with utter respect to group issues.
- The feelings of the group members must be acknowledged.

6.3 Setting objectives and agenda for group discussions.

For effectiveness to be realized, objectives and agendas of the meeting must be determined.

Importance of agendas/objectives

- To help group members to prepare for the meeting.
- To give the meeting structure.
- To allow the group leader to control the meeting/discussion.
- To give ways in which the meeting/discussions success can be measured.
- To allow group member to decide whether to attend or not.

How to set objectives/agendas of the meeting.

In setting the meeting's objectives/agendas, the following must be considered:

- Logistics i.e. the date, place and time of the meeting as well as the list of the expected attendees.
- Objectives i.e. clearly indicate the purpose of the meeting.
- Housekeeping i.e. welcome and introductions, apologies and approvals of the previous minutes. Any matters arising should be dealt with at this stage.

- Items i.e. the ‘meat’ of the agenda. Each item listed must be given a title, lead /presenter, time allocated,
- Any other business {A.O.B}
- Close i.e. the chair’s remarks on the meeting, next meeting

6.4 Facilitating group outcomes

Facilitation is the process of guiding and directing key parts of the group work involving members like meetings, trainings and planning sessions. However small or big the group meeting is, it requires someone to take lead and guide the proceedings for the desired goals to be realized. Facilitation is different from chairing a meeting as it involves:

- Guiding people to move through a process together.
- Focusing on how people participate in the learning or planning process.
- Being neutral and never taking sides i.e. the facilitator.
- Making sure that there is a democratic decision-making process.
- Understanding the goals of the organization and the meeting.

How to facilitate a meeting.

- By focusing on the climate and the environment of the meeting i.e. it must be very conducive.
- By focusing on the room arrangements and the logistics of the meeting.
- By focusing on the ground rules of the group and of the meeting.

Focusing on the rules, environment and logics as mentioned above, facilitation should take the following steps:

Meeting should begin on time.

i. Facilitator should welcome everyone.
ii. Facilitator should make introductions.
iii. A review of the agenda, objectives and ground rules for the meeting should be done.
iv. Participants should be encouraged.
v. Members should stick to the agenda.
vi. Detailed decision-making process should be avoided.
vii. Each item should be brought to closure.
viii. Everyone’s rights should be respected.
ix. The facilitator should be flexible in giving guidance.
x. Meeting results should be summarized and clearly state needs requring follow ups.
xi. The facilitator should thank the participants.
xii. The meeting should be closed.

Tips and skills for good facilitation.

For good facilitation, the facilitator should:

- Watch the body language of the group.
- Summarize and pause after every part/item is handled completely to allow people comprehend what has been said.

- Be conscious of his/her behavior.
- Focus on the group members and not the walls, blackboards or newsprints
- Be careful with his/her speech.
- Be conscious of your posture.

Intervening in case of disruptions in meetings.

- Let the group decide on the action to be taken.
- Make use of the ground rules and agenda to decide.
- Be honest and openly say what is going on without taking sides.
- Use humor to ease tension if any.
- Accept or legitimize a deal.

6.5 Evaluation of group communication strategies.

Effective communication is key to group development and realization of the predetermined goals and objectives. Thus, the group should spare time and evaluate the communication strategies and their effectiveness. Evaluating group communication strategies involves:

- Establishing the parameters to be measured
- Deciding on the type of evaluations to be conducted
- Carrying out the real evaluation

i. Establishing the parameters and boundaries of the evaluation. This involves:
    - Picking one or two communication types to be evaluated
    - Focusing on the aspect of study that makes evaluation more useful
    - Establishing the stages of communication to measure
    - Connecting the evaluation to the end goal
    - Creating the baseline for the evaluation if possible
    - Establishing milestones for the evaluation

ii. Deciding on the type of evaluation to be conducted. This involves:
    - Using qualitative analysis to determine the scope of the communication strategy
    - Trying surveys to figure the people getting the message
    - Using consulting groups/experts to determine the effectiveness of the strategy
    - Requesting informal feedback to get their perceptions
    - Check the impacts of the strategy

iii. Implementing the real/actual evaluation. This involves:
    - Measuring results against the set milestones
    - Reevaluating and refocusing the milestones needed
    - Establishing rewards for meeting targets/milestones set

Reasons for evaluating communication strategies.

- To improve communications process.
- To get reactions and suggestions necessary for improvement
- To track completed communication presentations events and reports
- To track feedback from audiences or stakeholders

6.6 Identifying and addressing specific communication needs of people.

Effective communication in a group requires that the specific communication needs of members are identified and addressed because prudent people have different communication needs. It is prudent to consider every member of the group and address their needs accordingly.

Identification of the specific communication needs must be done at the very initial stages of group engagement i.e. during the first meeting as soon as possible thereafter. This should happen proactively and opportunistically, though not retrospectively.

Having noted the specific communication needs of the members, the specific support required to address these needs must also be identified and provided.

In identifying these needs, there is need to abide by the existing legal requirements like the Mental Capacity Act 2005 and the Protection Act 1998.

How to identify the communication needs.

- Asking for members to self-define their specific communication or information needs.
- Asking individuals about their communication needs by a member of the group upon meeting of the group activities.
- Giving people a minimum of two options of identifying/explaining their needs thus getting suitable way for the majority.
- Asking the members to advice the group of their information or communication needs via inclusion of a request in the 'generic' letter.
- Including 'standard line' as part of the correspondence in attempt to encourage all members to engage the group should they have communication needs?
- Using existing data about the group members to get the communication needs.

Conclusion

This unit has covered skills of defining and implementing mechanisms of group interactions, using strategies to encourage all group members' participation, setting and following the objectives and agendas set for the meetings and discussions. It has also covered skills of providing relevant information to facilitate outcomes, evaluating group communication strategies and identifying and addressing specific communication needs of individuals.

Further Reading

Elspeth M. and Andrew O. [2000] *Strategic Change Itentey Management College,* Greenlands.Strat.Change, a, 103-114.

2.3.7.3 Self-Assessment

Written Assessment

1. The following activities should be done by groups to ensure their existence except one, which one is it?
    a) Identifying and evaluating what is occurring amongst them.
    b) Making decisions on their behaviors and language use.
    c) Expressing individual contributions on an issue.
    d) None of the above.
2. The following ways encourage group participation in the activities except?
    a) Communication
    b) Deliberation of group activities
    c) Judging others
    d) Information access.
3. Why do groups need agenda and objectives of their meetings and discussions?
    a) To help the group members prepare in advance.
    b) To give the meeting /discussion structure.
    c) To help the group leader control the meeting/discussion.
    d) All of the above.
4. Which of the following is not a consideration in setting the group agenda?
    a) Lateness of members
    b) Logistics
    c) Items
    d) Housekeeping.
5. A group facilitator should not be
    a) Judgmental
    b) Democratic
    c) Focused on the agendas
    d) Understanding.

6. In case of interruption of group meetings/discussions, the facilitator should not
    a) Let the group decide.
    b) Make use of ground rules.
    c) Be honest.
    d) Take sides.
7. Which of the following is not a good practice in identifying specific communication needs of group members?
    a) Allowing members to self-define their needs
    b) Asking members to advise the group on their needs
    c) Recording of disabilities of the group members
    d) Including a standard line in all correspondence
8. What is a group discussion?
9. Why should groups define their mechanisms?
10. Mention 3 strategies that improve group participation.
11. What are some of the skills required for facilitation?
12. Briefly explain how to evaluate a communication strategy.

Oral Assessment

1. What defines a group?
2. Explain group dynamics.

Practical Assessment

1. You have been mandated to facilitate a group discussion. Demonstrate how you will go about this duty.
2. Demonstrate how you will use your skills to evaluate a group communication strategy.
3. As a communications professional, how will you advise a group on identifying and addressing specific communication needs of its members?

2.3.7.4 Tools, Equipment, Supplies and Materials

- Desktop computers/laptops
- Internet Connection
- Projectors
- Telephone

2.3.7.5 References

Briggs, R. and Nunamaker, J. [1996]. *Team Theory of Group Productivity and its Application to Development and Testing of Group Support System*. CMI Working Paper Series-96-1, University of Arizona.

Woodcock, M. [1979], *Team Development Manual*, Gower Publishing, Farnborough.

2.3.8 Learning Outcome No 7: Represent the organization

2.3.8.1 Learning Activities

Learning Outcome No 7: Represent the organization	
Learning Activities	**Special Instructions**
7.1. Appropriately research and present relevant presentation when participating in internal or external forums, in a manner to promote the organization. 7.2. Deliver a clear and sequential presentation within a predetermined time. 7.3. Utilize appropriate media to enhance presentation 7.4. Respect differences in views. 7.5. Apply consistent written communication with organizational standards. 7.6. Respond to inquiries in a manner consistent with organizational standard.	Activities can be carried out in groups or individually. Presentation, drills and simulations can be carried out

2.3.8.2 Information Sheet No2/LO7

Introduction

This learning outcome covers how employees represent the organization in different forums using appropriate media to enhance their presentation, apply written communication and respond to client inquiries in line with organizational standards.

Definition of key terms

Media: Means or method used to represent information.

Multimedia: Refers to any technology that utilizes both graphics and sound in a digital form e.g. use of power point presentations.

Content/procedures/methods/illustrations

7.1 Research and Delivery of Presentation

When participating in internal or external forums, presentation is relevant, appropriately researched and presented in a manner to promote the organization. Employees are the organization's ambassadors and representatives to the visitors and the society. They need therefore to maintain good relations with the internal and external stakeholders. The organization should have a clear, precise means of conveying information to the internal and external world. Internal communication is when members of the organization exchange information with each other. It entails exchange of information and ideas within the organization. External communication involves exchange of information both within the organization itself and outside. It is when members communicate among themselves as well as with parties outside the organization.

Presentation techniques

The following should be considered when making presentations within and without the organization

- Portray positive image of the organization.
- The presentation should be relevant to the topic.
- It should be clear and concise in line with the objectives.
- It should portray good mastery of the content/subject matter by the presenter.
- The subject should be well researched.
- Maintain eye contact with the audience.
- Make use of facial expressions.

7.2 Presentation is clear and sequential and delivered within a predetermined time

The following aspect should be put into consideration when developing a presentation;

- Purpose of the presentation
- Who is the audience? In terms of characteristics like age, gender, needs, knowledge etc.
- Masterly of the content/subject
- Keep it simple.
- What are the most important parts of your topic for the audience to take away?
- The message should be simple and clear.
- Make use of illustrations to support your key points.
- Exhibit confidence and passion about what you are presenting on.
- Portray a sense friendliness and connect with the audience.
- The presentation should orderly and logical.
- Time allocated for the presentation should be adhered to.

The Structure of a Presentation

i. **Purpose:** Determine the learning objective and goal of the presentation. Focus on the main points the audience will gain from the presentation.
ii. **Know the audience:** In terms of characteristics like age, knowledge, background, seniority, gender etc.
iii. **Start with a bang:** Catch the audiences' attention and provide them with a reason to be interested in the presentation.
iv. **Body of Presentation:** Begin with the introduction, then main points and conclusion. All these should be directly linked to the purpose of the presentation
v. **Closing the Presentation:** Have a strong closing as it is the final impression you will leave with the audience.

7.3 Appropriate media is utilized to enhance presentation

The choice of media for the presentation is critical. You should select the media that best suits your message and is appropriate for your audience.

Presentation forums

- Meetings, seminars, workshops
- Printed media (newspapers, magazines, posters)
- Audio visual media (television, radio)
- Electronic media (internet, email, face book etc.)

Multimedia utilization in presentation

Multimedia is the use of different presentation medium at the same time. Multimedia involves use of a combination of text, sound, and/or motion. Multimedia includes any technology that utilizes both graphics and sound in a digital form e.g. use of power point presentations. The advantage of using multimedia in presentation is that the information being conveyed is easily understood by the receiver. The audience also gets a clear grasp of the concepts being presented. This is because it involves not just the use of narration/texts but incorporates the use of graphics.

Computer based media

These include presentation software such as power point. Interactive computer-based presentation aids are also used to enhance the effect of the presentation. These are handheld units used by members of the audience, connected to a monitor to which the speaker has access. These interactive aids are useful for tracking audience responses to questions, and they have the advantage over asking for a show of hands.

Audio visual media

This involves the use of media that utilises both sight and sound e.g. videos. Videos help to clarify, explain, emphasize, or illustrate a key concept in your presentation. The considerations on choice of the appropriate media include:

- The characteristics of the audience
- The form of the message/content to be communicated
- The urgency of the message
- Organizational policy
- Security and privacy of the message
- Cost
- The venue of the presentation

7.4 Differences in views are respected

In an organization, different views are expressed by both the employees and the clients. This exhibits the diversity in humanity. It is therefore important to develop the skill of respecting other peoples' views and at the same time adopting what is right and in line with the organizational objectives. The skills that one needs to adopt to ensure other views are include;

- Negotiation skills
- Agreeing and disagreeing politely
- Allowing others time to express their views
- Interrupting politely
- Openness and flexibility
- Showing empathy

7.5 Written communication is consistent with organizational standards

Communication skills relevant to client groups

Effective communication is based on how a message is delivered and how it is received. Miscommunication occurs when one person doesn’t deliver information in the same pace or priority as the other person processes. When communicating with an audience, it can be difficult to address all the different communication styles in attendance, but it’s imperative that you switch back and forth to ensure that all in the audience get the message you are presenting. In order to communicate effectively with the different client groups, you need to understand the message you need to communicate and then focus on the importance of connecting with others. This calls for you to adopt different styles to communicate with the different clients.

Methods of written communication

Handouts: Handouts are appropriate for delivering information that audience members can take away with them.

Letters: Letters are used to communicate to individual clients. They also contain information that is not meant for the public. The receipts in most cases are expected to make written responses.

Posters: These are used to communicate a variety of clients. They should be brief and precise and communicate the message in a simple way. They are often used for public information.

Banners: They communicate to a wide range of clients and can incorporate the use of graphics.

Circulars/Memo: These are used to communicate within the organization.

Written communication is often meant for literate audiences. It is however important to make the following consideration when preparing to communicate in written form;

- Level of literacy of the audience
- Urgency of the message
- Organizational policy
- Confidentiality of the message
- Appropriateness of the written media

7.6 Inquiries are responded in a manner consistent with organizational standard

Clients' responses should be addressed promptly, professionally and satisfactorily. This involves;

- Acknowledging the customer views.
- Listen carefully and keenly.
- Demonstrating your willingness to help the customer.
- Give the client assurance that you will make effort to address their enquiries.
- Encourage the customer to give all details about their enquiries.
- Reduce the response time by getting back to the customer promptly.
- Gather all the information needed to respond to the enquiry. This will ensure follow up enquiries are reduced to the minimum.
- Prioritize the customer enquiries by having a list of all the enquiries, the persons to be contacted and the time for responses.
- Ensure responses are responded to with speed and accuracy.

Handling client inquiries over the phone

- Pick the call promptly.
- Greet the client politely.
- Identify the organization by name.
- Inform the client to whom he/she is speaking.
- Find out the reason why the client is calling.
- Keenly listen to the client's enquiry.
- Take notes if necessary.
- Ensure you repeat the information to the client to show the customer you have understood the question.
- Offer the client a solution if in a possible to do it, or assure him/her when you will get back to them.

Conclusion

This learning outcome dealt with means of representing the organization through written and multimedia forms and handling of clients' enquiries according to organizational standards

Further Reading

Lauer, D. A., &Pentak, S. (2000). *Design basics* (5th Ed.). Fort Worth, TX: Harcourt College Publishers.

Pearson, J., & Nelson, P. (2000). An introduction to human communication: understanding and sharing. Boston, MA: McGraw-Hill.

2.3.8.3 Self-Assessment

Written Assessment

1. The following are written forms of communication. Which one is not?
   a) Memos
   b) Letters
   c) Posters
   d) Videos
2. One of the following is a consideration when developing a presentation?
   a) Gender of the presenter
   b) leadership
   c) Weather
   d) The audience
3. Which of the following is a computer-based presentation?
   a) Power point
   b) handouts
   c) circulars
   d) posters
4. Which of the following is not a way to respond to client's enquiries?
   a) Listening keenly
   b) Asking the client to call later
   c) Asking the client to give all the details
   d) Being calm
5. Which of the following is not a form of written communication in the organization?
   a) Email
   b) Banners
   c) Speech
   d) Poster
6. Prompt response to client's enquiries gives a positive image of the organization
   a) False
   b) True

7. Use of multimedia enhances a presentation and appeals to the audience.
    a) True
    b) False
8. Outline 5 considerations that one should make before developing a presentation.
9. Discuss what comprises internal and external communication.
10. Explain the importance of incorporating multimedia in a presentation.
11. Discuss the structure of a good presentation.
12. What techniques are required to ensure that individual differences are respected in an organization?

Oral Assessment

1. Simulate a scenario of a client making a telephone enquiry to your organization and how the enquiries are responded to.

Practical Assessment

1. You are the human resource officer at Bidii Company. Lately there have been increased cases of employees missing duty due to stress related issues. Plan for a sensitization session for the employees and prepare a 20 minutes power point presentation on “stress management.
2. Design a handout that can be given to prospective clients giving details of your organization’s vision, mission, key products/services and corporate social activities.

2.3.8.4 Tools, Equipment, Supplies and Materials

- Desktop computers/laptops
- Internet Connection
- Projectors
- Telephone

2.3.8.5 References

Cronen, V., & Pearce, W. B. (1982). *The coordinated management of meaning*: A theory of communication. In F. E. Dance (Ed.), *Human communication theory* (pp. 61–89). New York, NY: Harper & Row.

McLean, S. (2005). *The basics of interpersonal communication*. Boston, MA: Allyn & Bacon.

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CHAPTER 3: NUMERACY SKILLS/DEMONSTRATE NUMERACY SKILLS

3.1 Introduction

Demonstrate numeracy skills unit of competency is among the seven basic competencies offered in all the TVET level 6 qualification. The unit covers the knowledge, skills and behaviours required to effectivelly use numeracy skills by a worker inorder to apply a wide range of mathematical calculations for work, apply ratios, rates and propotions to solve problems in real life situatins. It entails identifying and using of geometry to draw and construct 2D and 3D shapes for work; collect, organize, present and interprate statistical data to help make decisions at the work place. The significance of numeracy skills to TVET level 6 curriculum is to develop logical thinking and reasoning strategies, in day today activities, in solving problems and making sense of numbers.

The critical aspects of competencies to be covered includes mathematical calculation for work, applying ratios through use of detailed maps to plan travel routes for work, geometry to draw and construct 2D and 3D shapes, collect, organize and interpret statistical data and also the use scientific calculators. The basic resources required include; calculators, rulers, pencils, graph books and dice. The unit of competency covers eight learning outcomes. Each of the learning outcome presents; learning activities that covers performance criteria statements, thus creating an opportunity to demonstrate knowledge and skills in the occupational standards and contents in the curriculum. Information sheet provides; defination of key terms, content and illustrations to guide in training. The competency may be assessed through written tests, demonstration, practical asignment and case study. Self assessment is provided at the end of each learning outcomes.

3.2 Performance Standard

Apply a wide range of mathematical calculations, use and apply ratios, rates and proportions, estimate, use detailed maps to plan travel routes, use geometry to draw 2D shapes and construct 3D shapes, collect, organize, and interpret statistical data and use routine formula tasks in accordance to workplace tasks and texts and mathematical language.

3.3 Learning Outcomes

3.3.1 List of learning outcomes

a) Apply a wide range of mathematic calculations for work
b) Apply ratios, rates and proportions to solve problems
c) Estimate measure and calculate measurements for work
d) Use detailed maps to plan travel routes for work
e) Use geometry to draw and construct 2D and 3D shapes for work
f) Collect, organize and interpret statistical data
g) Use routine formulae and algebraic expressions for work
h) Use common functions of a scientific calculator

3.3.2 Learning Outcome No 1: Apply a wide range of mathematical calculations for work

3.3.2.1 Learning Activities

Learning Outcome No 1: Apply a wide range of mathematical calculations for work	
Learning Activities	**Special Instructions**
1.1. Extract mathematical tasks and texts information embedded in a range of workplace. 1.2. Interpret and comprehend mathematical information 1.3. Select and use a range of mathematical and problem-solving processes 1.4. Use different forms of fractions, decimals and percentages. Performed calculation with positive and negative numbers 1.5. Express numbers as powers and roots in mathematical calculations 1.6. Use routine formulas to do calculations 1.7. Use estimation and assessment of processes to check outcomes 1.8. Discuss and explain mathematical language used for processes, results and implications of tasks	

3.3.2.2 Information Sheet No3/LO1: Apply a wide range of mathematic calculations for work

Introduction

The learning outcome uses and estimate decimals, fractions, percentages, powers and roots to calculate range of mathematical and problem solving in real life situations. It also entails addition and subtraction of integers.

Definition of key terms

Fraction: A fraction is a number that represents part of the whole.

Decimal: A decimal is number whose whole number part and the fractional part are separated by a decimal.

Percentages: A percentage is a number or ratio expressed as a fraction of 100.

Content/Procedures/Methods/Illustrations

1.1 **Mathematical information embedded in a range of workplace tasks and texts is Extracted**

Mathematics as a discipline include the study of number theory, algebra, geometry, statistics, calculus etc. Experts in mathematics explore and make use of sequence, pattern and series to discover new knowledge in mathematics. For one to be successful either in business and workplace, the knowledge of mathematics is a must.

1.2. Mathematics information is interpreted and comprehended

Understanding mathematics helps one to understand and do a wide range of mathematical concepts and factors and identify principles of a given area in mathematics that make things work. Many people have difficult clarifying mathematical ideas or solving problems that involves more than just calculations. Interpretation and understanding of mathematics are the key principle component to help visualize the concept of mathematics.

1.3 A range of mathematical and problem-solving processes are selected and used.

A mathematical solving and problem-solving process involves four key steps. The four steps include

- Details,
- Main idea,
- Strategy
- How to do.

A mathematician works through each step and organizes their ideas to provide evidence of their mathematical thinking and to show how to arrive at the solution.

At the idea stage, the mathematician looks to answer the following questions.

- What is the main idea in the question?
- What is he looking for?
- What is needed?

Ideals: This is where one reads the questions more than one time to keenly understand the idea well. The areas of interest here is the numbers used, words and statements. Facts are extracted to help answer the question. Hidden information at this stage is also looked as though not clearly indicated. The key areas required at this level is details needed, important details, and what is hidden to answer the question.

Strategy: Here a strategy (strategies) may be chosen to find a solution of the problem and that strategy to help find the answer to the problem.

How: This is to make sure that the answer got is reasonable and can be used to help understand the process clearly. This helps one to know which method was used to arrive at the problem.

The advantage of using the above method is because it leads to high level of thinking.

1.4. Types of Fractions

A fraction is a numeric quantity which is expressed such that it is not a whole number ($e.g$ ⅓ $= 0.33 \ldots$). The upper part of a fraction is called a numerator and the lower part is called a denominator. There are three types of fractions

i. **Proper fractions** e.g. $\frac{4}{7}$ $where\ 4\ is\ smaller\ than\ 7\ in\ this\ fraction.$

The value of a proper fraction is always less than 1.

ii. **Improper fractions** e.g. $\frac{11}{6}$ $where\ 11\ is\ bigger\ than\ 6\ in\ this\ fraction.$

The value of an improper fraction is always equal to or greater than 1.

iii. **Mixed fractions** e.g. $3\frac{1}{3}$ (combination of a proper fraction and a whole number)

The improper fractions can be converted into mixed fractions and vice versa. An improper fraction is first a fraction where top number (numerator) is greater than or equal to the bottom number, the denominator.

NOTE: Operation on addition, subtraction, multiplication and division can be operated on fractions.

Steps involved in converting an improper fraction to proper fractions are;

- Divide the numerator by the denominator
- Write down the whole number answer
- Write down any remainder above the denominator.

Decimals

A decimal is a fraction which is expressed such that it has a denominator as a power of multiples of ten and whose numerator is expressed by numbers placed to the right of a decimal point. There are two types of Decimals

i. Terminating decimals: these are decimals which stop at a given number of decimal places e.g. 0.7 (1decimal place), 0.85 (2 decimal place) and so on.

ii. Recurring/non terminating decimals: these are decimals which do not stop at a given number of decimal place but which may have a repeating digit or repeating set of digits after the decimal point e.g. (a) $0.33333333 \ldots \ldots . = 0.\dot{3}$ (b)$0.463463 \ldots . . =$ $0.\dot{4}6\dot{3}$. Recurring decimals can also be converted in fractions.

Example1: convert 0.444444 in fractions Steps;

- Let x be the recurring number,
- Examine the recurring decimal to determine the repeating digits,
- Place the repeating digit(s) to the left of the decimal point,
- Subtract the left sides of the equations and the right sides, i.e.,

X = 0.444444……………. (1)
10x = 4.44444…………….(2)
9x = 4……………………. (2) – (1)
X = $\frac{4}{9}$

Percentages

The meaning of the word percentage is per hundred. This is a way to represent parts of one whole. In percent one whole is considered to be 100%.
Percentages can be converted into fractions and decimals or vice versa.

Working with percentages

Percentages are mentioned with regards to the base value, which is also known as whole or reference value. The percentage amount is a portion of the base value. Converting percentages to fractions.

Procedure:

i. Write down the percentage divided by 100,
ii. If the percentage is not a whole number, then multiply both top and bottom by 10 for every number after a decimal point,
iii. Simplify.

Powers: These are numbers into which a given number is raised to. They are also referred to as exponentials, indices or Logarithms e.g. a^m where m is the power.
Root: The root of a number y is another number, which when multiplied by it gives itself a given number of times equal to y.

1.5 Calculations performed with positive and negative number

Numbers below zero are called negative numbers. Numbers above zero are called positive numbers. There are rules that are used when adding, subtracting, multiplying or dividing positive and negative numbers. A number line is used to help illustrate how to add and subtract positive and negative numbers. When adding positive numbers, we count to the right. When subtracting positive numbers, we count to the left.
Using a number line to illustrate $5 - 3$=2

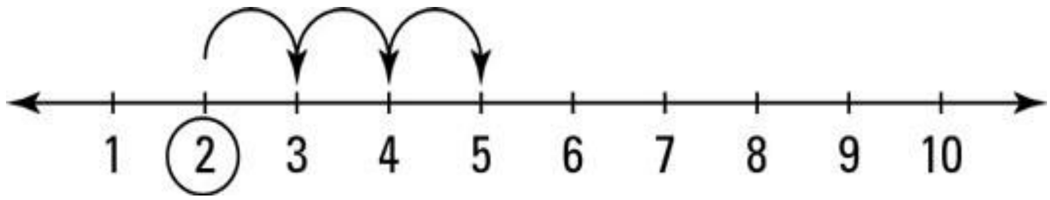

Figure 2. Number line

Here we imagine of moving up and down a number line to get the answer. Starting from zero we count up to5. Then subtract by moving six 6 steps to the left then subtract 4 to get -4.

1.6 Numbers are expressed as powers and roots are used in calculations

Powers are used when we want to multiply a number by itself repeatedly or we use powers (indices) to multiply a number by itself.

E.g. $8 \times 8 \times 8 \times 8$ is written as 8^4,

4 tells use the numbers of 8 (eights) to be multiplied together. Here the index (power) is 4. The number 7 is called the base.

Square roots

When 7 is squared we get 49. This means that $7^2 = 49$. The reverse of this process is called finding a square root.

The square root of 49 is 7 which is written as $\sqrt{49}$=7.

The square root of a perfect square has two roots e.g. $\sqrt{64}$=±8.

Generally, the square root of a member is a number which when squared give the original number.

NOTE: Negative numbers do not have square roots

1.7 Calculations done using routine formulas

All calculations used in mathematics follows a specific order. Formulas are used to provide mathematical solutions for real life problems. These formulas can be an equation, a principle or a logical relation. Addition, subtraction, multiplication, and division are easy. When we come across derivation, calculus and geometry, we need the use of formulas. There are many formulas used in mathematics which depends on a given situation.

1.8 Estimation and assessment processes are used to check outcome.

To achieve outcome in estimation and assessment we need to:

- Use a variety of estimation strategies to find the appropriate products and quotients of whole numbers.
- Analyze different estimation strategies for finding products.
- Identify essential elements of estimating quotient.

Some of the estimation strategy includes:

- Front end strategy
- Compensation strategy
- Rounding to multiples of 10
- Compatible numbers

1.9. Mathematical language used to discuss and explain processes.

Mathematics includes knowledge, skills and methods. Most language in mathematics are spoken and the symbols are vocal sounds. The language is a system of communication about mathematical objects such as numbers, sets, functions, operations and equations. The basic operation symbols in mathematics are $+(plus) - (minus)$

Conclusion

This learning outcome describes the skills and knowledge to extract, comprehend and analyze a broad range of mathematical information in fractions, decimals, percentages and whole numbers.

Further Reading

Purna Chandra Biswal (2009); *Probability and Statistics*; Prentice hall Of India Pvt Ltd

Thomas G.B and Finney R.L (2008); *Calculus and Analytical geometry*; Wesley –London

John bird (2006); high engineering mathematics; Elsevier ltd.

3.3.2.3 Self-Assessment

Written Assessment

1. Which one of the following contain a set of the fractions that are evenly spaced on a number line?
    a) $\frac{3}{4}, \frac{19}{24}, \frac{5}{6}$
    b) $\frac{3}{4}, \frac{19}{24}, \frac{7}{8}$
    c) $\frac{4}{5}, \frac{5}{6}, \frac{7}{8}$
2. How would you write the fraction $\frac{2}{10}$ as a decimal?
    a) 0.2
    b) 0.02
    c) 0.002
    d) 2
3. Choose the fraction equivalent to the decimal 0.09
    a) $\frac{9}{10}$

b) $\frac{90}{10}$

c) $\frac{90}{100}$

d) $\frac{9}{100}$

4. Convert $4\frac{3}{5}$ into an improper fraction.
5. Without using a calculator find the value of $\sqrt{36 \times 49}$
6. Find the square of $5\sqrt{2}$
7. A tank is to be filled from two taps. By itself, the first tap could fill the tank in $\frac{1}{2}$ hour. By itself, the second tap could fill the tank in $\frac{1}{3}$ hour. How long will they take together?

Oral Assessment

1. Differentiate between a decimal and a fraction.
2. What is an improper fraction?
3. What is a recurring decimal?

3.3.2.4 Tools, Equipment, Supplies and Materials

- Calculators
- Rulers, pencils and Erasers
- Charts with presentation of data
- Graph books
- Dice

3.3.2.5 References

John Bird (2006); *High engineering mathematics*; Elsevier Ltd
Purna Chandra Biswal (2009); *Probability and Statistics*; Prentice-hall Of India Pvt Ltd
Thomas G.B and Finney R.L (2008); *Calculus and Analytical geometry*; Wesley –London

3.3.3 Learning Outcome No 2: Use and apply ratios, rates and proportions for work

3.3.3.1 Learning Activities

Learning Outcome No 2: Use and apply ratios, rates and proportions for work	
Learning Activities	**Special Instructions**
2.1. Extract information regarding ratio, rates and proportions from a range of workplace tasks and texts. 2.2. Analyze mathematical information related to ratios, rates and proportions 2.3. Use problem solving processes to undertake the task 2.4. Simplify equivalence ratios and rates. 2.5. Calculate quantities using ratios, rates and proportions. 2.6. Construct graphs, charts or tables to represent ratios, rates and proportions 2.7. Review and check the outcomes. 2.8. Record information using mathematical language and symbols	Use textbooks

3.3.3.2 Information Sheet No3/LO2: Use and apply ratios, rates and proportions for work

Introduction

This learning outcome looks into the calculation of quantities using of ratios, rates, percentages and proportions in mathematics and also in real life situation. It also entails construction of graphs for ratios and proportions.

Definition of key terms

Rate: a rate is the ratio between rated quantities in different units. The word per is used to describe the units of two quantities measurements.

Ratio: ratio is the relationship between two numbers indicating how many times the first number contains the second.

Proportion: this is a part share or number considered in comparative relation to a whole.

Content/Procedures/Methods/Illustrations

2.1 Information regarding ratios, rates and proportions extracted from a range of workplace.

Task and texts: Here the skills and knowledge to apply and solve problems involving rates, ratios and proportions is described. This unit applies to individuals who need the skills of ratios, rates and proportions and how to apply them in real life situations.

2.2 Mathematical information related to ratios, rates and proportions are analyzed.

Rates

A rate is found by dividing one quantity by another. For example, a rate of pay consists of the money paid divided by the time worked. If a laborer receives Ksh200 for two hours work. His rate of pay is

$200 \div 2 = 100$ Shillings per hour

Here the rate is found by dividing the money by time.

Ratios

Ratios are helpful tool for comparing things to each other in mathematics and real life and therefore it is important to know what they mean and how to use them.

A ratio compares two quantities by division, with the dividend or number being divided termed antecedent and the divisor or number that is dividing termed the consequent.

Ratios occur frequently in daily life and help to simplify many of our interactions by putting numbers into perspective. Ratios allow us to measure and express quantities by making them easier to understand.

2.3 Problem solving processes are used to undertake the task.

Rates: a rate is the ratio between two related quantities in different units. In describing the units of a rate, the word “per” is used to separate the units of the two measurements used to calculate the rate.

Ratio

A good way of comparing quantities is by use of a ratio. Suppose that in a youth club there are 60 boys and 25 girls. The ratio of boys to the number of girls is spoken as ’60 to 25’ and can be written as

$$60:25$$

If you divide each part by 5, you get the simplified ratio.

$$12:5$$

This means that for every 12 boys there are 5 girls.

NOTE: You can only compare quantities using ratios if each quantity is measured in the same units

Proportions: To solve problems with percent we use the percent proportion shown in proportion and percentage.

$$\frac{k}{m} = \frac{x}{200} = r$$

$\frac{x}{200}$ Is called the rate.

$k = r.b$ This implies the $Percentage\ = rate\ \times\ time$

Percentages

Here we deal with 100% of a number. 100% means a whole thing and therefore 100% of a number is the same thing.

$$50\%\ of\ 20 = 10$$

$$20\%\ of\ 9 = \frac{9}{2}\ or\ 4\frac{1}{2}\ or\ 4.5$$

2.4 Equivalent ratios and rates are simplified

No matter how a ration is written, it is important that it be simplified down to its simplest form possible, just as with any fraction. This is done by finding the greatest common factor between the numbers and dividing accordingly. With a ratio comparing 16 to 24, for example, you find that both 16 and 24 can be divided by 8 which is the greatest common factor between the two numbers. This simplifies this ratio into 2 to 3 by dividing each by 8. Which is written as

$2: 3$ or $\frac{2}{3}$ or 0.75

Note that a decimal is sometimes permissible, though less commonly used.

2.5 Quantities are calculated using ratios, rates and proportions

Ratios.

Ratios are used to compare amounts or quantities or describe a relationship between two amounts or quantities. For example, a ratio might be used to describe the cost of a month's rent as compared to the income earned in a month. We may also wish to compare the number of buffaloes to the total number of animals in a zoo, or the number of calories per serving in two different brands of ice cream.

Rates

Rates are special type of ratios used to describe a relationship between different units of measurement, such as speed, wages or even prices. An aircraft can be described as travelling 300 miles per hour; an earthmover might earn Ksh 40, 000.00 per hour; fuel price may be sold at Ksh112.00 per litre.

Proportions

If two fractions are equal, we say that the two given rations are equivalent. It two ration are equivalent, then the involved four quantities are said to be in proportion. Proportions can be used to solve problem involving scaling. For example, if two eggs are used to make 40 pancakes, then how many eggs do you require to make 200 pancakes?

For this to work the ration must be equivalent. The ratio is

$$\frac{Eggs}{Pancakes}$$

Using the above information, this can therefore be written as

$$\frac{2}{40} = \frac{x}{200}$$

From equivalent ratio $x = 10$

2.6 Graphs, charts or tables are constructed to represent ratios, rates and proportions

Rates, ratios and proportions can be represented on tables and graphs. The proportionality on a graph means that as x increases, y increases and as x decreases, y decrease and the ratios between them remains the same. Suppose we have the ratio of teachers to students in a given school as 1 to 5. This ratio can be represented on a table as well as on a graph. For this to be done we know that Ratios have additive and multiplicative reasoning pattern.

Table 4. Number of teachers and students

Teachers	1	2	3	4	5
Students	5	10	15	20	25

This information can be represented on a graph by either taking teachers to be on the x – axis and students to be on the y-axis or the vice versa.

2.7 The outcome reviewed and checked.

The number of pupils in a class increases from 30 to 36. We say that increase is in the ratio $36{:}30 = 6{:}5$

This means that the fraction

$$= \frac{New\ number\ of\ pupils}{old\ number\ of\ pupils} = \frac{6}{5}$$

The number of pupils has been multiplied by $\frac{6}{5} = 1.2$

This is called the multiplying factor.

2.8 Information is recorded using mathematical language and symbols

Mathematics is written in a symbolic language that is designed to express mathematical thoughts. English language is a source of knowledge, but is not designed for doing mathematics.

The symbolic language of mathematics is a special-purpose language. It has its own symbols and rules of grammar that are quite different from those of English (Uttam Kharde 2016).

Conclusion

This learning outcome describes the skills and knowledge required to solve real life problems using ratios, rates and proportions. Mathematics is a language which is developed using symbols and to study the mathematics, it is necessary to understand the language in which it is written.

Further Reading

- Purna Chandra Biswal (2009); *Probability and Statistics*; Prentice-hall Of India Pvt Ltd
- Thomas G.B and Finney R.L (2008); *Calculus and Analytical geometry*; Wesley London

3.3.2.3 Self-Assessment

Written Assessment

1. A ratio equivalent to 3:7 is?
    a) 3:9
    b) 6:9
    c) 9:21
    d) 18:49
2. The ratio 35:84 in simplest form is?
    a) 5:7
    b) 7:12
    c) 5:12
    d) None of these
3. In a class there are 20 boys and 15 girls. The ratio of boys to girls is?
    a) 4:3
    b) 3:4
    c) 4:5
    d) None of these
4. Mr. Kinyua spends 35% of his salary on rent. After paying the month's rent he had Ksh50, 000.00 left. How much does he earn each month now?
5. Three candidates stood for election to school council. The percentage votes for each person are given in the table below.

Table 5: Election results

STUDENTS	% OF VOTES
Kelvin	30
Juma	P
K'olender	Y

Only 60% of the school voted and those 20 papers were spoiled and did not count. Three times as many people voted for K'olender as for Juma there are 1800 pupils in the school. How many people voted for each of the candidates?

If $x: y = 4: 1$ and$y = 3t$, find the ratio $x: y: t$

3.3.3.4 Tools, Equipment, Supplies and Materials

- Calculators
- Rulers, pencils and Erasers
- Charts with presentation of data
- Graph books
- Dice

3.3.3.5 References

J.K BackHouse, S.P.T Houldsworth; *Pure mathematics I;* Longman Group (FE) Ltd, Hong Kong

J.K BackHouse, S.P.T Houldsworth; *Pure mathematics I; Pure mathematics* I; Longman Group (FE) Ltd, Hong Kong

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Thomas G.B and Finney R.L (2008); *Calculus and Analytical geometry*; Wesley –London

3.3.4 Learning Outcome No 3: Estimate, measure and calculate measurement for work

3.3.4.1 Learning Activities

Learning Outcome No 3: Estimate, measure and calculate measurement for work	
Learning Activities	**Special Instructions**
3.1. Extract and estimate measurement information embedded in workplace texts and tasks 3.2. Identify and selected appropriate workplace measuring equipment 3.3. Estimate and make accurate measurements 3.4. Calculated the area of 2D shapes including compound shapes 3.5. Calculate using relevant formulas the volume of 3D shapes 3.6. Calculate using Pythagoras' theorem the sides of right-angled triangles 3.7. Perform conversion between unit's measurement 3.8. Problem solving processes are used to undertake the task 3.9. Review and check the measurement outcomes 3.10. Record appropriate information in using mathematical language and symbols in a given task	

3.3.4.2 Information Sheet No3/LO3: Estimate, measure and calculate measurement for work

Introduction

This learning outcome looks into the calculation of sides, area and volume of 2D and 3D shapes using relevant formulas. It also entails selection of measuring equipment and conversion of units of measurements.

Definition of key terms

Right angled triangle: This is a triangle whose one angle is equal to 90^0 and the other two angles are acute angles

2D shapes: These are flat planes figures or shape with two dimensions.

3D shapes: These are solids or objects with 3 dimensions. These dimensions are width, height and length.

Area: This is the quantity that expresses the extent of a two-dimension figure or shape, i.e., length and breadth.

Volume: The amount of space that a substance or object occupies

Content/Procedures/Methods/Illustrations

3.3.4.3 Measurement information embedded in workplace texts and tasks are extracted and interpreted.

This describes the skills and knowledge to estimate and measure quantities, to convert units within the metric system and between metric and non-metric units, to calculate area and volume including compound shapes and to use Pythagoras theorem. The unit helps to;

- Recognize common units of metric measurement for Length, Mass, Capacity and Temperature and use them appropriately in highly familiar situations.
- Identify and choose appropriate measurement tool and use it at a basic level in a limited range of highly familiar situations to measure and compare items.
- Recognize whole numbers into the hundreds related to measurement.
- Use common words for comparing measurements.

Required Knowledge

- Signs and prints, symbols represent measuring in measurement context such as on tools and packaging.
- Common units of metric measurement and their appropriate use.
- Abbreviations associated with highly familiar measurement and time.

3.2 Appropriate workplace measuring equipment are identified and selected

Length, Mass, Capacity and temperature have their standard measures given by Meters, Kilograms, Liters, and Degrees Celsius respectively. Familiar situations of measurement include reading and interpreting measures on advertising leaflets, notices, packaging etc. Appropriate measurement tool may include: rulers, tape measures, kitchen scales, measuring containers.

Common words used include:

- Long/short
- Big/small
- Thick/thin
- Short/tall
- Double/half

3.3 Accurate measurements are estimated and made

Estimation is a concept that one can incorporate in daily routine. To ensure accuracy of measurement it is important to introduce areas in measurement where practice can be done to enhance the art of accurate measurement.

This helps learners to use standardized units of measurements.

3.4. The area of 2D shapes including compound shapes are calculated

This involves skills and knowledge to develop the basic skills and confidence to perform simple and familiar numeracy task involving the identification, comparison and sketching of simple and familiar two-dimensional shapes.

Area of 2D Shapes

The area of a shape shows how much it covers. Here the area of shapes is calculated
For each length unit there is a corresponding area unit.
e.g.

1 square meter
1square centimeter
1 square kilometer etc.

Area of rectangles, parallelograms triangles and trapezia

Rectangle

The area of rectangle is found by multiplying its Length (x) and its breadth(y), which is given by

$$\boldsymbol{Area\ =\ xy}$$

Parallelogram

The area of a parallelogram is the product of its base and its height. If its base is b and the perpendicular is h then the area is $\boldsymbol{Area = bh}$

Triangle

The area of a triangle is half the product of the base and the height. If the base is b and the height is h. Then the area is

$$Area\ =\ ½\ x\ b\ x\ h = ½bh$$

Trapezium

Suppose the parallel sides of a trapezium are a and b, and that its height is h. then the area is

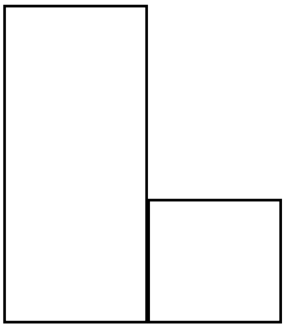
$$½h\ (a + b).$$

Area of a Circle

If a circle has radius r, then its area is πr^2.

Compound Shapes

Some shapes are made from a combination of basic shapes. Consider the figure below.



The area of this L shape is found by dividing the shapes into different areas so that the area can be calculated.

Figure 3. L Shape

3.5. The volume of 3D shapes is calculated using relevant formulas

In mathematics (geometry) we often are required to calculate the surface area and volume of 3D shapes.

The attributes of a three-dimension figure are the faces, edges and vertices. The three dimensions compose of the edges of a 3D geometrical shape.

Examples of the 3D shapes includes

i. **Sphere**

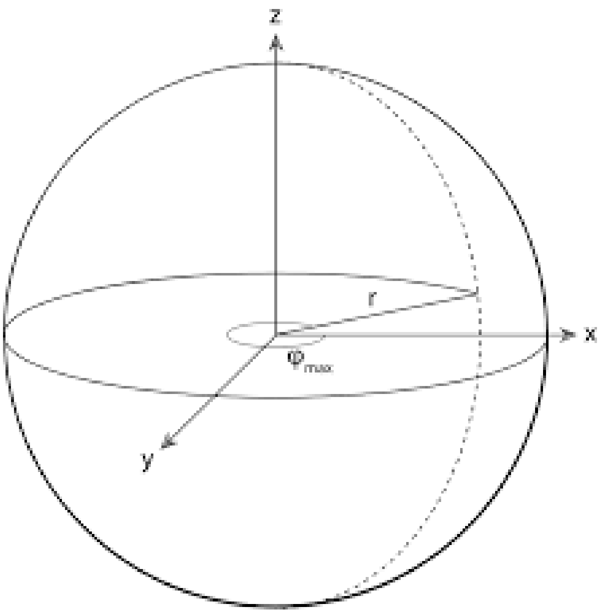


Figure 4. Sphere

The surface area is given by

A = $4\pi r^2$ and

Volume is given by

r = $\frac{4}{3}\pi r^3$

ii. Cone

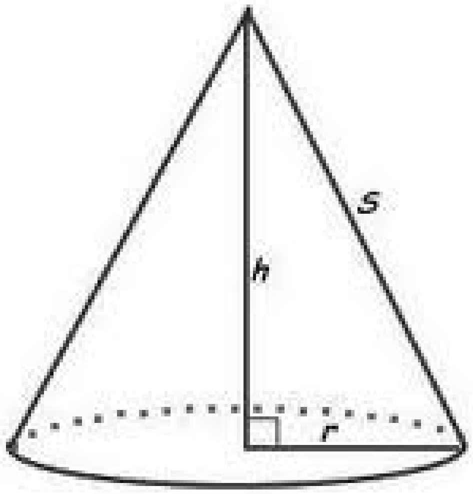


Figure 5. Cone

A Cone has a circular base and a slanting surface.

$$Surface\ area = \pi rl + \pi r^2$$

$$Volume = \tfrac{1}{3}\pi r^2 h$$

iii. Cylinder

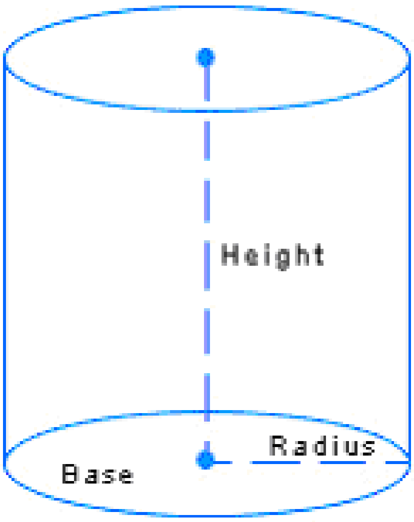


Figure 6. Cylinder

A closed cylinder has two circular circles and a curved surface.

The surface area is

$$S.A = 2\pi r^2 + 2\pi rh$$

The volume is

$$V = \pi r^2 h$$

iv. **Rectangular Prism:** this is a solid with side faces, where opposite sides are equal.

$$Surface\ area\ =\ 2(lh)\ +\ 2(lw)\ +2(wh)$$

$$Volume\ =lhw$$

Other 3D shapes include Prisms.

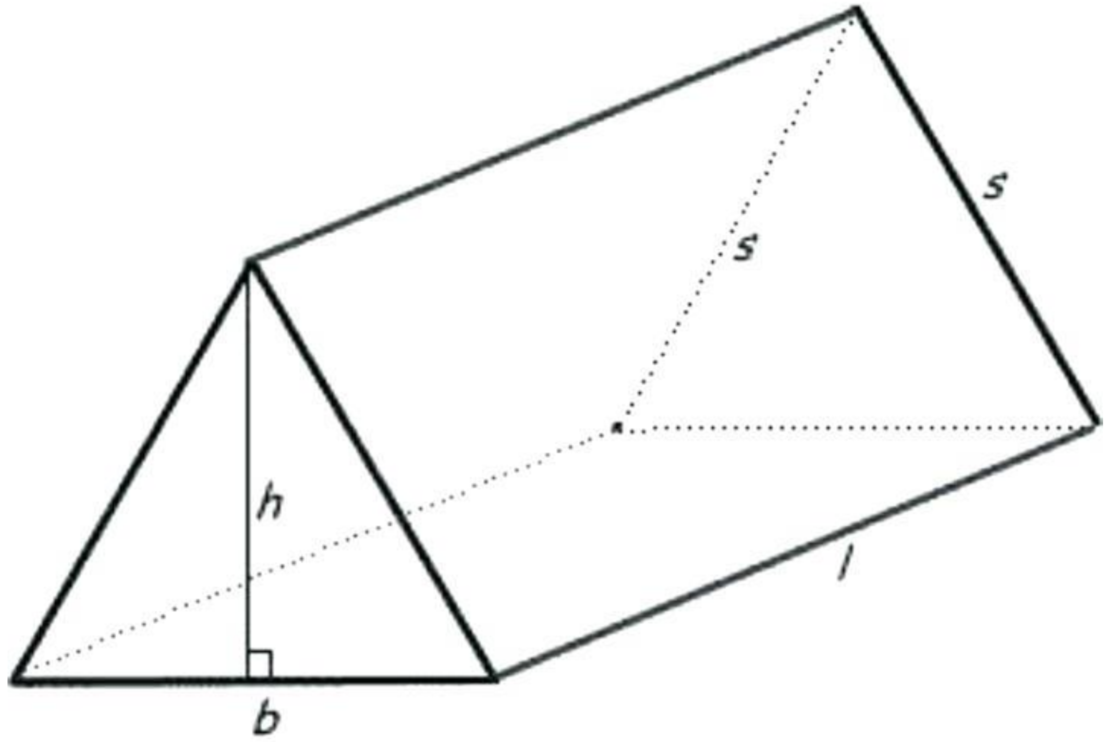


Figure 7. Rectangular prism

Prisms are three dimensional shapes with base of a triangle which can either be equilateral, isosceles or scalene triangle.

$$Surface\ area\ =\ bh+2ls+lb$$

$$Volume\ =\ ½\ (bhl)$$

3.6 Sides of right-angled triangles are calculated using Pythagoras' theorem

Pythagoras theorem is one of the best-known mathematical formulas which provide us with the relationship between the sides of a right-angled triangle.

A right-angled triangle consists of two side meeting at 90(degrees) and a third side called the hypotenuse which is the longest side of the right-angled triangle.

The Pythagoras theorem state that the relationship in every triangle say

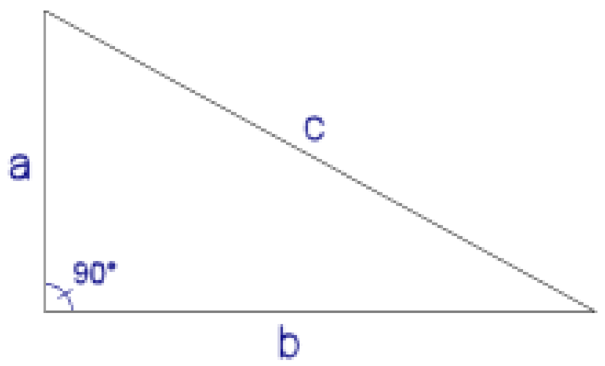


Figure 8. Right-angled triangle

Calculating the sides of the triangle requires the use of the right-angled triangle i.e. $c^2 = b^2 + a^2$ where

$$c = \sqrt{b^2 + a^2}$$

There are various types of a right-angled triangle which are categorized by the size of the acute angles. Examples are $30^0, 45^0, 60^0$, 90^0 etc.

Further concepts about right angled triangle can be done with trigonometry.

3.7 Conversions are performed between units of measurement

Measurements are ways that we tell others how much of an item we have. There are two systems of measuring objects i.e. English and Metric

English measurements are used only in USA, while metric measurements are used in nearly every other country.

Common Metric Measures

The metric system is also divided into different categories of measurement, but it has a base unit for each category. The categories under metric measurement are

Millimeters (mm)   1000mm = 1 m
Centimeters (cm)   100cm =1m
Meter (m) is the base unit
Kilometer (km)   1000m = 1km

Weight

Milligrams (mg) 100mg = 1g
Grams (g) base unit (1)
Kilograms (kg) 1000g = 1kg, 1000kg = 1tonne

Volume

Milliliters (ml) 1000ml = 1l
Liter (l) base unit

Temperature

Degrees Celsius (ºC)

Speed
Meters per seconds (m/s)

Time
Second (sec) 60 sec = 1 min
Minutes (60) min = 1 hr.
Hour 24hrs = 1 day

3.8 Problem solving processes are used to undertake the task

Measurement is the process of using a device or tool to find the dimensions, time, pressure amount, weight or mass of an object. We use measurement to help us solve problems in many real-life situations.

Perimeter and Area
To find the perimeter of an object or place, measure the distance around something.

Area: this is the amount of space within a boundary. The boundary can be a variety of shapes and calculating the area will depend on shape.

3.9 The measurement outcomes are reviewed and checked

Surface area
Rectangles
The surface area of a cuboid is equal to the sum of the area of all of its faces.
To find the surface area of any 3D shape, we can follow the process described below:

1. Draw a net of the 3D shape,
2. Calculate the area of each face,
3. Add up the area of all the faces to set the surface area (S.A) of the entire shape.

3.10 Information is recorded using mathematical language and symbols appropriate for the task

The 2D and 3D shapes can be identified using the name and describing the features using appropriate vocabulary. This includes:

- Names, identifies and classifies a range of simple 2D and 3D shapes.
- Using mathematic language to describe the properties of a range of common 2D shapes and 3D objects including size, face, edge, corner, base and angle.
- Identifies and recognizes 2D and 3D shapes by drawing.

Conclusion
This learning outcome is based calculating lengths, areas and volumes of 2D and 3D shapes to help solve real life problems.

Further Reading

Purna Chandra Biswal (2009); *Probability and Statistics;* Prentice-hall Of India Pvt Ltd

Thomas G.B and Finney R.L (2008); *Calculus and Analytical geometry;* Wesley –London

3.3.4.3 Self-Assessment

Written Assessment

1. A three-dimension shape can be called?
    a) Flat shape
    b) solid
    c) polygon
    d) hexagon
2. Vertices are also called?
    a) Edges
    b) corners
    c) faces
    d) sides
3. Which 3D shape has six rectangular faces?
    a) cube
    b) cuboid
    c) prism
    d) tetrahedron
4. A parallelogram has base 20cm and area $660cm^2$. What is its height?
5. The parallel side of a trapezium are 10cm and 12cm. The area is $55cm^2$. Find the height of the trapezium.
6. A paint roller is a cylinder which is 15cm long and with radius 3cm. Find the area of wall it can cover in one revolution.
7. A water tank is 0.8m high, 1.2m long and 1m wide. It is three-quarters full of water. How many bricks, 20cm by 10cm by 10cm, can be put into the tank before the water overflows?
8. A section of a path is 2m wide and 12m long. It is made from concrete 6cm thick. Find the volume of concrete, giving your answer in m^2

Oral Assessment

1. What is the difference between a kite and a rhombus?
2. How many sides do a nonagon has?

3.3.4.4 Tools, Equipment, Supplies and Materials

- Calculators’
- Rulers, pencils and Erasers’
- Charts with presentation of data
- Graph books
- Dice

3.3.4.5 References

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Thomas G.B and Finney R.L (2008); *Calculus and Analytical geometry;* Wesley –London

3.3.5 Learning Outcome No 4: Use detailed maps to plan travel routes for work

3.3.5.1 Learning Activities

Learning Outcome No 4: Use detailed maps to plan travel routes for work	
Learning Activities	**Special Instructions**
4.1. Identify and interpret different types of maps 4.2. Identified key features of maps. 4.3. Identify and interpret scales. 4.4. Calculate and apply actual distances using scales. 4.5. Determine positions or locations using directional information 4.6. Determine distances, speeds and times using planned routes and directions. 4.7. Gather and identified relevant factors related to planning a route with checked information 4.8. Select and check relevant equipment for accuracy and operational effectiveness. 4.9. Plan and record specialized mathematical language and symbols appropriate for a given task.	Individual presentation

3.3.5.2 Information Sheet No3/LO4: Use detailed maps to plan travel routes for work

Introduction

The learning outcome makes use of scale, maps and routes to calculate distances, speeds and times of positions or locations. It also entails giving and receiving directions using formal and informal methods.

Definition of key terms

Contour: These are lines joining points of equal value. Each successive contour represents an increase or decrease in a constant value. They are usually associated with change in thickness.

Speed: The rate at which someone or something moves or operates.

Distance: This is the length between two points.

Scale drawing: This is a drawing where dimensions are proportional to the actual size of the object being drawn in a predetermined ratio.

Content/Procedures/Methods/Illustrations

4.1 Different types of maps are identified and interpreted

In geography maps are one of the most important tools researchers, cartographers, students and other can use to examine the entire earth or a specific part of it.

Maps simplify defines a picture of the earth surface.

Maps can be classified into two main groups' i.e.

- Reference maps
- Thematic maps

Reference Maps: They show the location of geographical boundaries, physical features of earth, or cultural features such as places, cities, water and roads. Examples are: political maps, physical road, topographic maps, time zone, geologic and Zip code maps. The figure below shows Kenya reference map showing the features and boundaries of provinces.

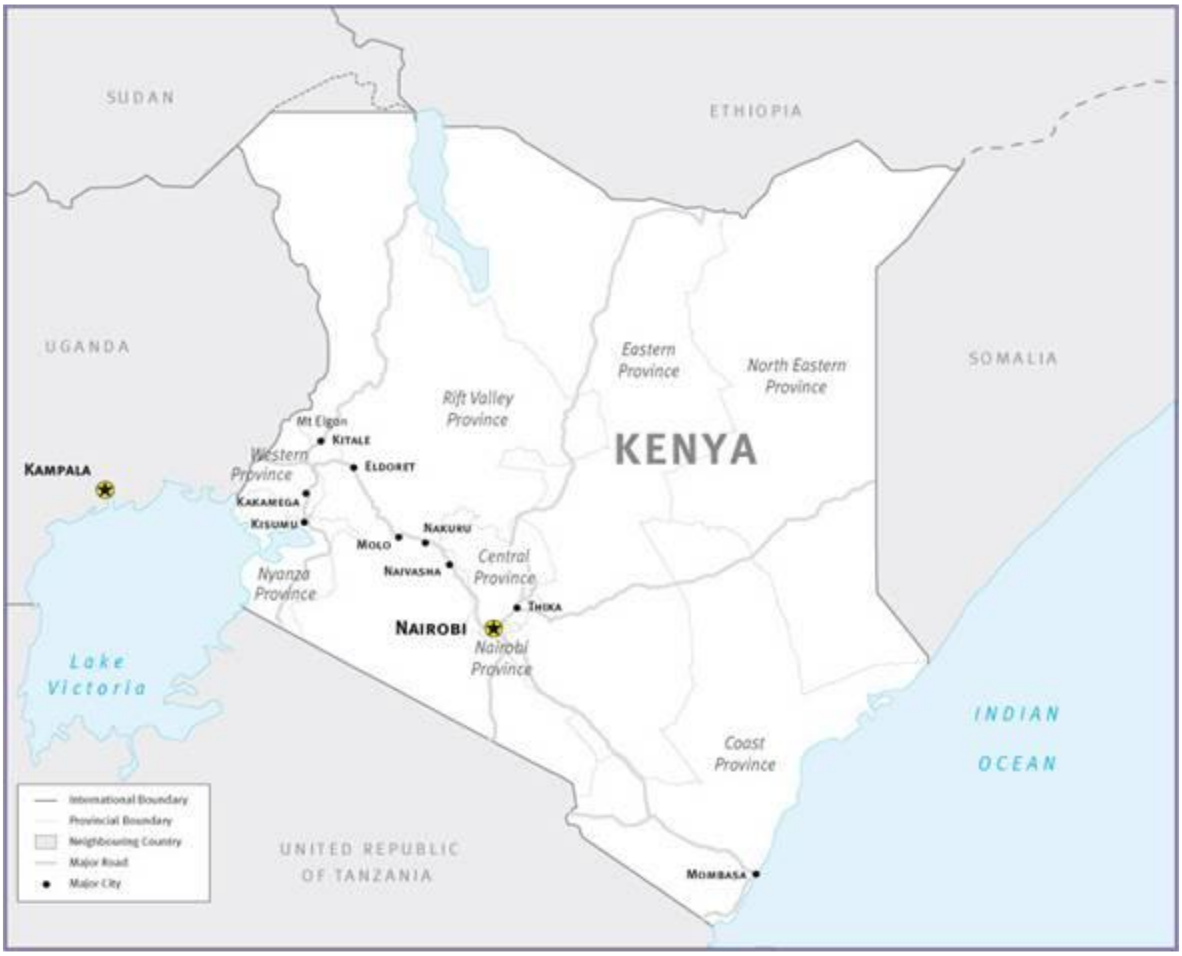


Figure 9. Reference map

Thematic Maps

They show the variation of a topic across a geographical area of weather maps, income map, resource maps etc. The figure shows an example of thematic map of Kenya indicating the distribution of ethnic groups.

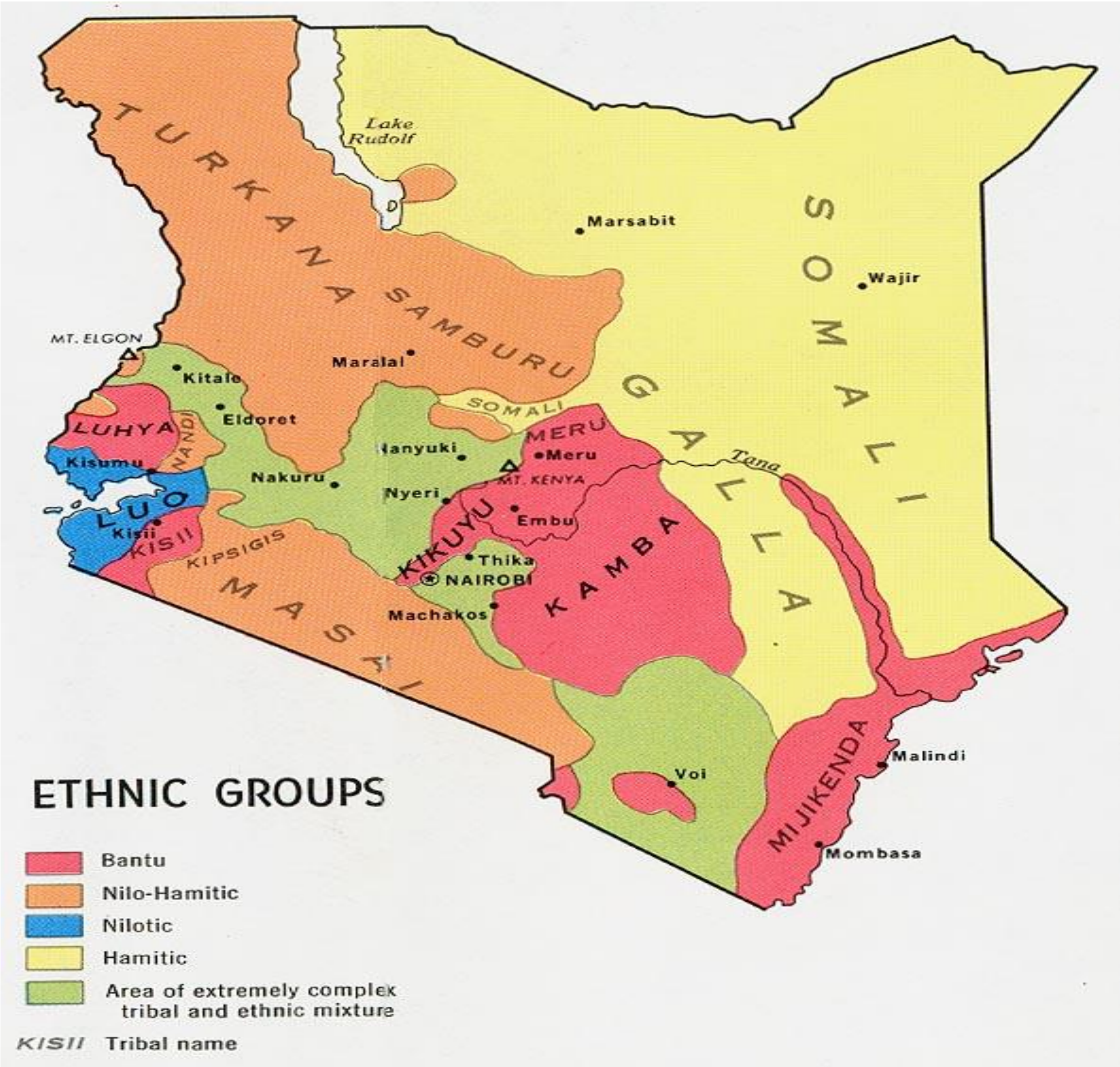


Figure 10. Thematic map

Other types of maps include;

Physical maps; they showing body of water masses, rivers seas etc. land features are colored according to their elevation

Topographical maps; they are like the physical maps where the difference is that they use contour lines instead of colors to show the changes in the landscape.

Road maps, or route map is a map that primarily displays roads and transport links rather than natural geographical information. It is a type of navigational map that commonly includes political boundaries and labels, making it also a type of political map

Interpretation of map

Maps are a 2-D representation of a 3-D world. They are a bird's eye view as if the viewer is flying above the land surface and looking down on it.

They show how objects are distributed and their relative size.

Map reading is the use of maps to gain the information they have to impart. It is an accomplishment that includes a thorough knowledge of the symbols and conventions used and the ability to interpret in terms of actual landscape the facts recorded. The knowledge of the symbols and conventions can be readily obtained by a little study. As a consequence, the map reader must supply many minor details from his general familiarity with map-making procedure and personal acquaintances with natural features.

Example

1. A map that shows the national and state boundaries, and cities is called a?
    a) Physical map
    b) Special map
    c) Population density map
    d) North Pole map
2. ___________shows the four cardinal directions and intermediate directions
    a) Key
    b) Compass rose
    c) Scale
    d) Symbol
3. State the five elements of a map.
4. Landforms such as mountains and volcanos can be found on a _________map.

1.2 Key features of maps are identified

A map usually contains the following elements

i. **Title (and subtitle):** They usually draw attention by virtue of its dominant size; it serves to focus attention on the primary content of the map.
ii. **Key (legend or explanation):** This is the principal reference to the map symbols. The legend describes all unknown or unique map symbols used. It is subordinate to the title.
iii. **Scales:** They provide the leader with important information regarding the linear relations on the map. A scale can be numeric or graphical.
iv. **Credits:** They includes the map source, the author, indication of the reliability of accuracy of the map, dates, or other explanatory materials.

The maps elements stated above are shown in the map given below.

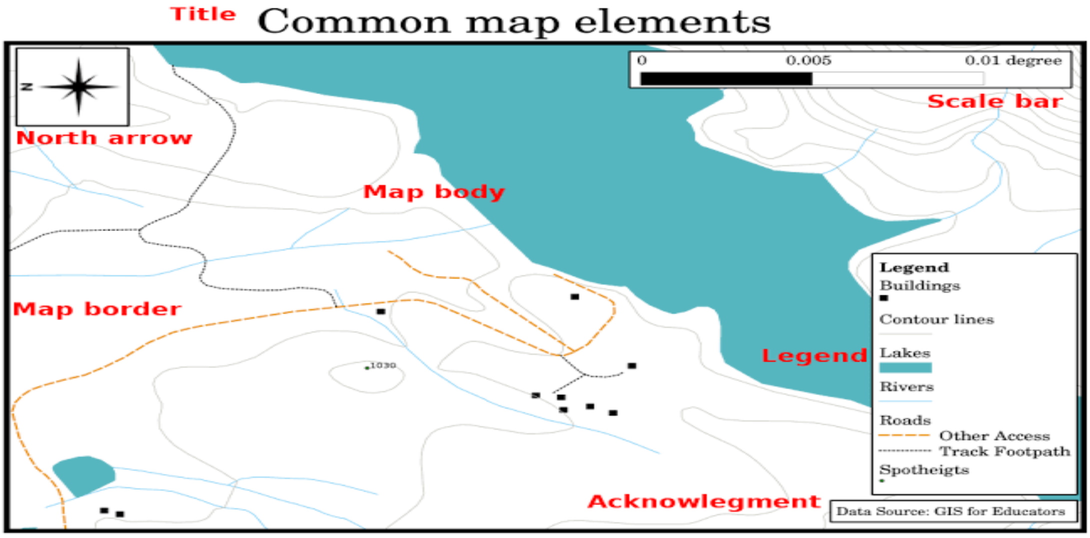


Figure 11. Features of a map

4.3 Scales are identified and interpreted

The scale of a map is the ratio of a distance on the map to the corresponding distance on the ground. There are 3 main ways that scale is indicated on a map;

- Verbal
- Representative fraction (RF)
- Bar scale

The use of scales;

- Use a given scale in conjunction with measurement on a plan/map to determine length.
- Dimension.
- Determine the scale of a map or plan.
- Use a given scale in conjunction with other content or skills to complete a project (e.g. use a given scale to determine the dimension in which to draw a 2-dimensional plan of an object, and the draw the plan)

Reading of maps

The following should be considered when reading maps;

- Identify the labels/names of national roads that must be travelled on to travel between two locations.
- Identify the number of the towns and the routes between two locations.
- Identify the scale of map.
- Identify the position of the two locations on a map and use given distance values on the map to determine the travelling distance between the two locations.
- Interpret a given set of directions and describe what location the directions lead to.
- Provide a set of directions to travel between two locations in a town using street names.

- Use a map in conjunction with a distance chart to determine the shortest route to travel between two locations.
- Estimate travelling times between two or more locations based on estimated travelling speed known or calculated distances.

Reading plan of maps

- Use a given key to identify the number of windows/rooms shown on the plan of the building.
- Identify on which plan a particular structure is shown (e.g. the door is shown on the north elevation plan)
- Measure dimensions on a plan and use a given scale to determine actual distances.

4.4 Scales are applied to calculate actual distances

Maps are very useful for more than just directions. They are used to determine the distances between two or more places. The scales on map can be of different types. The process of calculating actual distance from a map is as follows:

- Use a ruler to measure the distance between two points. If the line is curved, use a string to determine the distance and then measure the string.
- Get the scale for the map you are going to use which is either a ruler bar or written scale.
- If the scale is representative fraction for example (1/1000, 000), multiply the distance of the ruler by the denominator which denotes distance in the ruler units.
- If the scale is a ratio e.g. (1:100,000), you will multiply the map units by the number after the colon.

Any other form of a scale is calculated the same way. Decoding the scale is the key to determining the distance.

A scale of 1:100000 means that the real distance is 100000 times the length of 1 unit on the map of drawing.

Example1:

Write the scale 1 cm to 1 m in ratio form

Solution

1cm to 1m = 1cm: 1m

=1cm: 100cm

=1:100

NOTE: If the scale is 1:x then multiply the map distance by x to calculate the actual distance.

Example2:

A particular map shows a scale of 1:5000 what is the actual distance if the map distance is 8cm?

Solution
Scale = 1:5000 = 1cm: 500cm
Hence; map distance: actual distance = 1: 5000
Map distance is 8cm, let the actual distance be x,
Therefore,
8 = x = 1: 5000
8/x = 1/5000
x/8 = 5000/1 (multiply by 8)
x = 40000.
Hence, the actual distance is 40,000cm
40,000/100 = 400m

4.5 Positions or locations are determined using directional Information

Maps helps use to locate points on the earth's surface using a coordinate system which has both the $X - axis$ and $Y - axis$. The commonly used types of co-ordinate systems are geographical co-ordinates and Cartesian co-ordinate systems. The geographical coordinate system measures location of two points although the two points are described from a 3D surface using the polar axis. The latitude and longitude are used in locating points on earth surface. Latitudes are parallel to the equator and the longitudes are perpendicular to prime meridian. Both the equator and the prime meridian have a designated value0^0. Measurements of longitude are also defined as being either west or east of the prime meridian. Latitude measures the North-South position of location on earth surface.

Parallel of latitudes

They are;

- True east west lines
- Always parallel
- Any two are always equal distance apart

Meridians of longitudes

They are;

- All run in the true north-south direction
- Spaced farthest apart at the equator and converge to a point at the poles
- An infinite number can be created at the poles

The map in the figure below shows the locations of various points on the earth surface using the longitudes and latitudes.

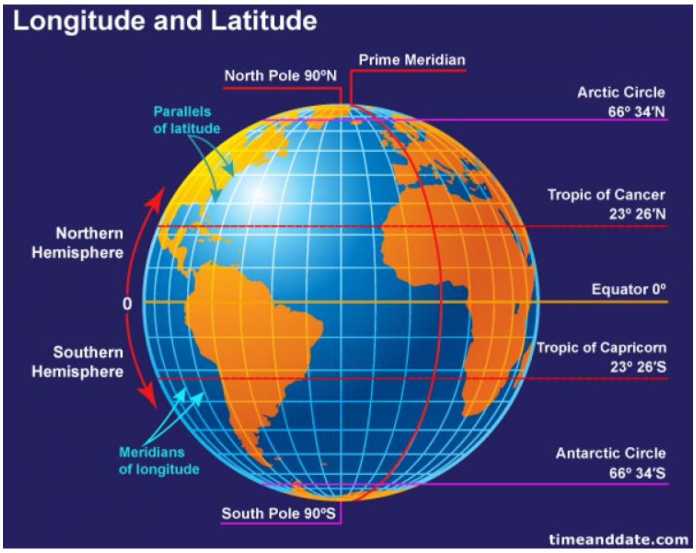


Figure 12. Map showing Longitude and Latitude Source: https://www.pixels.com/featured/world-map

The combination of meridian of longitudes and parallel of latitudes establishes a framework or grid by means of which exact positions can be determined in reference to prime meridian and the equator. A point described as 50^0, 25^0 is located 50^0 of arc north of the equator and 25^0 arch of west of the Greenwich meridian.

Example

1. Which of the following is the correct format for representing the location of a point on the earth surface?
   a) Longitude degrees N or S, Latitude degrees E or W
   b) Latitude degrees N or S, longitude degrees E or W
   c) Latitude degrees E or W, longitude degrees N or S
   d) Longitude degrees E or W, Latitude degrees N or S
2. If a city has location 35^0, 140^0E, which of the following statements is not true about the city?
   a) The city is 35^0 north of the equator
   b) The city is 140^0 east of the prime meridian
   c) The city lies on the equator
   d) The city lies above the equator

4.6 Routes are planned by determining directions and calculating distances, speeds and times

Routes take into account factors such as current traffic and the typical road speed on the requested day and time. The information includes the distance, travel time and a representation of the route geometry. When working with maps one may be required to calculate how long it would take to travel a specific distance at a certain speed. When using the formula involving distance, rate, and time it is essential that you pay attention to the units used in the problem. If the rate in the problem gives miles per hour (mph), then time must be in hours. If the time is given in minutes, divide by sixty to determine the number of hours prior to solving the equation. Distance, speed and time are calculated using the following formulas

- $Distance \ = speed \times time$
- $Time = \frac{Distance}{speed}$
- $speed = \frac{Distance}{time}$

Example

A train travelled 255 miles in 300 minutes. Determine the rate at which the train was traveling.

Solution

Hours=300mins/60=5hours

Rate=$distance/time$ =255/5=51 miles per hour

4.7 Information is gathered and identified and relevant factors related to planning a route checked

Route planning system drastically reduces the time it takes to plan a transport schedule. It also lower mileage and cut on fuel usage and increase customer service. Route planning is used to decide the route to take from one place to another. Consider the problem that you need to go from an office to a particular shop. Here, the office and the shop become the source and the destination respectively. The output of the route planning algorithm is the rout to take, which enlist all the roads and intersections to take to reach the destination from the source. Important factors and relevant to planning a route include;

- Distance to be covered
- Time to be taken
- Equipment for measuring distance and time

4.8 Relevant equipment is select and checked for accuracy and operational effectiveness

Equipment are inspected prior to start up in accordance with work place. Any aspects of e.g. or workplace that are found to be outside manufacturers or workplace specifications are reported to designated person for appropriate action. Equipment and component should be tested after start-up in accordance with manufacture specifications and workplace procedures.

Warning systems are all checked for operation effectiveness. Faults that may affect the safe operation of the equipment are reported to the appropriate personnel for specification. Results of inspection and testing are accurately reported in accordance with regulatory requirements, workplace policy and industry require. Records should be clear, then ambiguous and concisely kept in accordance with workplace policy. Clear reference is made to any items which may affect the future safety of the equipment.

Required Knowledge and Skills

- Operational safety requirement for the equipment concerned.
- Housekeeping standards procedures required in the workplace
- Site and layout and obstacles

Required of equipment operations

Communicate effectively with others when checking and assessing the operational capability of equipment. Read and interpret instructions, procedures, information's labels and signs relevant to the checking and assessing the operational capability of equipment. Interpret and follow operational instructions and prioritize work. Apply precautions and required actions to minimize, control, or eliminate hazards that may exist during work activities. Work may be conducted in;

- A range of work environment
- By day or night

Customers may be:

- Internal or external

Work place may comprise of:

- Large medium or small worksites

Work may be conducted in:

- Limited or restricted spaces
- Exposed conditions
- Control or open environment

4.9 Task is planned and recorded using specialized mathematical language and symbols appropriate for the task

Mathematics is written in a symbolic language that is designed to express mathematical thought. English language is a source of knowledge, but designed for doing mathematics.

Symbolic language.

The symbolic language of mathematics is a special purpose language. It has its own symbols and grammar that is quite different from English.

The vocabulary of Mathematics

The vocabulary mathematics consists of symbolic expression written the way mathematics traditionally writes them. A symbol is a typographical character such as $\lambda, \emptyset, \mu, \infty$. it includes symbols that are specific to mathematics, such as $\forall, \ni, \leq, \leftrightarrow, \beta, \infty$ which are expressions that stands for something.

A symbolic expression consists of symbols arranged according to specific rules.

Symbolic assertion is a complete statement that stands alone as a sentence.

Example, $\pi > 0$, $y > 0, x = 10$

Symbolic Statements

A symbolic statement is a symbolic assertion without variables. It is either true or false

- Example:$\pi r^2 > and\ 3^2 = 9^2$ are true symbolic statements
- π <0 and 2+4=8 are false symbolic statements. The false symbolic statements are also still regarded as symbolic statements.

Languages are ways of transforming information and meaning. Mathematics is a language which is developed using symbols. To study mathematics, it is necessary to understand the language in which the mathematics is written and read.

Conclusion

This learning outcome is based on scale drawing and determining positions, distances, speeds and time at various locations.

Further Reading

Purna Chandra Biswal (2009); *Probability and Statistics*; Prentice-hall Of India Pvt Ltd

Thomas G.B and Finney R.L (2008); *Calculus and Analytical geometry*; Wesley –London

3.3.5.3 Self-Assessment

Written Assessment

1. Calculate the speed of a car that travels 50km in an hour
   a) 50km/hr.
   b) 100km/hr.
   c) 200km/hr.
   d) 25km/hr.
2. A straight line on a d-t graph represents
   a) Slowing down
   b) Constant speed
   c) Speeding up
   d) No movement
3. The correct equation for calculating speed is
   a) v=t/d
   b) v=d×t
   c) v=d/t
   d) None

4. Convert these times in the 12-hour clock to the 24-hour clock
   a) 5.30a.m
   b) 1.40 pm
   c) 7.15p.m

5. A runner took 2 hours and 28 minutes to complete a race. If the ended at 10.15 a.m., when did he begin?
6. One plane leaves Nyeri on a bearing of 100^0, a second plane leaves Nanyuki on a bearing of 144^0. Where do their paths cross?
7. A point on the valley floor is 500m from the foot of a cliff. From the point, the angle of elevation of the top of the cliff is 10^0. How high is the cliff?

Oral Assessment

1. Differentiate between the angle of elevation and angle of depression.
2. Differentiate between latitude and longitude as used in locating a point on the earth surface

3.3.5.4 Tools, Equipment, Supplies and Materials

- Calculators
- Rulers, pencils and Erasers
- Charts with presentation of data
- Graph books
- Dice
- Handheld Global positioning

3.3.5.5 References

J.K BackHouse, S.P.T Houldsworth; *Pure mathematics I*
J.K BackHouse, S.P.T Houldsworth; *Pure mathematics I*
John Bird (2006); *High engineering mathematics;* Elsevier Ltd
Purna Chandra Biswal (2009); *Probability and Statistics;* Prentice-hall Of India Pvt Ltd
Thomas G.B and Finney R.L (2008); *Calculus and Analytical geometry;* Wesley –London

3.3.6 Learning Outcome No 5: Use geometry to draw and construct 2D and 3D shapes for work

3.3.6.1 Learning Activities

Learning Outcome No 5: Use geometry to draw and construct 2D and 3D shapes for work	
Learning Activities	**Special Instructions**
5.1. Identify a range of 2D shapes, 3D shapes and their uses in work contexts. 5.2. Name and describe features of 2D and 3D shapes. 5.3. Identify types of angles in 2D and 3D shapes. 5.4. Estimate and measure angles drawn using geometric instruments. 5.5. Name and identify angle properties of 2D shapes. 5.6. Evaluate unknown angle properties in shapes. 5.7. Apply properties of perpendicular and parallel lines to shapes. 5.8. Demonstrate and understand the use of symmetry. 5.9. Demonstrate and understand the use of similarity 5.10. Identify the workplace tasks and mathematical processes required. 5.11. Draw 2D shapes for work 5.12. Construct 3D shapes for work 5.13. Review and check the outcomes 5.14. Use specialized mathematical language and symbols appropriate for a task.	Individual presentation.

3.3.6.2 Information Sheet No3/LO5: Use geometry to draw and construct 2D and 3D shapes for work

Introduction

The unit deals with the use of geometrical instruments to draw and construct lines, angles, 2D and 3D shapes. It also entails estimation and calculation of angles of two- and three-dimension shapes.

Definition of key terms

Angle: This is the space between two intersecting lines or surfaces at or close to the point where they meet.

Similarity: This is state or fact of being similar.

Symmetry: This is the quality of being made up of exactly similar parts facing each other or around an axis.

Content/Procedures/Methods/Illustrations

5.1 A range of 2D shapes and 3D shapes and their uses in work contexts is identified

Two (2) Dimensional shapes and designs

- Circles
- Square/rectangles
- Triangles
- Parallelogram
- Trapezium
- Pentagon
- Hexagon
- Nonagon
- Octagon
- Rhombus

Three (3) Dimensional shapes and designs includes

- Spheres
- Cubes
- Cylinders
- Prisms
- Triangular prisms

5.2 Features of 2D and 3D shapes are named and described

The features of 2D and 3D shapes are described by the number of faces, edges, vertices. The faces are the flat parts of the shape. The edges are the line where two faces meet. The vertices are the points where two or more edges meet.

Example**-** the 3D shape with 6 faces has 12 edges and vertices. It is very important that we can handle 3D shapes in order to be able to count their faces, edges and vertices so they will help to construct their own 3D shapes from nets in order to find the surface areas.

5.3 Types of angles in 2D and 3D shapes are identified

2D shapes

Angles that make up the 2D shapes include right angled triangles (90°) found in rectangles, squares. Other angles that can be constructed to form 2D shapes include, 30°, 60°, 120°, and 150°.

5.4 Angles are drawn, estimated and measured using geometric instruments

Some of the instrument that are used for measuring angles of 2D and 3D shapes includes

Protractors

This is the most common device to measure angles. It is used to measure small angles and sometimes big ones. It is very useful in construction, engineering and architecture. The protractor which is commonly found in stationery stores is a half-circle with marked degrees from 0° to 180°.

Hand Square

Hand squares and set squares are devices used to measure angles in geometry. They are used for measuring of large angles as they have degrees from 0° to 360°. They are used for construction of stairs, frames and rafters. Framing squares are used for measuring angles as they are usually L-Shaped devices.

Compass

A compass is geometry is a hinged set of arms, where one arm has a pointed end and the other holds a pencil. There are more devices used for measuring angles and they are

- Navigational Plotter
- The sextant
- The theodolite
- Miter saw
- Inclinometer
- Goniometer

5.5 Angle properties of 2D shapes are named and identified

The properties of 2D shapes include details such as its angles and the number of its sides.

Examples

Squares

- All the four angles are the same.
- Opposite sides are parallel and equal.
- Diagonal intersect at 90°.
- Diagonal are equal in length.
- Angles add up to 360°.
- Have four sides.

Others are:

Properties of 2D Shapes

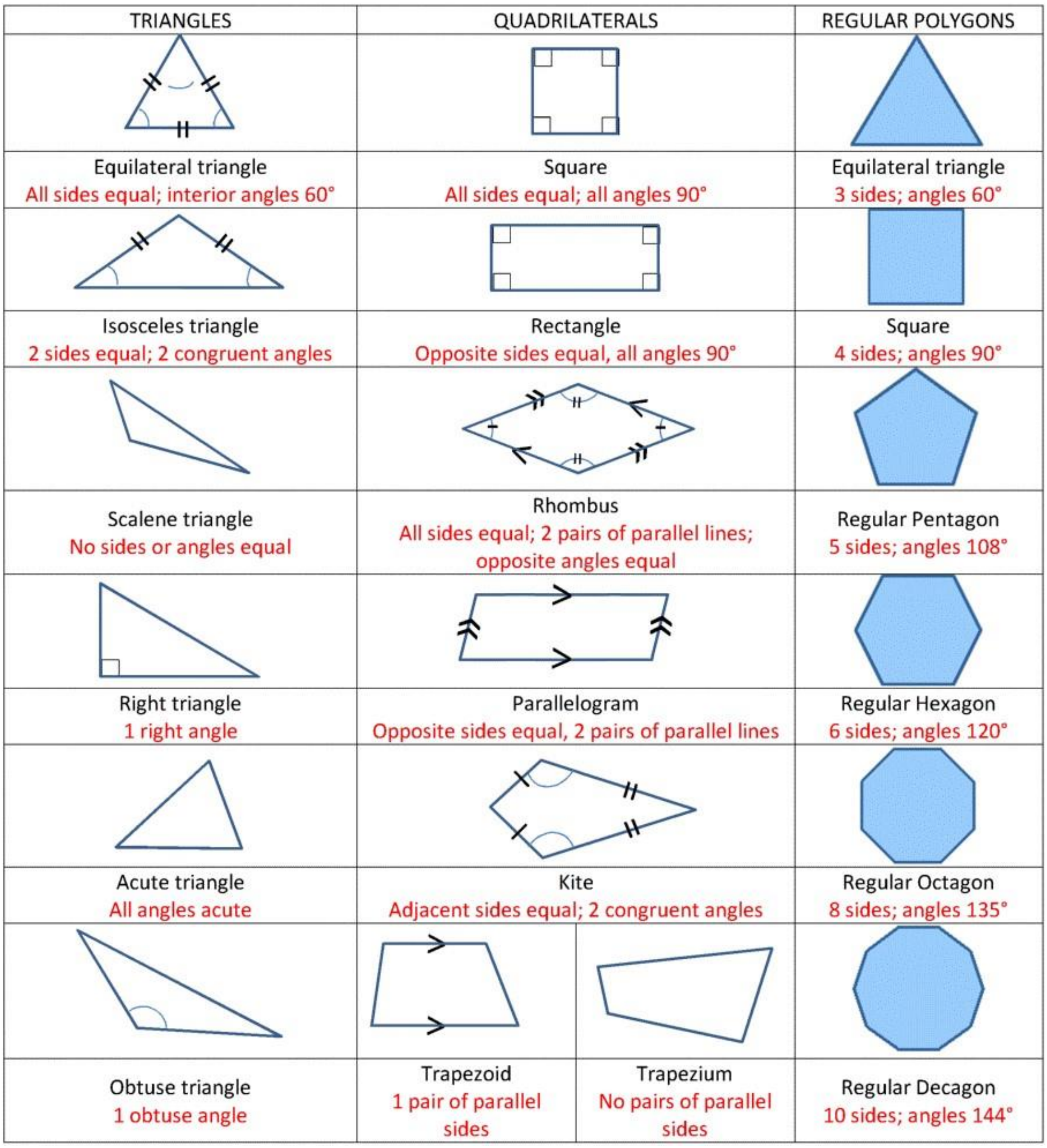


Figure 13. Geometric shapes Source: www.math-salamanda.com

3D shapes

These shapes can be complex as they involve talking about its vertices, faces and edges. The edges of 3D are the lines where 2 faces meet, so a cube has 12 edges. The faces of a cube and a cuboid all meet at 90°. The vertices are the points of a cube where 2 or more edges meet. The edge in a cube or cuboid meets at 90°.

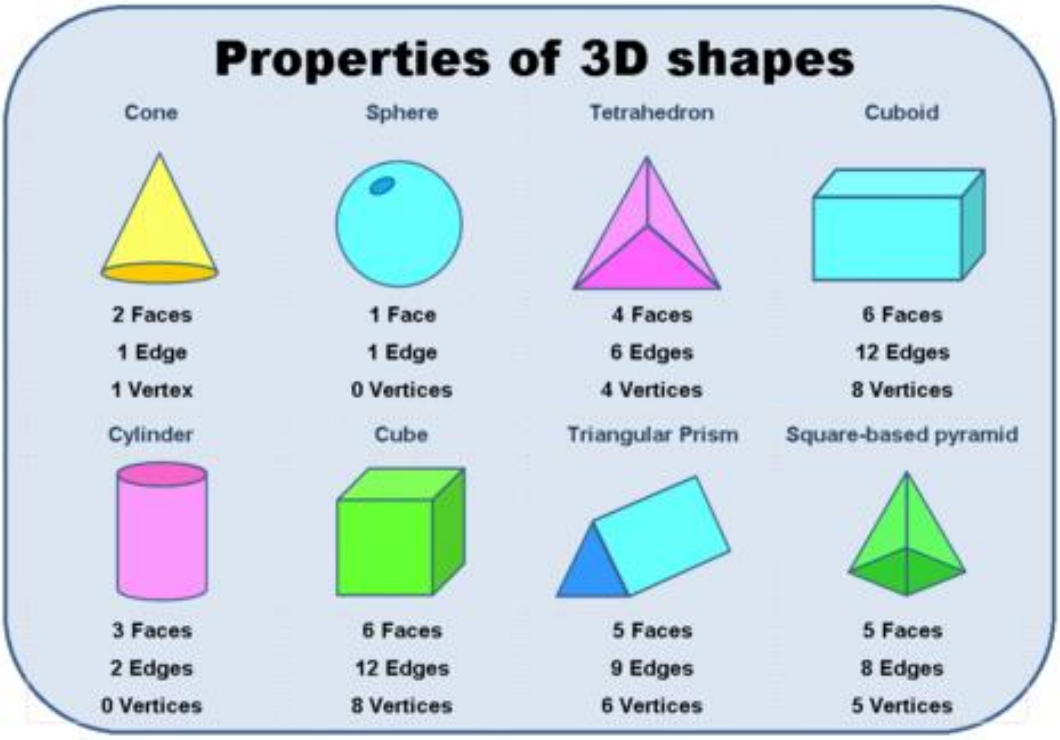


Figure 14. Properties of 3D shapes

5.6 Angle properties are used to evaluate unknown angles in shapes

Unknown angles can be calculated from various shapes if angle properties are known.
E.g. given the a right angled find the value of x. If 50-degree angle is known and the remaining angle being 8x.

$$8x + 50° = 90°$$
$$8x = 40°$$

The missing angle is $8 \times 5 = 40^0$

5.7 Properties of perpendicular and parallel lines are applied to shapes

Two lines are perpendicular if the angle between them is 90°. The perpendicular bisector of a line cuts it in half at 90°. To construct shapes either in 2D or 3D one must know how to construct perpendicular lines. Examples are;

- Construction of a perpendicular line from a given point to a given line
- Construction of a perpendicular at a point on a line
- Construction of perpendicular bisectors of a line
- Construction of parallel lines

Other methods include

- Using a straight edge and compasses.
- Using a set square.

5.8 Understanding and use of symmetry is demonstrated

Symmetry is the quality of being made up of exactly similar parts facing each other around an axis. The role of symmetry in geometry is universally recognized. Scientist regard symmetry breaking to be the process of new pattern formation. Broken symmetry is important because they help in classifying unexpected changes form. Through the process of symmetry breaking new patterns are formed. An object has rotational symmetry if the object can be rotated about a fixed point without changing the overall shape. The figure below illustrates the ideal behind symmetry. Triangle ABC is similar to Triangle AEF. The line $x = 1$ is the line of symmetry.

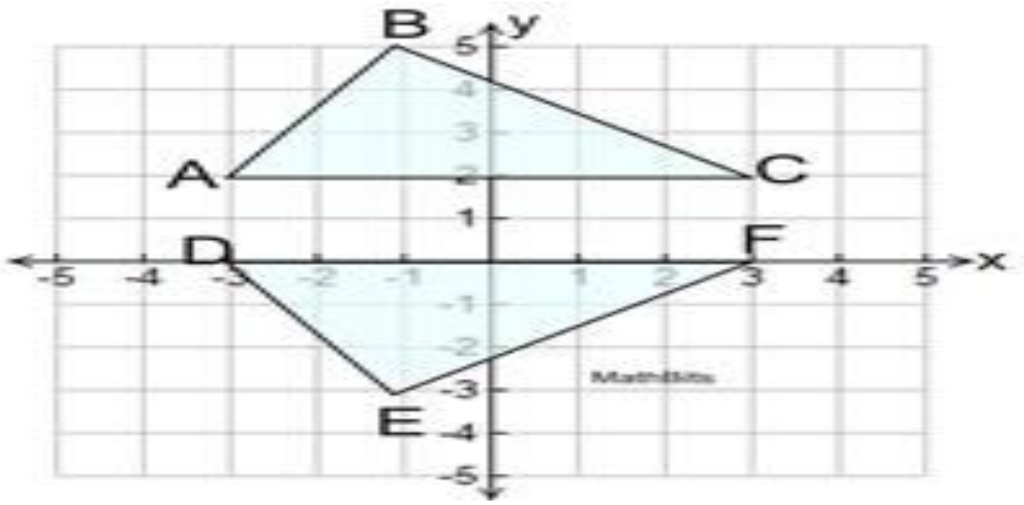


Figure 15. Symmetry demonstration

2D and 3D have different line of symmetry

Square has 4 lines of symmetry
Rectangle has two lines of symmetry
Isosceles triangle has one line of symmetry
Equilateral triangle has three lines of symmetry
Scalene triangle has zero lines of symmetry

1.9 Understanding and use of similarity is demonstrated

The term congruence means that two figures or objects are of the same size and shape. Similarity means that two figures or objects are of the same shape, though not of the same size. Two circles will always be similar because they have the same shape. Triangle ABC and triangle $A'B'C'$ are similar because the corresponding sides and angles are equal.

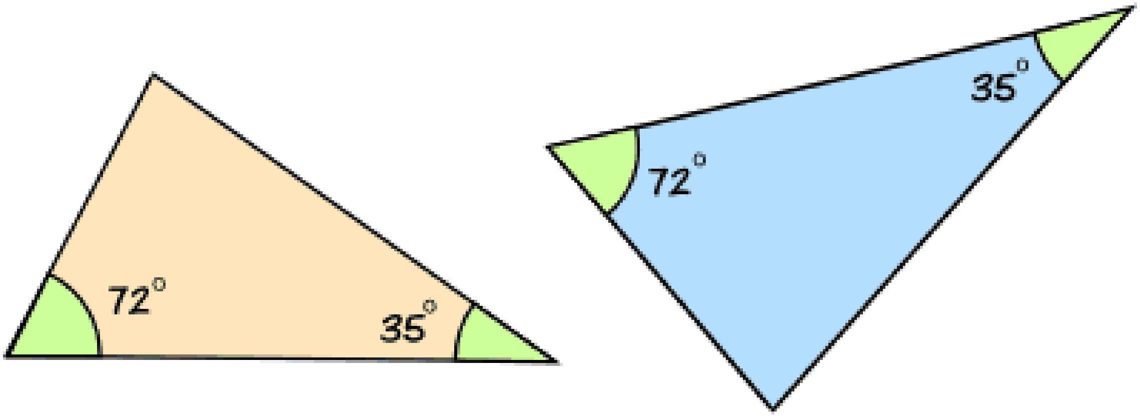
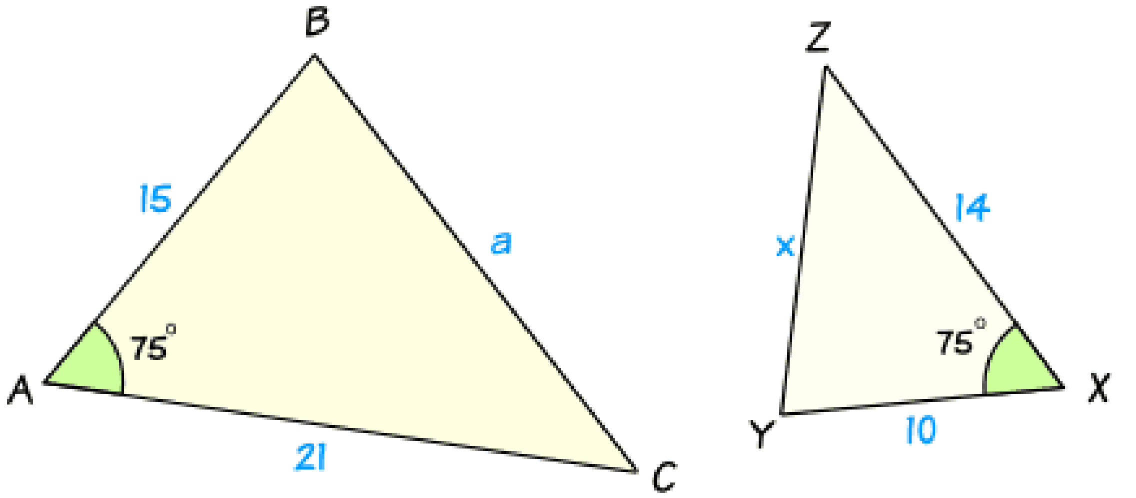


Figure 16. Congruent figures

If the two of their angles are equal, then the third angle must be equal. Angles of a triangle always add to 180^0

In this case, the missing angle is $180^0 – (72^0 + 35^{0)} = 73^0$



In this example we can see that:

- One pair of sides is in the ratio of 21: 14 = 3: 2
- Another pair of sides is in the ratio of 15: 10 = 3 : 2
- There is a matching angle of 75^0 in between them

So, there is enough information to tell us that the two triangles are similar.

5.10 The workplace tasks and mathematical processes required are identified

The task and mathematical estimates required are;

- Carrying out calculations
- Construction of 2D and 3D shapes using mathematical equipment.
- Performing the processes of enlargement, rotation, reflection, using symmetry and similarity.
- Making of nets for various 3D shapes to help calculate surface area.

5.11 2D shapes is drawn for work

Examples are;

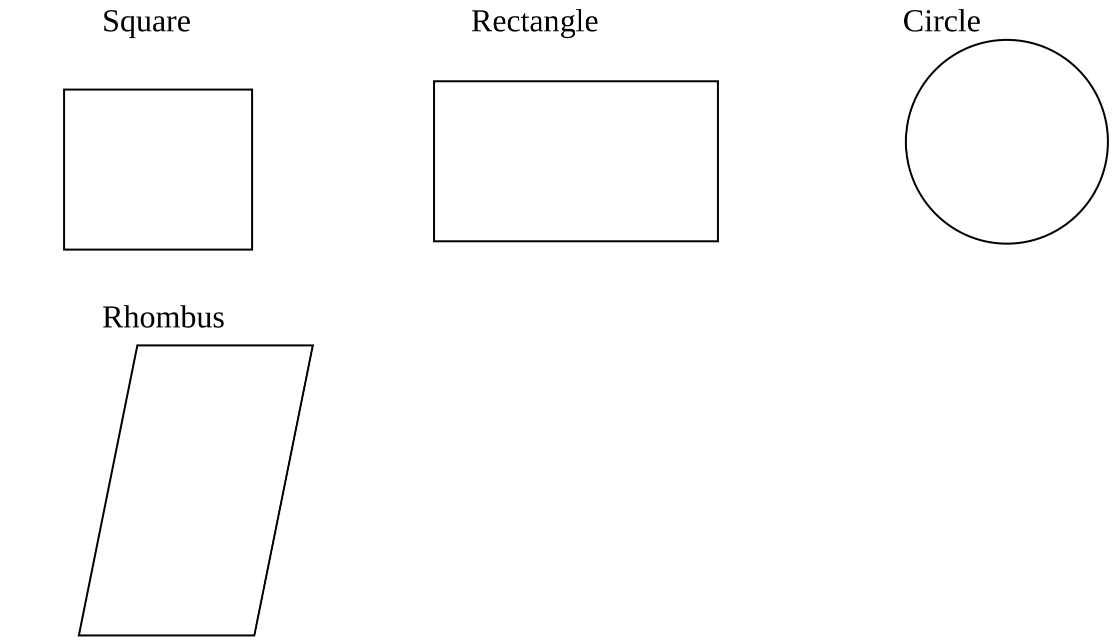
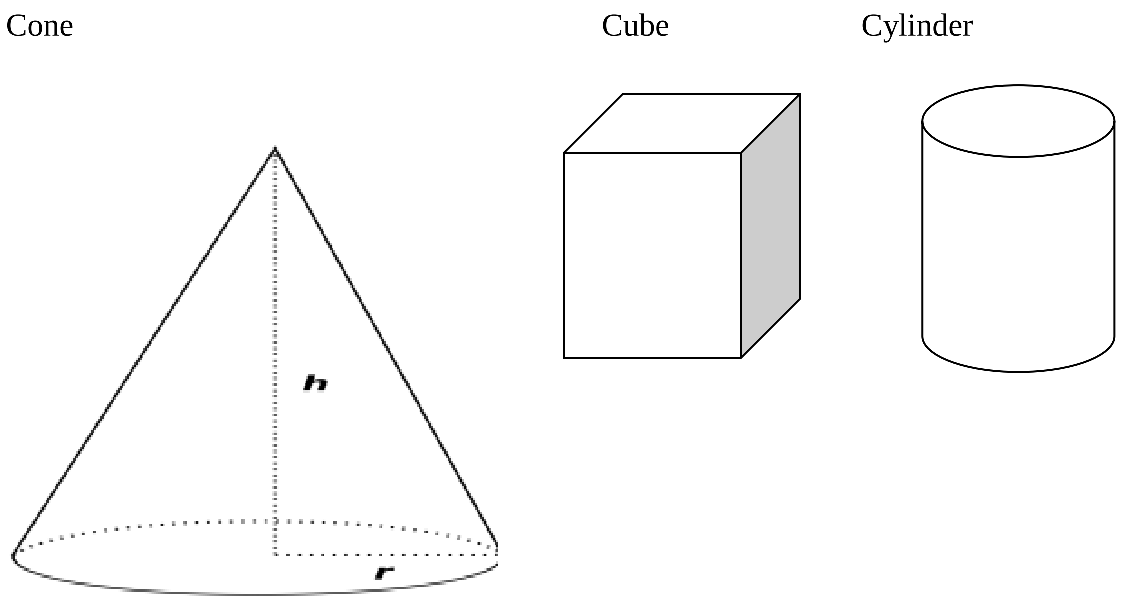


Figure 17. Examples of 2D shapes

5.12 3D shapes are constructed for work



Where h is the height and r is the radius.

Figure 18. Examples of 3D shapes

5.13 The outcomes are reviewed and checked

The construction of 2D and 3D shapes helps in calculating the surface area and volume. Marking he nets of the 3D shapes can help to calculate the surface area and this can help to verify the formulas used for the calculations of these areas

5.14 Specialized mathematical language and symbols appropriate for the task are used

Symbols appropriate for the tasks are used. Mathematics has its own language which is appropriately used to help achieve designed results.
In this learning outcome some of the term used to help achieve the desired tasks are;

- Faces of 2D and 3D shapes
- Vertices
- Edges
- Lines of symmetry
- Nets of solids

Conclusion

This learning outcome is based is based on use of geometry to construct 2D and 3D and to demonstrate the understanding of symmetry and similarity. The construction of is also demonstrated.

Further Reading

Purna Chandra Biswal (2009); *Probability and Statistics;* Prentice hall Of India Pvt Ltd

Thomas G.B and Finney R.L (2008); *Calculus and Analytical geometry;* Wesley –London

3.3.6.3 Self-Assessment

Written Assessment

1. Which three-dimension figure will be created if a rectangle is rotated about one of its lines of symmetry?
   a) Cone
   b) cube
   c) cylinder
   d) triangular prism

2. A right circular cone has a radius of 6 inches and a slant side length of 10 inches. A right cylinder has a radius of 8 inches and a height of 12 inches. How many cones full of water are needed to fill the cylinder
    a) 4
    b) 8
    c) 10
    d) 12
3. Find the magnitude of $\overline{AB}$ where A (-4, -6) and B (1, -3)
    a) $\sqrt{106}$
    b) $\sqrt{90}$
    c) $\sqrt{34}$
    d) $\sqrt{18}$
4. Find the surface area and volume of a cube of side 6cm.
5. A prism is 8cm long and its cross-section is a right-angled triangle with sides 5cm, 12cm and 13cm. Find its surface area?
6. The area of a trapezium is $36m^2$. Its height is 9m and one of the parallel sides is 5m. Find the length of the other parallel side?

Oral Assessment

1. What is a tetrahedron?
2. How many vertices does a triangular prism has?

3.3.6.4 Tools, Equipment, Supplies and Materials

- Calculators
- Rulers, pencils and Erasers
- compass
- Charts with presentation of data
- Graph books
- Dice

3.3.6.5 References

J.K BackHouse, S.P.T Houldsworth; *Pure mathematics I*
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Thomas G.B and Finney R.L (2008); *Calculus and Analytical geometry;* Wesley –London

3.3.7 Learning Outcome No 6: Collect, organize and interpret statistical data

3.3.7.1 Learning Activities

Learning Outcome No 6: Collect, organize and interpret statistical data	
Learning Activities	**Special Instructions**
6.1. Identify workplace issue requiring investigation 6.2. Determine audience, population and sample unit 6.3. Identify data to be collected 6.4. Select data collection method 6.5. Collect and organize appropriate statistical data 6.6. Illustrate data in appropriate formats 6.7. Compare the effectiveness of different types of graphs 6.8. Calculate the summary statistics for collected data 6.9. Interpret the results and findings 6.10. Check data to ensure that it meets the expected results and content 6.11. Extract and interpret results and information from tables, graphs and summary statistics. 6.12. Investigate mathematical language and symbols are used in reporting results	Individual presentation

3.3.7.2 Information Sheet No3/LO6: Collect, organize and interpret statistical data

Introduction

This learning outcome describes the collection, organization, presentation and interpretation of data for making valid decisions. It also looks into methods of selecting a sample from a population as well as errors made during sampling.

Definition of key terms

Data: Is facts and statistics collected together with desired aim to help make conclusions
Population: Is the whole number of people or objects in a given area
Sample: Is a carefully chosen part of the population
Census: This is complete official count of a given population
Sampling: Is the process of selecting a sample from a population

Content/Procedures/Methods/Illustrations

6.1 Workplace issue requiring investigation are identified

Every activity requires data for statistical reasons. The reason why we collect data is

- To get tangible returns.
- To grow existing database.
- Improving of existing products.
- For customer feedback.
- To understand the audience.
- Increase engagement

6.2 Audience / population / sample unit is determined

There are two main measures of a population. This includes

- Population size (the number of individuals)
- Population density: this is the number of individuals per unit area or volume.

A sample is usually used to help get the characteristics of a given population. The reason why a sample is used is because sampling method is cheaper and faster. There are various methods of choosing a sample from a population. These methods are random and non-random.

Random or probability methods are

- Simple random sampling
- Stratified sampling
- Systematic sampling
- Multistage sampling etc.

Non-random methods are

- Judgment sampling
- Quota sampling
- Cluster sampling etc.

6.3 Data to be collected is identified

Data collection is a process of gathering and measuring information on various variables of interest, which enables one to answer stated research question, test of hypothesis concerning a certain situation. Data can be classified according to the different measurement scales. They are:

a) Nominal data

This is data which has been measured at the weakest and lowest level of measurements. Such a level entails a classification of data qualitatively or by name (hence the term nominal). If you observe a group of students in a college, they fall in two categories, male or female. We cannot add or subtract if no numbers have been assigned to them. If this data has not been coded in a personal file and be available to computer programming, one might use numeral zero (0) to represent one (1) to represent married people.

b) Ordinal data

This type of data is acquired in a way that categorizes it, so that each category has a known or specific relationship to every other category. There are some underlying dimensions with respect to the quality of each data category. Like ranking of data along a specific scale. Measure like big, bigger, and biggest or disagree strongly, disagree neutral, agree, agree strongly.

Other examples of Ordinal classifications are like secretary grade 1, secretary grade 2, secretary grade 3 etc.

c) Interval data

This kind of data is acquired through a process of measurement where equal measuring units are employed. The movement in magnitude between one measure to the one above it or below is identical in the subject population under consideration. In interval data, the quantity zero exists in theory but does not matter in practice. E.g., zero degrees Fahrenheit does not represent the complete absence of temperature.eg consider the Fahrenheit the scale of temperature. The difference between 30 degrees and 40 degrees represent the same temperature difference as the difference between 80 degrees and 90 degrees. This is because each 10 degrees interval has the same physical meaning.

d) Ratio data

Ratio data have all the characteristics of interval data. The zero position indicates the absence of the quality being measured. The Fahrenheit scale for temperature has an arbitrary zero point and is therefore not a ratio scale. However, zero on Kelvin scale is absolute zero hence a ratio scale.

6.4 Data collection method is selected

There are various data collection methods. They are categorized into either for collecting primary or secondary data. Primary data is data which is collected for the first time by the investigator. There are various methods of collecting primary data. They include;

- Observation
- Interviews
- Questionnaires
- Sampling etc.

6.5 Appropriate statistical data is collected and organized

Large amounts of data normally should be summarized. In preparation for the summarization, it is often useful to distribute the data into groups or classes or categories and then determine the number of individuals belonging to each group, class or category. Such a number is called the **class frequency**. If the data is arranged in classes together with the corresponding class frequency for each class in a table, we call such a frequency distribution or frequency table.

6.6 Data is illustrated in appropriate formats

Data can be presented in tables. Tables are the formats in which most numerical data are initially stored and analyses. Other method in which data is represented are;

- Bar graphs
- Line graph
- Pie chart
- Histogram (frequency polygon)
- The stem and leaf plot

The stem and leaf plot

This is a method of representing data which was devised by Turkey in 1977 and it involves three essential steps.

i. Find the range of the given data.
ii. Choose an appropriate class width.
iii. Make a new table which looks like a histogram, but which preserves the original data.

6.7 The effectiveness of different types of graphs are compared

There were times when data was limited and thus data presentation was also limited. Currently there is massive data and thus there are numerous methods of presenting data.

Tables are the best way to present data for reference purposes and can include very complex information. This type of information can be presented clearly by using an appropriate label and displaying the data in suitable groups. Bar graphs are good for comparisons, while line charts are good for relationships and distributions.

Pie charts are only used for simple compositions but cannot be used for comparisons or distributions.

Data is best presented in a consolidate manner and thus helps leaders to get an overview of most of the important findings of your work without having to go through the entire manuscript. Visuals are introduced to present data due to clarity. Therefore, various types of graphs for data presentation are used for comparing different set off data.

6.8 The summary statistics for collected data is calculated

Summary statistics for data is calculated by use of measures of central tendency and measures of dispersion. Measures of central tendency include;

i. **Arithmetic mean**

Given the set of numbers $x_1, x_2, \ldots, x_n$ the mean which is dented by $\bar{X}$ is defined by

$$\frac{X_1 + \cdots + X_n}{n} = \frac{\sum x_i}{n}$$

However if the numbers $x_1, x_2, \ldots, x_n$ occur with frequencies $f_1, f_2, \ldots, f_n$ then the mean is given by $\bar{X} = \frac{\sum f_i x_i}{\sum f_i}$

ii. **Mode**

This is an observation which occurs more times than any other observation.

iii. **Median**

If a set of data is arranged in ascending or descending order the median is the middle number if the number of observations is old.

Measures of dispersion

This measures the extent to which a set of data spread about an average are the mean. There are various measures of dispersion.

i. **Range**

This is the difference between the largest and the smallest values in each data

ii. **Mean Absolute Deviation (Mad)**

The sum of the deviation is zero. Since the total of the deviation is zero the mean of the absolute deviation is the one that is used as a measure of dispersion.

$$MAD = \frac{\sum |X_i - \bar{x}|}{n}$$

iii. **Inter Quartile Range**

This is the difference between 3rd quartile and 1st quartile

$Q_3 - Q_1$

iv. **Semi-interquartile range**

This is given by $\frac{1}{2}(Q_3 - Q_1)$

v. **Coefficient of Quartile Deviation**

A relative measure of dispersion based on the quartile deviation is called the coefficient of quartile deviation. It is defined as

Coefficient of Quartile Deviation

Coefficient of quartile deviation$=\frac{\frac{Q_3-Q_1}{2}}{\frac{Q_3+Q_1}{2}} = \frac{Q_3-Q_1}{Q_3+Q_1}$

It is pure number free of any units of measurement. It can be used for comparing the dispersion

vi. Variance

The variance of a set of data is given by

$$\sigma^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}$$

and the standard deviation is the square root of variance.

$$\sigma^2 = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}}$$

For data with frequencies the variance is given by

$\sigma^2 = \frac{\sum_{i=1}^{n} f_i(x_i - \bar{x})^2}{\sum f_i}$ or $\sigma^2 = \frac{\sum f_i x_i^2}{\sum f_i} - \left(\frac{\sum f_i x_i}{\sum f_i}\right)^2$

6.9 The results / findings are interpreted

Data interpretation refers to the implementation of processes through which data is reviewed for the purpose of arriving at an information conclusion. The information of data assigns a meaning to the information analyzed and determines it significance and implications.

Analysis involves estimating the values of unknown parameters of the population and testing of hypothesis for drawing inferences.

6.10 Data is checked to ensure that it meets the expected results and content

To check whether the data meet the expected results and content, the following should be considered;

a) **Error**: This is the collective noun for any departure of the results from the true value. Analytical error can be;
   - Random or unpredicted
   - Systematic or predicted
   - Constant
   - proportional

b) **Accuracy:** This is the trueness or closeness of analytical result to the value

c) **Precision:** The closeness with which results of replicate analyses of a sample agree

d) **Bias:** The consistent deviation of analytical results from the true value caused by systematic errors in a procedure

6.11 Information from the results including tables, graphs and summary statistics is extracted and interpreted

When data is presented on all forms of data presentations, information can be extracted from these forms. Some of the information that can be extracted is the measures of central tendency (mean, mode, variance etc.). Other measures that can be extracted are measures of dispersion which includes (range, quartiles, etc.)

6.12 Mathematical language and symbols are used to report results of investigation

Statistics has become the universal language of the sciences and data analysis which leads to powerful results. There is a wide variety of symbols used in statistics. The Greek letters are usually used. Some of these are

- Σ summation
- μ population mean
- β beta
- σ standard deviation
- π product

Conclusion

This learning outcome is based collection, organization, summarization, and presentation of data to make varied decisions and conclusions.

Further Reading

Purna Chandra Biswal (2009); *Probability and Statistics;* Prentice-hall Of India Pvt Ltd

Thomas G.B and Finney R.L (2008); *Calculus and Analytical geometry;* Wesley –London

3.3.7.3 Self-Assessment

Written Assessment

1. A numerical value used as a summary measure for a sample, such a sample mean is known as?
    a) Population parameter
    b) Sample parameter
    c) Population means
    d) Sample statistics
2. Mμ is an example of
    a) Population parameter
    b) Sample statistics
    c) Population variance
    d) Mode

3. The sum of percentages frequencies for all classes will always equal to
    a) One
    b) the number of classes
    c) the number of items in the study
    d) 100
4. Consider the table below

0-9	10-19	20-29	30-39
40	50	70	40

What is the class size for this distribution?
    a) 9
    b) 10
    c) 11
    d) Varies from class to class
5. The difference between the largest and the smallest value is the?
    a) Variance
    b) Interquartile range
    c) Range
    d) Coefficient of variation
6. The age of distribution of 70 workers in a factory is given below.

Ages (years)	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55
Frequency	2	10	12	X	10	8	2	3

    i. Find the value of X.
    ii. Calculate the mode, median and quartile deviation of the above data
7. For a throw of a fair tetrahedron die with its faces marked 1,2,3,4 respectively, the score X represents the number of the face which lands on the floor. Find $\boldsymbol{E}\ (\boldsymbol{X})$and variance of x
8. The median and standard deviation of 50 observations are 25 and 6 respectively. Find the second Pearson measure of skewness if the sum of the observations is 900. Comment on your answer.
9. The expenditure of 100 persons is given below

Expenditure ($)	0-10	10-20	20-30	30-40	40-50
Number of persons	14	f_1	27	f_2	15

The mode of the distribution is 24. Show that;
    i. The values of f_1 and f_2 are 23 and 21 respectively.
    ii. Obtain the median of the distribution.

Oral Assessment
1. State four primary data collection methods
2. Differentiate between a sample and a population.

Practical Assessment

Correct statistic data of mathematics trainee attendance in your class, organize, analyze, and present it in an orderly manner.

3.3.7.4 Tools, Equipment, Supplies and Materials

- Calculators
- Rulers, pencils and Erasers
- Charts with presentation of data
- Graph books
- Dice

3.3.7.5 References

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3.3.8 Learning Outcome No 7: Use routine formula and algebraic expressions for work

3.3.8.1 Learning Activities

Learning Outcome No 7: Use routine formula and algebraic expressions for work	
Learning Activities	**Special Instructions**
7.1. Demonstrate the understanding of informal and symbolic notation, representation and conventions of algebraic expressions 7.2. Develop simple algebraic expressions and equations 7.3. Operate on algebraic expressions 7.4. Simplify algebraic expressions 7.5. Do substitution of simple routine equations 7.6. Identify and comprehend routine formulas used for work tasks 7.7. Evaluate routine formulas by substitution 7.8. Transpose routine formulas 7.9. Identify and use appropriate formulas for work related tasks 7.10. Check and use outcomes of calculated result	• Individual presentation/ Assignment • Group work

3.3.8.2 INFORMATION SHEET No.3 /LO7: Use routine formula and algebraic expressions for work

Introduction

The learning outcome covers the use of routine formula and algebraic expressions for work. It entails understanding of informal and symbolic notation, representation and conventions of algebraic expressions. In addition, it also involves operations on algebraic expression by substituting and simplification of the algebraic expressions.

Definition of key terms

Formula: This is a mathematical relationship or symbols expressed as a rule.

Linear equation: Refers to an equation between two variables that gives a straight line when plotted on a graph.

Content/Procedures/Methods/Illustrations

7.1 **Informal and symbolic notations of algebraic expressions**

Special notations are used in algebra which is a critical aspect. Symbols, also known as variables, are used to represent numbers. Variables are represented by letters such as a and b or x, y, z. Special symbols such as =, ≥, ≤ among others are used to denote relationships. Other symbols are used to denote the familiar arithmetic operations: + for addition; -for subtraction; or x for multiplication; ÷ for division; and for positive square root. Superscripts such as the 2 in x^2, are used to denote repeated multiplications. For example (x^2 is a shorthand for$x.x$, and x^3 is a shorthand for$x.x.x$). The symbol π is used to represent the special number 3. 142. Thus algebra is full of expressions such as

$$3 \times 2 + 2\mathrm{x} + 4$$

$$\frac{a+b}{2}$$

$$a + c$$

And equations (pairs of expressions separated by an equality sign, (=)

$$y = 2x^3 + 2x + 7$$

$$mn = \mathrm{nm}$$

$$(x+a)(x-a) = x^2 - a^2$$

$$\mathrm{A} = r^2$$

7.2 Simple algebraic expressions

In algebra, just like arithmetic, numbers are used as symbols for values and quantities but in case where numbers are unknown, we use letters to represent them. For example, when we say that a teacher went to class with 5 books, we know the exact number of books he/she had. Suppose we say that the teacher went to class with x books. What does x represent? The letter p can represent a number.

Examples

1. Geoffrey had k books and John had g books. How many books did the two have?

Solution: Total number books equals (k + g) books.

2. John had q mangoes and divided from equally among his t children. How many mangoes did each child get?

Solution: There are q mangoes, and there are t children, each child got $\frac{q}{t}$ mangoes.

Note that you should state what the letters represent when you form an algebraic expression from a mathematical problem. You can choose any letter except the letter o. This is because this letter can be mistaken for the number 0.

7.3 Operations on algebraic expression

Subtraction and Addition

In addition, or subtraction is done by checking the like terms. Like terms refers to same variables or variables raised in the same power.

Example 1: $x + 3x + 5y - 2 + 5$

Group all the similar terms

$$x + 3x + 5y - 2 + 5$$

Combine all like terms and same variables.

$$x + 3x + 5y - 2 + 5$$

$$4x + 5y + 3$$

Example2: $5x + x^2 - 3x + 5$

Group all similar terms

$$5x + x^2 - 3x + 5$$

Combine like terms

$$x^2 + 5x - 3x + 5$$

$$x^2 + 2x + 5$$

Observe that x^2 is not added to$2x$.

x^2Is in second degree while $2x$ is not. They are same variable but different degree.

Multiplication of algebraic Expression

Multiplying an algebraic expression involves distributive property and index law.

Example 1: 5 multiplied to x equals 5x.

Example 2: $x(x - 1)$

$$x(x - 1)$$

x(x) + x (1) $\times$ $(x) - x(1)$

$$x^2 + x$$

Example 3: $(x-2)^2$
$(x-2)^2$ This equation means that (x – 2) is multiplied with (x – 2)

$$(x-2)(x-2)$$

$$x(X)+x(-2)-2(x)-2(-2)$$

x^2 – 2x – 2x + 4

x^2 – 4x + 4

Division of algebraic expression

Example: $30a^3 3b^2$ divided by $5a^2 2b^3$

$$\frac{30a^3 3b^2}{5a^2 2b^3}$$

$$\frac{30aaabb}{5aabbb}$$

Divide the constant to obtain 6ab

7.4 Simplifying algebraic expression
Simplification of an algebraic expression means writing it in the most efficient manner, without changing the value of the expression. This mainly involves collecting like terms. The rule here is that only like terms can be added together.

Like (or similar) terms
Like terms are those terms which contain the same powers of same variables.
Examples of like terms:

$3x$, $6x$, and $-4x$
$3yx^2$, $-6yx^2$
$8xy^2$, $5y^2 x$, and $3xy^2$
Examples of unlike terms
Xy^2 and $x^2 y$
2x+3y

Combining like terms

$$3x^2+5x^2=(3+5)x^2=8x^2$$

Distributive law was used in reverse we undistributed a common factor of x^2 from each term.
Example: $x^2 + 2x + 3x^2 + 2 + 4x + 7$

Starting with the highest power of x, we see that there are four x-squared in all ($1x^2 + 3x^2$).

Then we collect the first powers of x and see that there are six of them ($2x + 4x$).

The only thing left is the constants 2 + 7 = 9. Putting this all together we get

$x^2 + 2x + 3x^2 + 2 + 4x + 7$

$= 4x^2 + 6x + 9$

Parentheses

Parentheses must be multiplied out before collecting like terms**.** If there is some factor multiplying the parentheses, then the only way to get rid of the parentheses is to multiply using the distributive law.

Example: $3x + 2(x – 4)$

$3x + 2x – 8$

$= 5x – 8$

7.5 Substitution into simple routine equations

Examples

When x=2,
What is $10/x + 4$?
Replace 2 where x is:
10/2 + 4 = 5 + 4 = 9

When x=5,
What is $x + x/2$?
Replace 5 where x is:
5 + 5/2 = 5 + 2.5 = 7.5

If x=3 and y=4,
What is $x^2 + x$y?
Replace 3 where x is, and 4 where y is:
$3^2 + 3×4 = 3×3 + 12 = 21$

If x=3
What is $x^2 + x$y?
Replace 3 where x is:
32 + 3y = 9 + 3

7.6 Linear equation

A linear equation looks like any other equation. It is made up of two expressions set equal. A linear equation is special because:

- It has one or two variables (x and y).
- No variable in a linear equation is raised to a power greater than 1 or used as the denominator of a fraction.
- When you find pairs of values that make the linear equation true and plot those pairs on a coordinate grid, all the points for any one equation lie on the same line. Linear equations graph as straight lines.

A linear equation in two variables describes a relationship in which the value of one of the variables depends on the value of the other variable. In a linear equation in x and y, x is called x is the independent variable and y depends on it. We call "y" the dependent variable. When you assign a value to the independent variable, x, you can compute the value of the dependent variable, "y". You can then plot the points named by each (x, y) pair on a coordinate grid.

7.7 Slope

Slope is how steep the line is with respect to the *y* axis.

Procedures for plotting a straight line

Pick any two points on the line.

Find how fast *y* is changing, subtract the *y* value of the second point from the *y* value of the first point ($y_2 - y_1$).

Find how fast *x* is changing, subtract the *x* value of the second point from the *x* value of the first point ($x_2 - x_1$).

Find the rate at which *y* is changing with respect to the change in *x*, write your results as a ratio: ($y_2 - y_1$)/ ($x_2 - x_1$).

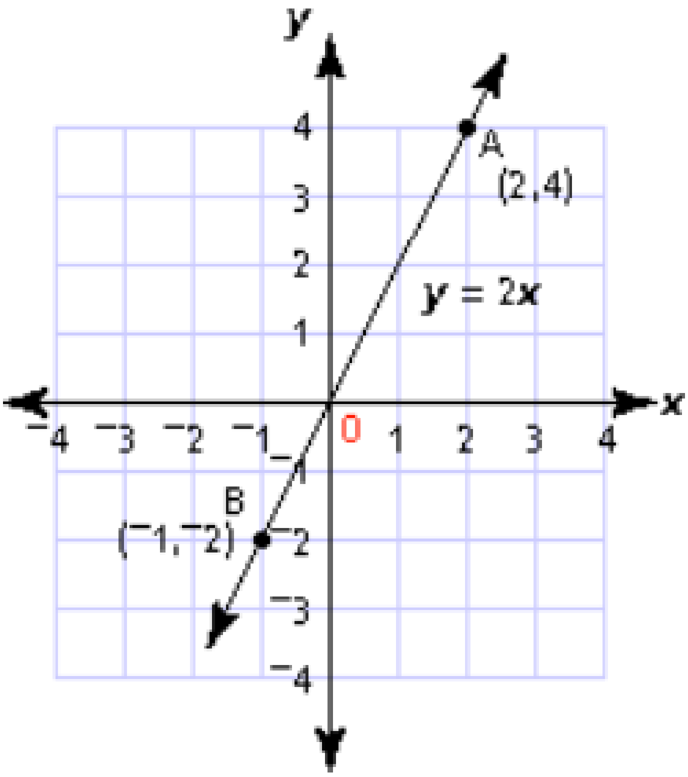

Figure 19. Plotting a straight line

If we designate Point *A* as the first point and Point *B* as the second point, the slope of the line is (- 2 – 4)/ (- 1 – 2) = -6/-3. Or 2.

If we designate Point *B* as the first point and Point *A* as the second point, the value of the slope is the same: (4 – -2)/(2 – -1) = 6/3, or 2. The value is constant along the line and if you pick different other points will give u same result. The number obtained is a gradient.

7.8 Intercept form

The slope-intercept form of a linear equation is $y = mx + b$.

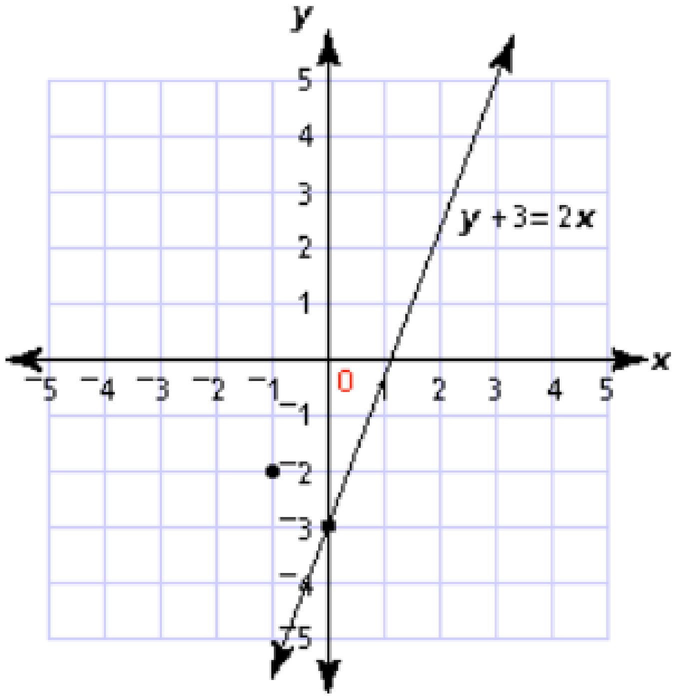

Figure 20. Slope-intercept form of a linear equation

In the equation, x and y are the variables. The numbers m and b give the slope of the line (m) and the value of y when x is 0 (b).

The value of y when x is 0 is called the y-intercept because (0, y) is the point at which the line crosses the y axis.

You can draw the line for an equation in this form by plotting $(0, b)$, then using m to find another point. For example, if m is 1/2, count +2 on the x axis, then +1 on the y axis to get to another point (1, b + 2)

The equation for this line is $y + 3 = 2x$. In slope-intercept form, the equation is $y = 2x – 3$. You can see that the slope m = 2 and the slope really is 2 since for every positive2 change in y, there is a positive1 change in x.

Now look at b in the equation: -3 should be the y value where x = 0 and it is.

7.9 Zero Slope

When there is no change in y as x changes, the graph of the line is horizontal. A horizontal line has a slope of zero.

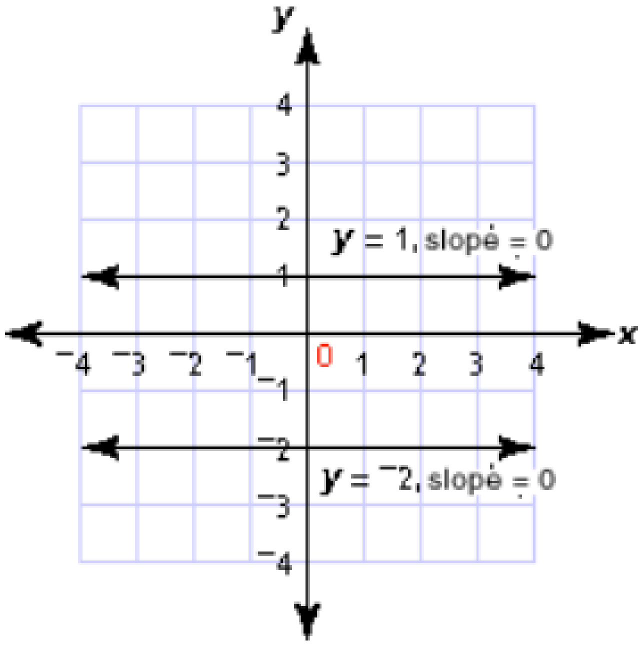

Figure 21. Zero slope

7.10 Undefined Slope

When there is no change in *x* as *y* changes, the graph of the line is vertical. You could not compute the slope of this line, because you would need to divide by 0. These lines have undefined slope.

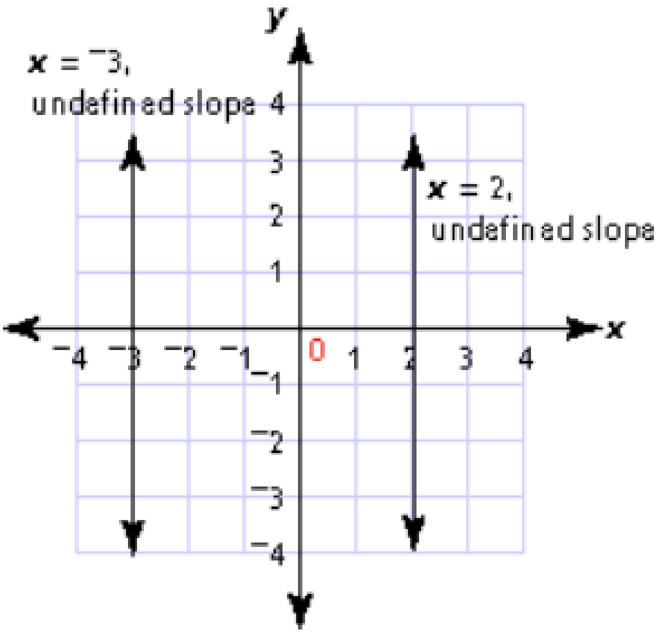

Figure 22. Undefined slope

Conclusion

This unit deals with forming, simplifying and solving for the unknowns in a given equation. The unit also deals with solving linear equation.

Further Reading

McNeil, N. M., Weinberg, A., Hattikudur, S., Stephens, A. C., Asquith, P., Knuth, E. J., &Alibali, M. W. (2010). *A is for apple: Mnemonic symbols hinder the interpretation of algebraic expressions. Journal of Educational Psychology*, *102*(3), 625.

3.3.8.3 Self-Assessment

Written Assessment

1. If x=–3, what is the value of $2x$−1x+1?
    a) −4
    b) −2
    c) 2
    d) 323
2. Which of the following is equivalent to 3a+4b− (−6a−3b)?
    a) 16ab
    b) –3a+b
    c) –3a+7b
    d) 9a+b
    e) 9a+7b
3. If 2(x−5) =−11, then x=?
    a) −212
    b) −8
    c) −112
    d) −3
    e) −0.5
4. What is the slope of the line with the equation 2x+3y+6=0?
    a) −6
    b) −3
    c) −2
    d) −23
    e) 23
5. For all x≠–4, which of the following is equivalent to the expression below?

$$\frac{x^2+12x+3}{x+4}$$

    a) x+3
    b) x+8
    c) x+11
    d) x+16
    e) x+28
6. What is a linear equation?
7. Provide three characteristics of a linear equation
8. Using a graph paper, draw a line y=x

3.3.8.4 Tools, Equipment, Supplies and Materials

- Calculators
- Graph books
- Group discussions
- Practical examples

3.3.8.5 References

Chalouh, L. and Herscovics, N., 1988. *4Teaching Algebraic Expressions in a Meaningful Way*.

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Tirosh, D., Even, R., & Robinson, N. (1998). Simplifying algebraic expressions: Teacher awareness and teaching approaches. *Educational studies in mathematics*, *35*(1), 51-64.

3.3.9 Learning Outcome No 8: Use Common functions of a scientific calculator for work

3.3.9.1Learning Activities

Learning Outcome No 8: Use Common functions of a scientific calculator for work	
Learning Activities	**Special Instructions**
8.1. Locate required numerical information to perform tasks 8.2. Determine the order of operations and function keys necessary to solve mathematical calculations 8.3. Identify and use function keys on a scientific calculator 8.4. Estimations are referred to check reasonableness of problem-solving process 8.5. Appropriate mathematical language, symbols and conventions are used to report results	• Individual assignment • Group work

3.3.9.2 Information Sheet No.3 /LO8: Apply a wide range of mathematic calculations for work

Introduction

The learning outcome covers the common functions of a scientific calculator for work. It entails locating the required numerical information to perform tasks, determining the order of operations and functions of keys necessary to solve mathematical calculation, identifying and using function keys on a scientific calculator, and reporting results using appropriate mathematical language, symbols and conventions.

Definition of key terms

Calculator: It is an electronic gadget that is portable and typically used to perform calculations ranging from basic arithmetic to complex mathematics.

Numerical: Refers to expressions involving numbers or associated with numbers.

Problem solving: This is a process of trying to find solution to a problem through working in depth to extract details to steer towards getting a better solution.

Content/Procedures/Methods/Illustrations

8.1 Numerical information

Numerical information is what can be measured or something that has measurements. It is often collected as a number form, even though there are other types of numbers that may appear in the number from. For instance, the number of people that attended the movie theater over the course of the month. Numerical data can be identified by just seeing or checking whether the data can be added together. Besides, an individual should be able to perform any operation of mathematics on the numerical data. The data can also be rearranged in ascending and descending order. Information can only be numerical if the answers can also be represented in fraction and decimal form. If the numerical information is put to various groups, then it is considered categorical. If you were to measure the height of four ladders, you could average the heights, you could add the heights, and you could put them in ascending or descending order. That's because the height of the ladders is numerical data

8.2 Order of operations

When you have a math problem that involves more than one operation—for example, addition and subtraction, or subtraction and multiplication—which do you do first?

Example 1:

6 – 3 x 2 =?

In cases like these, we follow the order of operations. The order in which operations should be done is abbreviated as PEMDAS:

- Parentheses
- Exponents
- Multiplication and Division (from left to right)
- Addition and
- Subtraction (from left to right)

In the above example, we're dealing with multiplication and subtraction. Multiplication comes a step before Subtraction, so first we multiply 3 x 2, and then subtract the sum from 6, leaving 0.

Example 2:

30 ÷ 5 x 2 + 1 =?

There are no Parentheses.

There are no Exponents.

We start with the Multiplication and Division, working from left to right.NOTE: Even though Multiplication comes before Division in PEMDAS, the two are done in the same step, from left to right. Addition and Subtraction are also done in the same step.

30 ÷ 5 = 6, leaving us with 6 x 2 + 1 =?

6 x 2 = 12, leaving us with 12 + 1 =?

We then do the Addition: 12 + 1 = 13

Note that if we'd done the multiplication before the division, we'd have ended up with the wrong answer:

5 x 2 = 10, leaving 30 ÷ 10 + 1 =?
30 ÷ 10 = 3, leaving 3 + 1 =?
3 + 1 = 4 (off by 9!)
One last example for advanced students, using all six operations:

8.3 Functional keys on a scientific calculator

The buttons used on the scientific calculator are labelled differently depending on the manufacturer. However, below are some of the common functions of keys and the meaning.

Table 6: Functional Keys

Operation	Mathematical Function
+	Addition or plus
-	Subtraction or minus: note that there is a different button that can make a positive number to be negative, often marked as (-) or negation (NEG).
×	Multiply or ties
/ or ÷	Over, divide, division by
^	Raised to the power of
y^x or x^y	X raised to power y or y raised to the power x
√	Square root
e^x	Exponent
LN	Log of or natural logarithm
SIN	sine function
SIN^{-1}	Arcsine or inverse sine function
COS	Cosine function
COS^{-1}	Arccosine or inverse cosine function
TAN	Tangent function
TAN^{-1}	Arctangent or inverse tangent function
()	Parenthesis
Store	Place a number in memory for later use
Recall	Recover the number from memory for immediate use

Identification of keys to use depends on the kind of numerical information offered and operations instructed. For instance, 3+5× 4 you know, according to the order of operations, the 5 and the 4 should be multiplied by each other before adding the 3. Your calculator may or may not know this. If you press 3 + 5 x 4, some calculators will give you the answer 32 and others will give you 23 (which is correct). Find out what your calculator does. If you see an issue with the order of operations, you can either enter 5 x 4 + 3 (to get the multiplication out of the way) or use parentheses 3 + (5 x 4).

8.4 Estimations

Estimation is a procedure by which we assign a numerical value or numerical values to the: population parameter based on the information collected from a sample, population parameter based on the information collected from a population sample, statistic based on the information collected from a sample, statistic based on the information collected from a population. In mathematics estimations are commonly done by rounding off or expressing numbers to the nearest unit, ones, tens, hundreds, thousands, etc. Example: rounding off the 345 to the nearest hundreds we obtain 300.

8.5 mathematical language, symbols and convention

Mathematical convention

A mathematical convention is a fact, notation, name or usage which is a consensus among mathematicians. For example, the fact that one evaluates multiplication before addition in the expression 3+7×8 is merely conventional. There is nothing inherently significant about the order of operations.

Example 1

	Examples	Meaning
Start of the alphabet	a, b, c,….	Fived values (constants)
From i to n	i, j, k, l, m, n	Positive integers
End of the alphabet	…..x, y, z	variables

Example 2

$y = ax + b$ It is assumed a and b are fixed values, x and y are assumed to vary or change (variables)

Mathematical symbols

Mathematics uses more of symbols rather than words:

- There are the 10 digits: 0, 1, 2, ... 9
- There are symbols for operations: +, −, ×, /,
- And symbols that "stand in" for values: x, y,
- And many special symbols: π, =, <, ≤,

Conclusion

The learning outcome equips learners with competency numerical skills of handling numbers. It further provides basic knowledge on handling a scientific calculator.

Further Reading

Kincaid, D., Kincaid, D. R., & Cheney, E. W. (2009). *Numerical analysis: mathematics of scientific computing* (Vol. 2). American Mathematical Soc.

3.3.9.3 Self-Assessment

Written Assessment

Find:

1. $-10 + 3 - (-4) + 5 =$
   a) 2
   b) -12
   c) -4
   d) 16
2. $-96 \div -6 \div 8 =$
   a) 2
   b) 12
   c) -12
   d) -2
3. $5x - 2 - (8 - 12) + 16 \div -8 =$
   a) 6
   b) -8
   c) -16
   d) -6

4. Define the term numerical information.
5. Provide some of the symbols used in mathematics.

3.3.9.4 Tools, Equipment, Supplies and Materials

- Calculators
- Rulers, pencils and Erasers
- Charts with presentation of data
- Graph books
- Dice

3.3.9.5 References

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CHAPTER 4: DIGITAL LITERACY/DEMONSTRATE DIGITAL LITERACY

4.1 Introduction

Demonstrate digital literacy unit of competency is among the seven basic competencies units offered in all the TVET level 6 qualification. This unit covers the knowledge, skills, and behaviours required to effectively use computer and other PCs, digital devices such as smartphones, tablets, laptops and desktop. It entails identifying and using digital devices for purposes of communication, work performance and management at the work place. Digital literacy is siginificant to TVET level 6 curriculum due to the critical role that technology plays in societal and industrial growth. Digital literacy has also gained recognition as a valuable tool for lifelong learning and collaboration in this global village.

The critical aspects of competency to be covered include control of security threats, computer crimes, applying word processing and spreadsheet in accordance with workplace procedures, integrating emerging issues in computer ICT applications and applying laws governing protection of ICT. The basic resources required include digital devices such as desktop computers, laptop computers, smart phone, printers, internet access, computer software among others. The unit of competency covers six learning outcomes. Each learning outcome presents learning activities that cover performance criteria statements, thus creating opportunity for the trainees to demonstrate knowledge and skills in the occupational standards and content in the curriculum. Information sheets provide; definition of key terms, content and illustration to guide in training. The competency may be assessed through written tests, demonstration, practical assignment, interview/oral questioning and case study. Self assesssement is provided at the end of each learning outcome. Holistic assessment with other units relevant to the industry sector workplace and job role is recommended.

4.2 Performance Standard

Apply security measures to data, hardware and software in solving tasks in automated environment in accordance with manufacturer's specifications, work procedures, prevailing technology and laws governing protection of ICT.

4.3 Learning Outcomes

4.3.1 List of learning outcomes

a) Identify computer software and hardware.
b) Apply security measures to data, hardware and software in automated environment.
c) Apply computer software in solving tasks.
d) Apply internet and email in communication at workplace.
e) Apply desktop publishing in official assignments.
f) Prepare presentation packages.

4.3.2 Learning Outcome No 1: Identify appropriate computer software and hardware

4.3.2.1 Learning Activities

Learning Outcome No 1: Identify appropriate computer software and hardware	
Learning Activities	**Special Instructions**
1.1 Determine concepts of ICT in accordance with computer equipment. 1.2 Determine classifications of computers in accordance with manufacturer's specification. 1.3 Identify appropriate computer software (a collection of instructions or computer tools that enable the user to interact with a computer, its hardware, or perform tasks) according to manufacturer's specification. 1.4 Identify appropriate computer hardware (collection of physical parts of a computer system such as monitor, keyboard, and mouse) according to manufacturer's specification. 1.5 Determine functions and commands of operating system accordance with manufacturer's specification.	Computer software and hardware to be provided. Activities may be carried out in groups or individually.

4.3.2.2 Information Sheet No4/LO1: Identify appropriate computer software and hardware

Introduction

Digital literacy is an important topic in the modern world. Literacy is the urge to read and learn. So digital literacy is the process of acquiring knowledge and skills to effectively use computers and other technology devices. Some of the computer hardware are, desktop/monitor, printers, scanners, mouse, Keyboard, and storage devices (hard disk). The computer software includes Windows, Linux, UNIX. These are the operating system software.

Under the computer software's we also have application software's which include: word processors (e.g. Microsoft word), spreadsheets (e.g. Microsoft Excel), graphic presentations (e.g. Microsoft PowerPoint), and the database management systems (e.g. Microsoft access).

Definition of Key Terms

Information computer technology: This is an extensional term to IT that stresses on systems that enable users to access, store, transmit and manipulate information. ICT is a broad subject and the concepts are evolving. It covers any product that will store, retrieve, manipulate, transmit, or receive information electronically or in a digital form (e.g. emails).

Computer software: Computer software is a collection of instructions that enable the user to interact with a computer, its hardware, or perform tasks. It is used or needed for input, processing, output, storage and management of activities. Softwares which are used for inputting data in the system include; word processors, spreadsheets, and presentation software. Software used for storage include cloud storage where the output is stored or hosted using resources in data centers and delivered to end users over the internet. Software for management of activities include database management systems which allow users to process data into useful information.

Computer hardware: This is any tangible device in the computer environment. Some of the hardware that maybe encountered in this topic are:

- Monitor: This is the main output device of a computer. It is commonly known as Visual Display Unit (VDU).
- Printer: is used to print information of paper.
- Storage devices: these include flash disks, hard disks and optical disks (e.g. CDs).
- Input devices: such as the mouse and keyboard.

Internet: This is a global system of interconnected computer networks that use internet protocol suite (TCP/IP) to link devices worldwide. The internet carries a vast range of information, resources and services. Picture information is shared via the internet.

Digital literacy: While literacy is defined as the ability to read and write, digital literacy is the ability to access, process, understand and create information in the digital environment.

Content/Procedures/Methods/Illustrations

1.1 Concepts and Functions of ICT

Functions of ICT

- **Data capture**: Process of compiling information e.g. Amazon uses internet cookies to capture data about the customers' purchases via the website. So, it use the data to suggest items to a user related to the previous orders via the website.
- **Data processing**: This involves converting, analyzing, computing and producing all forms of data information. After capturing data, the system must reorganize that data based on what the organization wants to use the information for.
- **Generation of information**: Involves organizing information into a useful form.
- **Storage of information** involves retaining information for future use e.g. Facebook stores user registration details.
- **Retrieval of information:** Process by which a computer device is used to find and copy data for future distribution and processing. A good example is Google or Yahoo who have data centers which store information which can be used at a later stage by the end user to search for information online.

Basic concepts of ICT

Information technology encompasses all the technology (hardware, software and computer networks) that we use to collect, process, protect and store information. Information computer technology involves transfer and use of all kinds of information. ICT is the

foundation of economy and a driving force of social change in the 21st century. Distance is no longer an issue when it comes to accessing information, e.g. working from home, distance learning, and e-banking are now possible from any place with an internet connection and a computing device.
Hardware: The physical and tangible parts of a computer, that is, electrical, electronic and mechanical parts e.g. monitor, keyboard, mouse, etc.
Software: These are the intangible parts of computer.

Software types

i. Operating system: This is the program which manages computer hardware e.g. Linux, Windows, Mac OS X, etc.
ii. Application software (utility programs): These are all programs that users use to perform different tasks or for problem solving. For example Microsoft word, Microsoft excel and Microsoft PowerPoint.
iii. Computer networks: A computer network is comprised of at least two computers, connected by wire or wirelessly that can exchange data.

Types of networks:

- LAN (local Area Network): Covers a relatively small geographical area e.g. a university campus or office building. Examples include Ethernet and Wi-Fi.
- WLAN (Wireless Local Area Network): Links two or more devices using wireless communication within a limited area such as a campus or office building. Some WLANs exist to extend an existing wired network.
- WAN (Wide Area Network): Covers a relatively large geographical area e.g. cities or states. Connects a greater number of computers and local networks.

1.2 History and Classification of Computers

The computer as you know it today had its beginning with a 19th century. English mathematician called Charles Baggage (1791 – 1871) designed the analytical engine and it is this design that the basic framework of computers today is based on.
Computers can be classified into three generations. Each generation lasted for a certain period of time and each gave us either a new and improved computer or an improvement of the existing computer

i. **First generation** (1937-1946): The first computer Atanasoh Berry computer (ABC) was built by Dr. JOHN B. Atanasoh and Clifford Berry. In 1943 an electronic computer named the colossus was built for the military. Other developments continued until 1946 when Electronic Numerical Integration and Computer (ENIAC) was built. There were no operating systems.

ii. **Second generation** (1947-1962): The computers in this generation used transistors instead of vacuum tubes, which were more reliable. The Universal Automatic Computer (UNIVAC1) was introduced for commercial use. In 1953, the

International Business Machine (IBM) 650 and 700 series computers made their mark in the computer world. Over 100 programming languages were developed. Computers had memory and operating systems.

iii. **Third generation** (1963-Present): The invention of integrated circuit brought us this generation. Computers became smaller, more powerful, and more reliable and they were able to run many different programs at the same time.

Classification of computers

Computers can be classified in the following basis:

- Basis of size
- Basis of functionality
- Basis of data handling

Classification on basis of size

- **Supercomputer**: This is the highest performing computer system. It has a high level of performance compared to general purpose computer. Examples include PERAM, Jaguar, and roadrunner.
- **Mainframe computer:** Commonly called big iron. They are used by big organizations for bulk data processing such as statistics, census data processing and transaction processing e.g. IBM series, system 29 etc.
- **Minicomputers**: They came into the market in the mid-1960s and were sold for a cheaper price than the mainframe. They were designed for control, instrumentation, human interaction e.g. laptops, PCs etc.
- **Microcomputers:** It is small, relatively inexpensive with a microprocessor as its CPU. It includes a microprocessor, memory and minimal input and output circuitry mounted on a single printed circuit board.

Classification on basis of functionality

- **Servers**: Dedicated computers set up to offer some services to the client
- **Workstations**: Computers designed to primarily be used by a single user at a time.
- **Information appliances**: Portable devices designed to perform a limited set of tasks like basic circulations, playing multimedia, etc.
- **Embedded computers**: Computing devices which are used in other machines to serve limited set of operations

Classification on basis of data handling

- **Analogue computer**: Form of computer that uses the continuously changeable aspect of physical facts such as electrical, mechanical quantities to model the problem being solved.
- **Digital computers**: They perform circulations and logic operations with quantities represented as digits usually the binary number system i.e. 0s & 1s.
- **Hybrid**: A computer that processes both analogue and digital information.

1.3 Components of a Computer System

Computer system

A computer software is simply a collection of data or computer instructions that tell the computer how to work. They include computer programs, libraries and non-executable data such as online documentation or digital media.

Types of software

- **Application software**: Uses the computer system to perform special functions or provide entertainment functions beyond the basic operation of the computer itself.
- **System software**: Software for managing computer hardware behavior so as to provide basic functionalities that are required by users or other software to run properly. Examples are operating system, device drivers and utility software.
- **Malicious software:** Software developed to harm and disrupt computer e.g. malware, viruses.

1.4 Computer Hardware

These are the physical, tangible parts of a computer such as cabins, CPU, monitor, keyboard, speakers, etc.

Examples

- Input devices and output devices: Input devices enter information into the system e.g. keyboard, mouse. Output devices display information in human readable mode.
- Storage devices e.g. CDs, flash disk and hard disk

1.5 Operating System Function and Commands

The operating system is a system software that manages computer hardware, software resources and provides common service for computer programs.

Types of operating systems

- Single and multi-tasking
- Single and multiuser
- Distributed: Manages a group of distinct computers and make them to appear to a single computer
- Template
- Embedded: Designed to be used in embedded computer systems
- Real time: An OS that guarantees to process events or data by a specific moment and time
- Library

Functions of an operating system

- Security: It uses password protection to protect user data and similar techniques**.**
- Job accounting: It keeps track of time and resources used by various tasks and users.
- Memory management: It manages the primary and main memory.
- Processor management: It decides which processes have access to the processor.
- Device management: It manages device communication via their respective drivers and keeps track to all devices connected to the system.

Commands of an operating system

- APPEND: Sets the path to be searched for data files or displays the current search path.
- ASSIGN: Command direct request for disk operations from one drive to a different drive.
- ATTRIBE: This command changes or views the attributes of one or more drives.
- CALL: Starts a batch file from which another batch file and returns when that one ends
- CHCP: Command either displays or changes the active code page used to display character glyphs in a console window.

Conclusion

This unit covered determining concepts of computers, classification of computers, identification of appropriate computer software and hardware as well as determining functions and commands of operating systems, history of computers, functions and concepts of ICT.

Further Reading

Computer basics by Rajaraman
People.bu.edu/briefcomputerhistory.html

4.3.2.3 Self-Assessment questions

Written Assessment

1. WAN stands for?
    a) Wide area network
    b) Wide access network
    c) Wide arithmetic network
2. Program used to control system performance is classified as.
    a) Experimental program
    b) System program
    c) Specialized program
    d) Organized program
3. Examples of system programs include
    a) Operating system
    b) Trace program
    c) Compiler
    d) All of the above
4. Which of the following is not a computer hardware?
    a) Malware
    b) Monitor
    c) Compact disk
    d) Hard disk
5. Which one of the following is an odd one out when looking at the functions of ICT?
    a) Generation of information
    b) Storage of information
    c) Data capture
    d) None of the above
6. Which one of the following is not a classification of computers on the basis of size?
    a) Analogue computers
    b) Minicomputers
    c) Mainframe computers
    d) Supercomputers
7. Types of computer software are
    a) System software
    b) Logic software
    c) Both A and B
8. Which network covers a relatively small geographical area?
9. WLAN stands for.
10. What is a computer software?
11. What are embedded computers?
12. What is an operating system?

Oral assessment questions

1. What are some functions of an operating system that you understand?
2. Briefly explain the history of computers.

Practical Assessment

Which one of the following is used to store programs installed on a computer?

a) DVD drive
b) Video card
c) CD drive
d) Hard drive

Project

1. Type the following in a word document

   <u>Students</u>
   Peter
   James
   John
   <u>Teachers</u>
   Lewis
   Caleb
   Melisa

2. I want to create a second copy of an open document under a different name. What should I do?

   i. copy and paste the text in a new document
   ii. use ‘save as’
   iii. press ctrl s
   iv. open the file again
   v. Which of the following methods can you not use to zoom in?
   vi. holding ctlr key and scrolling the mouse wheel
   vii. using the zoom button
   viii. ctrl+ shift +z
   ix. Using the zoom slider at the bottom right corner.

4.3.2.4 Tools, Equipment, Supplies and Materials

- Desktop computers
- Laptop computers
- Other digital devices
- Printers
- Storage devices
- Internet access

- Computer software

4.3.2.5 References

Mall, R. (2018). *Fundamentals of software engineering*. PHI Learning Pvt. Ltd.

People.bu.edu/briefcomputerhistory.html

Rajaraman, A. (1995). Introduction to computers. In *Academic Library Automation* (pp. 6-16). New Delhi, Ess Ess Publications.

4.3.3 Learning Outcome No 2: Apply security measures to data, hardware, software in automated environment

4.3.3.1 Learning Activities

Learning Outcome No 2: Apply security measures to data, hardware, software in automated environment	
Learning Activities	**Special Instructions**
2.1. Classify data security and privacy (confidentiality of data, cloud computing) in accordance with the prevailing technology. 2.2. Apply security threats (cyber terrorism, hacking) and control measures (counter measures against cyber terrorism, risk reduction, risk management, pass wording) in accordance with laws governing protection of ICT. 2.3. Detect computer threats and crimes. 2.4. Undertake protection against computer crimes in accordance with laws governing protection of ICT.	Computer software and hardware to be provided. Activities may be carried out in groups or individually.

4.3.3.2 Information Sheet No4/LO2: Apply security measures to data, hardware, software in automated environment

Introduction

Data security is certainly a hot topic these days. Controlling access to data helps ensure privacy and is required according to federal agency policies and regulations. Data security is a process of making sure data are available only to those who need to use it for a legitimate purpose. We have found that data security is not very different from other forms of security. The same concepts used to design castles apply to the construction of servers that offer access to a corporate database. The details are different, and the technical pieces are quite different, but the same approaches, rules and lessons apply. Below are some important maxims to keep in mind. Most of them have stood the test of time for thousands of years:

i. There is no such thing as absolute security: We can raise the attacker's cost of breaching our data security to a very high level, but absolute guarantees are not possible.
ii. Data security is always a question of economics: What is the value of what you are protecting? How much time, effort, and money are your opponent's willing to spend to get through your defenses?
iii. An attacker doesn't go through security, but around it: Their goal is to find and exploit the weakest link.
iv. Don't underestimate the value of your asset: Often common everyday data is underestimated. Mundane data can be very important.

Definition of key terms

Data security: This is the process of making sure data is available only to those who need it for legitimate purpose.

Data: This is the information that has been translated into a form that is efficient for movement or processing.

Data privacy /Information privacy: It is the aspect of information technology that deals with the ability of an organization or individual to determine what data in a computer system can be shared with third parties.

Security threats: This is the process of an illegal entity gaining access to a company's data or information.

Control measures: This is any measure taken to eliminate or reduce the risk of security threats.

Cyber criminals: These are illegal users who use many different methods to lure you into parting with your confidential personal or business information.

Content/Procedures/Methods/Illustrations

2.1 Data Security and Privacy Are Classified in Accordance with the Prevailing Technology

As discussed earlier, data security is the process of making sure data is available only to those who need to use it for legitimate use. Data security privacy on the other hand is the aspect of information technology that deals with the ability of an organization or individual to determine what data in a computer system can be shared with third parties. As more of our daily lives go online and the data we share is used in new and innovative ways, privacy and security have become important trust and reputation issues. The growing volume and sensitivity of information being shared, stored and used is driving demand for greater transparency about how such information is being protected (security) and managed (privacy). As a result, data security and privacy have moved from the backroom to the boardroom. Data breaches and privacy missteps now regularly make headlines and are a focal point for discussions and legislation worldwide. Failure to communicate on these important issues can damage business by eroding trust, tarnishing brand and reputation as well as undermining competitiveness.

Data security ensures that the data is accurate and reliable, and it is available when those with authorized access need it. A data security plan includes facets such as collecting only the required information, keeping it safe, and destroying any information that is no longer needed.

These steps will help any business meet the legal obligations of possessing sensitive data. Companies need to enact data security policy for the sole purpose of ensuring data privacy, or the privacy of their customers' information. More so, companies must ensure data privacy because the information is an asset to the company. A data security policy is simply the means to the desired end which is data privacy. However, no data security policy can overcome the willing sale or soliciting of the consumer data that was entrusted to an organization.

Challenges to big data security and privacy

- Securing and protecting data in real time: Due to large amounts of data generation, most organizations are unable to maintain regular checks. However, it is most beneficial to perform security checks and observation in real time or almost in real time.
- Data provenance: To classify data, it is necessary to be aware of its origin in order to determine the data origin accurately, so that authentication, validation and access control can be gained.
- Protecting access control method communication and encryption: A secured data storage device is an intelligent step in protecting the data. Yet, because most often data storage devices are vulnerable, it is important to encrypt the access control methods as well.

2.2 Security Threats Are Identified and Control Measures Used

A threat is a possible danger that might exploit a vulnerability to breach security and therefore cause possible harm. A threat can either be intentional (e.g. hacking by an individual or criminal organization) or accidental (the possibility of a computer malfunctioning OR the possibility of natural disasters such as fires or otherwise a circumstance, capability, action or event).

Classification of security threats

- Classification according to type
- Physical damage: For example, fire, floods
- Natural events: For example, climate, volcanic
- Compromise of information: Via eavesdropping, theft of media
- Technical failures: For example, equipment, software
- Compromise of functions and errors in use, abuse of rights
- Classification according to origin
- Deliberate: Aiming at information asset e.g. spying, illegal processing of data
- Accidental: For example, equipment failure, software failure
- Environmental: For example, natural event, loss of power supply
- Negligence: Known but neglected factors compromising the network safety and sustainability.

Categories of the risk of security threats

- Damage: How bad would an attack be?
- Reproducibility: How easy it is to reproduce the attack?
- Exploitability: How much work is it to launch the attack?

- Affected users: How many users will be impacted?
- Discoverability: How easy it is to discover the threat?

Counter measures to security threat

A counter measure is an action, device, procedure or technique that reduces a threat, a vulnerability or an attack by eliminating or preventing it, by minimizing the harm it can cause or by discovering and reporting it so that corrective action can be taken.

Counter measures against physical attacks

If a potential malicious actor has physical access to a computer system, they have a greater chance of inflicting harm upon it. We can use the following counter measures:

i. **Electronic destruction devices:** Devices such as USB killer may be used to damage or render completely unusable anything with a connection to the motherboard of a computer. Without paper destruction, these devices may result in the destruction of ports and anything physically connected to the device attacked e.g. monitors.
ii. **Hard drives and storage**: If the data of a storage device is in use and must be secured, one can use encryption to encrypt the content of a storage device or even encrypt the whole storage device. The device can be unlocked by a password, biometric authentication, a network interchange or any combination thereof. The process of adding physical barriers to the storage device is not to be neglected. Locked cases or physically hidden drives with a limited number of personnel with knowledge and access to the keys or locations may prove to be a good first line against physical theft.

2.3 Computer Threats and Crimes Are Detected

Cyber criminals may use many different ethos to lure you into parting with your confidential information. Malware (malicious software may be described as a variety of forms of hostile, intrusive or annoying software or program code. Malware could be computer viruses, worms, Trojan horses, dishonest spyware and malicious rootkits. Here is a quick explanation on some of the common computer threats you may come across:

i. **Computer viruses**: This is a small piece of software that can spread from one infected computer to another. The virus could corrupt, steal or delete data in your computer, or even erase everything on your hard drive.
ii. **Trojan horse**: Users can infect their computers with this software simply by downloading an application they thought was legitimate but was infect or malicious. Once in your computer, it can do anything from recording your passwords by logging keystrokes to hijacking your webcam so as to watch and record you're every move.
iii. **Malicious spyware**: It is used to describe a Trojan application that was created by cyber criminals to spy on their victims. An example would be a key logger software that records a victim's every stroke on his/her keyboard. The recorded information is periodically sent back to the originating cybercriminal over the internet.

iv. **Computer worm**: This is a software program that can copy itself from one computer to another without human interaction. A worm can send copies of itself to every contact in your email address book and then send itself to all the contacts in your contact address book.

v. **Spam**: In the security context, it is primarily used to describe unwanted messages in your email box. Spam is a nuisance as it can clutter your mailbox as well as taking up space on your mail server. However, spam messages can contain links that when clicked could go to a website that installs malicious software on to your computer.

vi. **Pursing**: Pursing scams are fraudulent attempts by cybercriminals to obtain private information. Pursing scams often appear in the guise of email messages designed to appear as though they are from legitimate sources.

vii. **Rootkit**: This is a collection of tools that are used to obtain administrator-level access to a computer or a network of computers. A rootkit could be installed on a computer by a cyber-criminal exploiting a vulnerability or security hole in a legitimate application on your PC and may contain spyware that monitors and records keystrokes.

These are perhaps the most common computer threats and crimes you will encounter that describe methods cyber-criminals use to access data, computer hardware and software.

2.4 Methods to Protect Yourself from Computer Crimes

i. **Using strong passwords**: Don't repeat your passwords on different data and software Change your passwords regularly. Make them complex. That means using a combination of at least 10 letters, numbers and symbols.

ii. **Keep your software updated**: This is especially important with your operating systems and internet security systems. Cyber criminals often use known exploits in your software to gain access to your system. Patching those exploits and flaws can make it less likely that you will become a cyber-criminal target.

iii. **Strengthen your network:** It is a good idea to start with a strong encryption as well as a virtual private network. A VPN will encrypt all traffic leaving your devices until it arrives to its destination.

iv. **Keep up to date on major security breaches:** If your data has been impacted by a security threat, find out what information the hackers accessed and change your passwords immediately.

v. **Know that identity theft can happen anywhere**: It is important to protect your data for example, by using a VPN when accessing the internet over a public Wi-Fi network.

Conclusion

This unit dealt with application of security measures to data, hardware, and understanding and listing the computer threats and crimes, classifications of security threats and the counter measures and methods of protecting data, software and hardware from security threats.

Further Reading

Cheswick, W. R., Bellovin, S. M., & Rubin, A. D. (2003). *Firewalls and Internet security: repelling the wily hacker*. Addison-Wesley Longman Publishing Co., Inc.

4.3.3.3 Self-Assessment

Written Assessment

1. A computer network consists of two or more computing or other devices connected by a?
    a) Wireless signal
    b) Cable
    c) Communication media
    d) Wire
2. Which is not a method of protecting data from computer threats?
    a) Pursuing
    b) Rootkit
    c) Spam
    d) All the above
3. The process of an illegal entity to gain access to a company’s data or information is?
    a) Security threat
    b) Data privacy
    c) Data security
    d) Data integrity.
4. Which one of the following is not a computer threat or crime?
    a) Computer virus
    b) Malware
    c) Rootkit
    d) None of the above
5. Which one of the following are categories of the risk of security threats?
    a) Damage
    b) Negligence
    c) Affected user
    d) Both a and c
6. Security threats can be classified as.
    a) Physical damage
    b) Technical failures
    c) Compromise of functions
    d) All the above
7. What does download from the internet mean?
    a) Retrieving files from the internet

b) Lowering your game level on the internet
c) Viewing web pages on the internet.

8. What is data?
9. What is a computer virus?
10. What is data privacy?
11. What is data security?
12. What is a security threat?

Oral Assessment

1. What is a security threat and what are the types of a computer threats you know?
2. Briefly explain the concept of data security and privacy?

4.3.2.4 Tools, Equipment, Supplies and Materials

- Desktop computers
- Laptop computers
- Hard drive
- Flash disks
- Computer antivirus
- Internet access

4.3.3.5 References

Cheswick, W. R., Bellovin, S. M., & Rubin, A. D. (2003). *Firewalls and Internet security: repelling the wily hacker*. Addison-Wesley Longman Publishing Co., Inc.

Panko, R. R. (2010). *Corporate computer and network security, 2/e*. Pearson Education India.

Pfleeger, C. P. (2003). Data security.

4.3.4 Learning Outcome No 3: Apply computer software in solving tasks

4.3.4.1 Learning Activities

Learning Outcome No 3: Apply computer software in solving tasks	
Learning Activities	**Special Instructions**
3.1. Apply Word processing concepts (using a special program to create, edit and print documents) in resolving workplace tasks, report writing and documentation. 3.2. Apply Word processing utilities in accordance with workplace procedures. 3.3. Prepare Worksheet layout in accordance with work procedures 3.4. Build Worksheet and manipulate data in the worksheet in accordance with workplace procedures. 3.5. Undertake continuous data manipulation on worksheet in accordance with work requirements. 3.6. Undertake database design and manipulation in accordance with office procedures. 3.7. Provide data sorting, indexing, storage, retrieval and security in accordance with workplace procedures.	Computer software and hardware to be provided. Activities may be carried out in groups or individually.

4.3.4.2 Information Sheet No4/LO3: Apply Computer Software in Solving Tasks

Introduction

The term software refers to the set of electronic program instructions or data that a computer processor reads in order to perform a task or operation. Software can be categorized according to what it is designed to accomplish. The main two types are: System software and application software. Under this unit, we will talk about application software. Application software (or simply applications) are often called productivity programs or end users programs because they enable the users to complete tasks such as: Creating documents, spreadsheets, databases, publications, doing online research, sending email, designing graphics etc. Application software is specific to the task it is designed for and can be simple as a calculator application or as complex as word processing application. When you begin creating a document, the word processing software has already set the margins, font and line spacing for you. Microsoft Word is a popular word processing application that is included in the software suite of applications called Microsoft Office.

A software suite is a group of software applications with related functionality. For example

- Office software suites might include word processing, spreadsheets, and database, presentation and email applications.
- Graphics suites such as Adobe Creative Suite might include applications for creating and editing images.
- Audio suits such as Sony Audio Master Suite is used for audio productions.

In designing databases, there are a few rules to stick to. It is important to know what these rules are, but more importantly to know why these rules exist, otherwise you will tend to make mistakes. On the other hand, worksheets help you with your financial calculations.

Definition of key terms

Word processor: This is a computer program or device that provides for inputs, editing, formatting and output of text often with additional features.
Word documents: All items created using a word processing software.
Word Processing: A computerized method of writing, editing, saving, formatting and printing texts.
Text: Consists solely of letters.
Characters: Anything typed from your keyboard.
Text wrap: In word processing programs, this occurs when you get to the end of the line and the text wraps without you pressing the enter key.
Font: Size and style of writing.
Edit: To make changes to a document.
Table: Refers to data arranged in a series of rows and columns.
Word Processing Utilities: These are the software used to manipulate text and apply a basic design to your pages.
Database: An organized collection of data, generally stored and accessed electronically for a computer system.
Update: Insertion, modification and deleting of the actual data.
Spreadsheet: A user interface that resembles one or more paper accounting worksheets.

Content/Procedures/Methods/Illustrations

3.1 Word Processing Concepts Are Applied in Resolving Workplace Tasks, Report Writing and Documentation

As we have seen, word processing is the production of typed documents (such as business letters) with automated and usually computerized typing and text editing equipment. A word processing program allows you to create, edit, format and print many types of documents such as letters. Memos, CVs, etc. You can create World Wide Web pages with some word processing programs.

Word Processing Concepts and Descriptions

a) Opening word processing package: Word processing package is mostly used in offices on microcomputers. To open a new document, click on the "start" button and go to "all programs" and click on "Microsoft word"

b) Opening and closing of documents: Word automatically starts with a blank page. To open a new file, click on "new".

c) Page set up: Page set up options are usually available on the "page layout menu". Parameters defined by the user help in determining how a printed page will appear.

d) Print preview: This option is used to view the page or adjust before any document gets printed.

e) Cut, copy, paste.

f) Table manipulation: Manipulation of table includes drawing a table, changing cell width and height, alignment of text in the cell, deletion/insertion of rows and columns and boarders and shading.

In summary, this topic provides us with a clear idea about components of word processing basics, opening and closing the documents, text creation and manipulation, formatting the text, table manipulation.

3.2 Word Processing Utilities are applied in Accordance with Workplace Procedures

Under this topic, we look at some of the word processing utilities in Microsoft word. They include:

a) Checking spelling. To check spelling in an entire document:

i. Under the review menu, choose spelling and grammar under the proofing submenu.

ii. A popup box will appear where you will get to specify exactly what you want to check. It will also give you suggestions to the current sentence.

iii. Then you will click change command and it will automatically save the changes and take you to the next sentence. Once finished, you will close the spelling and grammar popup box by clicking the close command.

b) Finding Synonyms. To find synonyms for a word in a document:

i. Select the word in your document.

ii. Click the review menu then choose the thesaurus from the submenu.

iii. To replace the word with a synonym, select the synonym and click replace.

c) Hyphenating words.

Hyphenation allows words to break between the syllables of words. Books and magazines hyphenate their texts in order to have more uniform spacing between words.

Under the page layout menu, select hyphenation from the page set up submenu and the word processor will automatically hyphenate the text.

d) Getting word count and other document statistics.

Word count is finding out the numbers of words, characters, paragraphs and lines in the document.

Under the review menu, click the word ‘count’ from the porting submenu. A popup box will appear showing the document’s statistics which includes pages, words, characters (with and without spacing), paragraphs and lines.

3.3 Worksheet Layout Is Prepared in Accordance with Work Procedures

Preparing worksheet layout

A worksheet is a collection of cells where you keep and manipulate the data. Each excel workbook can contain worksheets.

a) Select a worksheet: When you open an Excel workbook, Excel automatically selects sheet 1 for you. The name of the sheet appears on the sheets tab at the bottom of the document window.

b) Insert a worksheet: You can insert as many worksheets as you want. To quickly insert a worksheet, click the plus sign at the bottom of the document window.

c) Rename a worksheet: To give a more specific name, execute the following steps:
   - Right click on the sheet tab of sheet 1
   - Choose to rename
   - Type a new name

d) Delete a worksheet: To delete a worksheet, right click on the sheet tab and choose to delete.

3.4 Building A Worksheet and Applying Data Manipulation on Worksheet

a) Develop a spreadsheet to analyze your expenditures for a month or for whatever period you like and learn the basics of organizing budgets with key features of spreadsheets.

b) Choose a file and save it as Financials.

c) Begin to enter information by simply clicking on a cell and typing your entry.

d) Plan your needed data. Before creating any kind of spreadsheet. You need to plan what it will include so that you can structure and format it accordingly. While it is possible to change the spreadsheet structure later on, the more data you have added, the more inconvenient it becomes.

e) Create headings. You create headings depending on the topic being covered. To create diagonal names, navigate the ‘home’ tab and ‘find’ and click the formatting option with a diagonal rising appearance. This means the headings stand out without changing the column width.

Basic Terms in Excel

Formulas: It is an expression that operates on values in a range of cells or a cell. Example =A1+A2+A3 which finds the sum of the range of value from cell A1 to cell A3.

Functions: These are predetermined formulas in excel. They eliminate laborious manual entry of formulas while giving them human friendly names. For example, = SUM [A1:A3]. This function sums all the values from A1 to A3.

3.5 Ways to Insert Data in A Worksheet

- **Simple insertion**: Typing a formula inside a cell. This is the most straightforward method of inserting basic excel formulas. The process starts with typing an equal sign, followed by the name of the function.
- **Using insert function option from formulas tab**: To achieve this, go to the formulas and select the first menu labeled 'insert' function. The dialog box will contain all the functions you need.
- **Using Auto sum option**: Navigate to the home tab in the far-right corner, click the 'auto sum' option. Then click the caret to show other hidden formulas.

Basic Excel Formulas for your Workflow

i. SUM

Aggregates values from a selection of columns or rows from your selected range.
=SUM {number 1, [number 2],}

ii. AVERAGE

= AVERAGE {number 1, [number 2,}

iii. COUNT

This function counts all cells in a given range that contain only numeric values.
=COUNT {value 1, [value 2],}

iv. COUNTA

This function counts all cells in a given range regardless of the type i.e. it counts dates, times, strings.
= COUNTA. {Value 1, [value2],}

v. IF

It is used when you want to sort your data accordingly to a given logic.
=IF {logical –test, [value –if-true], [value-if-false]}

vi. TRIM.

This function makes sure your functions do not return errors due to unruly spaces.

=TRIM [text]

vii. MAX and MIN.

Functions help in finding the maximum number and the minimum number in a range of values.

=MIN {number1, [number2],}

=MAX {number1, [number2],}

3.6 Preparing A Database and Manipulating the Data

Designing a database is in fact easy, but there are a few rules to stick to. It is important to know what these rules are, but more importantly, know why these rules exist, otherwise you will tend to make mistakes. Standardization makes your data model flexible and that makes working with your data much easier. A good database design starts with a list of the data that you want to include in your database and what you want to be able to do with the database later.

i. **Identifying Entities:** Types of information that are stirred in a database are called entities. These entities exist in four kinds: people, things, events and locations. If the information you want to include doesn't fit in these categories, then it is probably not an entity but a property of an entity, an attribute.

ii. **Identifying Relationships**: Identify the relationship between entities and determine the cardinality of each relationships. The relationship is the connection between entities. Types of relationships include:
   - One to one
   - One to many
   - Many to one
   - Many too many

iii. **Identifying attributes:** The data elements that you want to save for each entity are called attributes. For example, about the product that you sell, you may want to know the price, name of the manufacturer, etc.

iv. **Assigning keys**
   - **Primary keys:** One or more data attributes that uniquely identify an entity. A key that consists of two or more attributes is called a composite key. All attributes part of a primary key must have a value in every record (which cannot be left empty) and the combination of these attributes must be unique in the table.
   - **Foreign keys**: This is an entity in reference to the primary key of another entity. It can also be part of a primary key, in that the attribute will be indicated primary key behind its name.

Defining the attributes data type

The standard data types that every database knows and are most likely to be used are:

i. CHAR: Includes characters, numbers, and punctuations and has a characteristic that is always saved as a fixed amount of positions e.g. CHAR 10.
ii. VARCHAR: same as CHAR but the difference is that VARCHAR only takes as much space as necessary.
iii. TEXT: Contains large amounts of texts.
iv. INT: Contains a positive or negative whole number e.g. INT 10
v. FLOAT, DOUBLE: It can store floating point numbers.

3.7 Provides Data Sorting, Indexing, Storage, Retrieval and Security in Databases

Data storing in database is done by a process called Normalization.

Normalization

Normalization makes your data model flexible and reliable. It does generate some overhead because you usually get more tables, but it enables you to do many things without having to adjust it.

- Normalization the first form: States that there may be no repeating groups of columns in an entity.
- Normalization the second form: States that all attributes of an entity should be fully dependent overall primary key.
- Normalization the third form: States that all attributes need to be directly dependent on the primary key and not on other attributes.

Types of database objects

- Tables: They store information.
- Queries: Lets you perform an action on a table.
- Forms: Attractive windows that you create, arrange and colorize.
- Reports: Help you print some or all of the information in a table.
- Macros: Mini programs that automate custom tasks.
- Modules: Files that contain visual basic code.

Saving Databases

Access doesn't require that you save your data. It automatically saves any edits you make to the records in a table.

When you add or edit a database object, Access waits until you finish and close the object at which it prompts you to save or discard your changes.

Conclusion

The unit covered the application of computer software in solving tasks in accordance with workplace procedures. We looked at word processing using Microsoft word, preparing worksheets using Microsoft excel and designing databases using Microsoft Access.

Further Reading

Schneider, G. M., & Gersting, J. (2018). Invitation to computer science. Cengage Learning.

4.3.4.3 Self-Assessment

Written Assessment

1. What stores information in databases?
    a) Query
    b) Report
    c) Table
    d) All the above
2. In a computer, a tool which is used to find a similar or alternative word in a document is called?
    a) Finder
    b) Thesaurus
    c) Dictionary
    d) Style Cluster
3. Computer word processing includes process of?
    a) Entering text
    b) Editing text
    c) Formatting document
    d) All of the above
4. When starting word, default document window name is
    a) Document 1
    b) File 1
    c) Word 1
    d) Wpd 1
5. DBMS is a software
    a) True
    b) False

6. Database is generally
    a) System centered
    b) User centered
    c) Company centered
    d) Data centered
7. The restrictions placed on the data
    a) Relation
    b) Attribute
    c) Parameter
    d) Constant
8. What is a word processor?
9. What is a database?
10. What is a spreadsheet?
11. What is a function in MS Excel?
12. What do you understand by normalization?

Oral Assessment

1. What are some of the word processing concepts you understand?
2. What are some of the ways that one can insert data in Microsoft excel?

Practical Assessment

1. Type a word document using a word processing utility of your choice and explain the importance of growing technology in the modern world.
2. Using Microsoft excel, come up with a spreadsheet that inputs all the marks in your academic year and come up with the total marks. Generate a report.
3. Briefly explain the features of Microsoft word and excel.

Project

Using the knowledge on database design, come up with a database called class of year 2019.Create tables with your names, ID number, unit and date of admission as the fields.
Create another table called course, with course ID, course name and year as the fields. Use the appropriate relationships to link these table then fill each with a maximum of 6 entries.

4.3.4.4 Tools, Equipment, Supplies and Materials

- Desktop computers
- Laptop computers
- Computer software
- Printers
- Storage devices
- Internet access

4.3.4.5 References

Hajek, D. W. (2017). *Introduction to Computer Graphics.*
Schneider, G. M., & Gersting, J. (2018). *Invitation to computer science*. Cengage Learning.
Wempen, F. (2014). *Computing fundamentals: IC3 edition*. John Wiley & Sons.

4.3.5 Learning Outcome No 4: Apply internet and email in communication at workplace

4.3.5.1 Learning Activities

Learning Outcome No 4: Apply internet and email in communication at workplace	
Learning Activities	**Special Instructions**
4.1. Open and apply electronic mail addresses in workplace communication in accordance with office policy. 4.2. Define and execute office internet functions in accordance with office procedures. 4.3. Determine Network configuration (organizing and maintaining information on the components of a computer network) in accordance with office operations procedures. 4.4. Install and manage official World Wide Web according to workplace procedures.	Computer software and hardware to be provided. Activities may be carried out in groups or as individual.

4.3.5.2 Information Sheet No4/LO4: Apply Internet and Email in Communication

Introduction

This unit covers applying internet and email in communication by opening email address, executing office internet functions and determining network configuration. We will have to understand what the internet and email is. The internet is many connected computers (large set of computer networks) linked together they can communicate with each other, over the telephone lines. Internet refers to a global interconnection of computer and computer networks to facilitate global information transfer. It is an interconnection of computers throughout the world, using ordinary communication lines and modems. The internet uses (Very Small Aperture Telecommunication Systems) VSATS such as telephone lines, satellites. The electronic mail (email) is one of the common services provided by the internet. Email is a worldwide system for sending and receiving electronic messages from one computer to another. Email refers to electronic messages sent over the internet or a network. Email can contain both text and files.

In summary we will be looking at how we will apply the internet and email in communication by opening electronic mail addresses, executing the internet functions and determining network configuration.

Definition of key terms

Internet: Refers to the global interconnection of computers and computer networks to facilitate global information transfer. It is an interconnection of computers throughout the world.

Email: This is a worldwide system for sending and receiving electronic messages from one computer to another.

HTTP (Hyper Text Transfer Protocol): This is a standard protocol for communications between a web browser and a web server.

Web browser: This is a program that lets the user browse through information in the web. Intranet - Is an internal corporate network used in an organization to enable the sharing of documents among coworkers.

Extranet: It works in the same manners as intranet but provides information to selected users outside the organization.

Web pages: Documents published by organizations and individuals who are interested in putting themselves on the web.

Network configuration: This is the process of setting network controls, flow, and operation to support the network communication of an organization and or network owner. It is also known as network set up.

World Wide Web (WWW): This is a global (international) system of connected web pages containing information such as text, pictures, sound and video.

Content/Procedures/Methods/Illustrations

1.1 Opening and Applying Email Addresses in Workplace Communication

Electronic mail (email)

Email is a worldwide system for sending and receiving electronic messages from one computer to another. Email refers to electronic messages sent over the internet or a network. Email can contain both text and files. With email, users can create send messages to one user, several users or all the users on a distribution list. Most email software enables users to send text messages. Users can also attach files from word processors, spreadsheets, reports, production data etc. and then send them via email.

Components Required

For one to be able to communicate using email, the following components are required:

- A computer: Where you will send and receive email.
- An email program: Programs that let you send, receive and manage email messages. They include Microsoft outlook, outlook express, lotus notes and Eudora.
- Email addresses of the sender and the receiver.
- An internet service provider (ISP): Company who will deliver your messages to the receiver.

Opening or setting up an email or news account

To set up an email account, use an email program such as outlook express. Outlook express is a web browsing software that can help you exchange email messages on the internet. You will need the following information from your internet service provider or Local Area Network (LAN). For email accounts you need to know:

i. The type of mail server you use (POP3, IMAP or HTTP).
ii. Your account name and password.
iii. Name of incoming mail server,
iv. If you are using POP3 or IMAP, the name of an outgoing mail server.

To add a mail or news account

a) On the startup menu, point on the programs then click outlook express.
b) On the tool's menu click accounts.
c) In the internet account dialog box, click add button.
d) Select either mail or news to open the internet connection wizard and then follow the instructions to establish a connection with a mail or news server.

Email addresses

Each user has his/her own email address in form of computer storage space to receive messages. The email address is accessed via a computer terminal within the system. In addition, each user has a password to protect access.

Components of an email address

It consists of two parts separated by the symbol @ e.g. mnf@tropicalheat.com.

i. The first part of the address to the left side of @ refers to the person's identity or login name. e.g. mnf
ii. The second part following @ is the computers address. It is usually made up of 2 subparts to further identify the individual, organization(s) or country. In this case "tropical heat "identifies the business, ".com" is the extension which identifies the type of the organization.

Some activities done on the email

- Reading email messages.
- Reply email messages
- Creating and sending email messages.

Advantages of email

- It is cheap and economical.
- It is secure i.e. access can be restricted by a password.
- It is faster i.e. emails can be sent instantly.
- It is efficient i.e. messages prepared only once can be sent to several users.

Disadvantages of email

- Initial installation cost is high.
- Messages may be lost before they are read due to virus infection.
- High cost of storage.

1.2 Define and Execute Internet Functions

We study the internet to understand the services it offers, what is required in order to get connected as well as to establish a connection and log out of the internet. Internet refers to the global interconnection of computers and computer networks to facilitate information transfer. It is an interconnection of computers throughout the world using ordinary telecommunication lines and modems. Other names of the internet include: The net, Information superhighway, cyber space.

Features of the internet

- The internet is a collection of networks.
- Networks are connected by gateways that effectively remove barriers so that one type of network can "talk" to a different type of network.

Functions of the internet

- Communication: Internet communication capabilities include sending and receiving emails. You can send emails to your friends anywhere in the world, chat and send instant messages.
- Information retrieval: The internet is a library. Thousands of books, magazines can be read on the internet.
- Offering of information and products. You can find information, buy books online, check what the weather is like anywhere in the world and so much more.

Internet services

- Electronic mail [email]
- Online chatting
- Downloading of programs
- File transfer
- Video conferencing

Uses of the internet

- Buyers can do shopping online.
- Salespeople can use the internet to keep in touch with their home offices.
- Students can communicate and gather information.
- Researchers can get information.

1.3 Network Configuration

Network configuration /network set up is the process of setting a network control, flow and operation to support the network communication of an organization and or network owner**.** Network configuration allows a system administrator to set up a network to meet communication objectives. The process involves the following tasks:

a) Router configuration: Specifies the correct IP addresses and route setting.
b) Host configuration: Sets up a network connection on a host computer/laptop by logging the default network settings such as IP addressing, proxy, network name.
c) Software configuration: Any network-based software is allowed access and provided with the appropriate credential to monitor network traffic.

Broadly speaking, there are two types of network configuration:

i. **Peer-to-peer networks**: They are commonly implemented where less than 10 computers are involved and where strict security is not necessary. All computers have the same status hence the term "peer" and they communicate to each other on equal footing.

ii. **Client/server networks:** There are more suitable for larger networks. A central computer or server acts as the storage location for files and applications shared on the network. Usually, the server is a higher than average performance computer. The server also controls the network access of the other computer which are referred to as client computers.

Components of a computer network

- Minimum of at least 2 computers
- Cables that connect the computers to each other although wireless communication is becoming common.
- A network interface device on each computer. (NIC)
- A switch used to switch the data from one point to another. Hubs are outdated and are little used for new installations
- Network operating system software

Advantages of computer networking

- Speed
- Cost
- Resource sharing
- Flexible access
- Security.

4.4 World Wide Web (WWW or WEB)

The web is an internet application [software] that uses the internet as its network. The web is a collection of hyperlinked web pages published on the internet. The web is a global (international) system of connected web pages containing information such as text, pictures, sound, and video.

Web pages: Documents published by an organization and individuals who are interested in putting themselves on the web.eg text, pictures, sound, video,
Website: Collection of web pages belonging to an organization or individual
Web browser: Program that lets the user surf on the web. Some of the common types of web browsers are Internet Explorer, Firefox, Chrome, Microsoft Edge, Torch, etc.
Web hosting: A WWW server is a computer with programs that answers requests for documents from clients [browsers] over the internet.
Web address: (Uniform Resource Locator URL) An address is a location of a file. Each web page in the world has a unique internet address or location. The internet addresses are called URLs. e.g. URL of Microsoft is http://www.microsoft.com

Advantages of the internet

- One can download (copy) information from a website.
- Provides up to date information.
- Can be used for research.it is a fast way of communicating
- It doesn’t require a lot of training to browse.

Disadvantages of the internet

- It leads to spread of viruses.
- No copyrights rules is meant to protect the property of an organization.
- The cost of the internet service provider is high.

Conclusion

The unit dealt with applying internet and email in communication. We looked at how to open emails and applying them in workplace communication. We also looked at the components of the email, its advantages and disadvantages. We looked at the internet, its features and functions and we also looked at some of the network configurations

Further Reading

Panko, R. R. (2010). *Corporate computer and network security, 2/e*. Pearson Education India.

4.3.5.3 Self-Assessment

Written Assessment

1. The program that lets the user browse through information on the web is called.
   a) Intranet
   b) Extranet
   c) Web browser
   d) Web pages
2. In internet technology IP means?
   a) Internet provider
   b) Internet protocol
   c) Internet procedures
   d) Internet processor.
3. A website's front page/main page is called?
   a) Browser page
   b) Search page
   c) Home page
   d) Bookmark
4. Verification of a log in name and password is known as?
   a) Configuration
   b) Accessibility
   c) Authentication
   d) Logging in
5. The process of transferring files from a computer on the internet to your computer is called?
   a) Uploading
   b) Forwarding
   c) FTP
   d) Downloading.
6. Internet explorer falls under.
   a) Operating system
   b) Complier
   c) Browser
   d) IP address.
7. What is the full form of WWW in web address?
   a) World Wide Web
   b) Worldwide word
   c) Worldwide wood
   d) None of these.
8. What is an email?
9. What is an attachment?
10. What is Microsoft outlook?

11. What is the internet?
12. What is the World Wide Web?

Oral Assessment

1. What are some of the functions of the internet?
2. What are some of the advantages of the internet?

Practical Assessment

Open a web browsing application and go to address http://www.ecdl.org/mysampletestvs/

i. Name the second of the 2 logos displayed in the top of the screen that loads (not the ECDL logo).
ii. Click on the social networking link. What is this person's marital status?
iii. Copy and paste this person's education information into the answer box.

4.3.5.4 Tools, Equipment, Supplies and Materials

- Internet
- A computer/laptop
- An email program
- An ISP

4.3.5.5 References

LaMacchia, B. A., Lange, S., Lyons, M., Martin, R., & Price, K. T. (2002). *NET framework security*. Reading: Addison-Wesley.

Northcutt, S., & Novak, J. (2002). *Network intrusion detection*. Sams Publishing.

Panko, R. R. (2010). *Corporate computer and network security, 2/e*. Pearson Education India.

4.3.6 Learning Outcome No 5: Apply Desktop publishing in official assignments

4.3.6.1 Learning Activities

Learning Outcome No 5: Apply Desktop publishing in official assignments	
Learning Activities	**Special Instructions**
5.1. Identify desktop publishing functions and tools in accordance with manufactures specifications. 5.2. Develop desktop publishing tools in accordance with work requirements. 5.3. Apply desktop publishing tools in accordance with workplace requirements. 5.4. Enhance typeset work in accordance with workplace standards.	Computer software and hardware to be provided. Activities may be carried out in groups or as individual.

4.3.6.2 Information Sheet No4/LO5: Apply Desktop Publishing in Official Assignment

Introduction

In this unit we will cover the application of desktop publishing by identifying, developing and applying functions and tools. We will look at the definitions of desktop publishing, the desktop publishing software, designing a publication, using a DTP system and orienting terminologies. We can describe publishing as the process of producing publications such as newspapers, pictures, cards, pamphlets, books calendars, etc. that has a special text and graphical designs and layouts. Desktop publishing refers to the process of producing publications by designing their text and graphics layout using special desktop publishing software installed on the personal computers. We shall later be discussing the DTP later on this unit.

Definition of Key Terms

Desktop publishing: Refers to the process of producing publications by designing their text and graphics layout using special desktop publishing software installed on the personal computers. The text and graphical objects can turn be inserted, edited, formatted and printed.

Publishing: This is the process of producing publications such as newspapers, cards pamphlets pictures, calendars, books, etc. that has special text and graphical designs.

Type setter: This is the person designing publications.

Electronic pages: Commonly refers to the website, manuals, e-books, etc. which are normally not printed but shared digitally.

Virtual pages: On the other hand, are electronic pages created in a DTP software which are eventually published as printed pages.

Content/Procedures/Methods/Illustrations

5.1 Desktop Publishing Functions and Tools

Publishing is the process of producing publications such as newspapers, cards, pamphlets, books etc. that has special text layout and designs. Traditionally publishing involved drawing and writing manually on wooden or metallic boards. The artwork would then be painted with ink and pressed on papers to produce a printout. Today the art of publishing makes use of personal computers and small printers that are able to print high-quality text and graphics. All the publishing process can be done on a desk in the office or at home. Desktop publishing refers to the process of producing publications by designing their text and graphics layout using special desktop publishing software installed on personal computers.

Examples of desktop publishing

- Adobe page maker
- Adobe Photoshop: Used for editing and formatting photographs
- Adobe illustrations
- Microsoft publisher

Differences between a desktop publisher and a word processor

A DTP software gives the user more tools and control of the page layout, text manipulation and graphic design than a word processor.

However, word processor has been incorporated with text and graphic formatting and editing tools e.g. you can design a full publication in a Microsoft word by using the available drawing and picture tools, create columns.

Functions of the desktop publishing tools and software

a) **Graphic design**: This is the number one use for desktop publishing and can be held accountable for why the term has changed so much over the years. Professional graphics designers use the DTP programs such as QuarkXPress, Adobe page maker and Adobe Photoshop to create web Pages of newspapers and a variety of other visual documents.

b) **Career assistance**: Word processing also has played its part in the DTP world. Microsoft word and open office are used faithfully by numerous jobseekers everyday as the means to put together the perfect resume, cover letter or portfolio. Many create documents from scratch, while others take the advantage of the very convenient templates.

c) **Education**: In the education field, teachers and students use a variety of DTP programs to complete assignments and projects. Whether it is an introduction to desktop publishing course in QuarkXPress or a teaching writing course that takes in-depth look at Microsoft word, the use of a DTP in educational institutions is very prevalent.

d) **Business**: Today desktop publishing is pretty much used to handle all the "paperwork" of a business although it is possible to run a business without it the help of DTP, it the smartest business decision. Examples of DTP use in business are business cards, postcards and invitations.
e) **Crafts and personal project:** DTP is the crafters dream come true. Examples of desktop publishing project for personal use are greeting cards, postcards and invitations.

These five uses of desktop publishing software are only a few and after taking advantage of desktop publishing you will soon realize there are many other uses of DTP software that you didn't realize before. Desktop publishing has proven beneficial to corporations, the work at home and the starring artists. Some of the desktop publishing tools we will discuss them below:

i. Adobe page maker
ii. Adobe Photoshop-mainly used for editing and formatting photographs
iii. Adobe illustrator-used for creating complex freehand artwork such as drawing and logos
iv. Microsoft publisher
v. Harvard graphics

5.2 Desktop Publishing Tools

There are two types of DTP software:

a) Graphic-based: They are specifically developed for editing and formatting graphic object like pictures. Examples:

- **Adobe Photoshop**: A raster graphic editor developed and published by adobe for windows and Mac OS. This software has become the industry standard, not only in raster graphics but also in digital art as a whole.
- **Corel draw**: Is a vector editor developed and marketed by Corel corporations. It is also the name of the Corel graphics suite which includes the bitmap image of the editor Corel photo paint as well as the other graphics-related programs.

Graphic-based desktop publishers have superior capabilities for handling images such as setting resolutions, brightness contrast, cropping and filling images with color.

b) Layout-based: They are specifically developed to create different page layout designs and pictures. Examples:

- **Adobe page maker**: This is a discontinued desktop publishing computer program introduced in 1985 by Aldus. The combination of PageMaker using the Macs graphical user interface for document creation and the apple laser writer for output represented the starting point of what became the desktop publishing revolution in the late 1980.

- **Microsoft publisher**: This is a desktop publishing application from Microsoft word in that emphasis is placed on page layout and design rather than text composition proofing.

Other types of desktop publishing tools are:

- Adobe framework
- Microsoft power point
- Microsoft word
- Open office organization / Libre Office
- Luks cape

5.3 Applications or Where Desktop Tools are Applied

a) Desktop publishing in the workplace:

The ability to work with page layout or word processing software in the workplace is a skill that many employees find attractive. The HR employee who can set up and generate forms to onboard new employees, the manager who can design and print out an employee handbook and the sales manager who can format and print sales reports or direct mail pieces that someone without desktop publishing skill can't bring. Any workplace that has a desktop computer has the potential for handling some of its own design and print work. Including skills in this area or indicating comfort level with computers on a resume may make that resume stand out from the competition. Examples of typical items that business set up internally and either print or send out to a potential printer includes:

- Brochures
- Booklets
- Newsletters
- Forms

b) Desktop publishing in a home environment

Desktop publishing in a home is usually limited to small-run print projects for the family. A family with a desktop computer, software and a printer can produce many projects. Examples include:

- Greeting cards
- Post cards
- Family calendars

c) Other places desktop publishing thrives

In addition to business and home use, desktop publishing also exists in:

- Churches
- Schools
- Copy centers
- Sports teams

Designing a publication

Different publication has different design layout and formatting.

Types of publication

There are several types of publication that can be produced using DTP software. They include:

- Cards: They may be for special occasions such as weddings graduations, etc.
- Certificates: These are types of publications used to show completion of courses and special events
- Newspapers, magazines and newsletters: They contain news targeting a group of people.
- Books: Are bulky publications with many pages bound together.

5.4 Typesetting

Type setting is the composition of the text by means of arranging physical types or digital equivalent. Stored letters and other symbols (called sorts in mechanical systems and graphics in digital system) are retrieved and ordered according to a language orthography for visual display. Typesetting is the process of arranging letters numbers and characters on a printed or digital space. Typesetting is done to maximize print space, for graphic design purposes and generally to facilitate a given result for the orientation of text on a page. Typesetting began with the original printing presses, where this process was profoundly a manual task. Workers had to struggle with bulky machines and manually integrate letters and character, eventually sets of printed dies to set up typesetting for print production. The typesetting processes of today are radically different. Early digital typesetting information was stored on disk drives. Eventually tools like text markup languages as well as solid taste media and modern networking, evolved typesetting to the point where today processes rely on advanced algorithms that knows just to put and how to position on each letter and character.

Conclusion

This unit covered applying desktop publishing functions, tools, application of desktop in workplaces.

Further Reading

Toor, M. L. (1996). *The Desktop Designer's Illustration Handbook*. John Wiley & Sons.

4.3.6.3 Self-Assessment

Written Assessment

1. You have finished your travel brochures for social studies. How can you see what your document will look like before printing?
    a) View brochure
    b) Print review
    c) Open the brochure
    d) You can't you must print it first
2. Typing in ALL CAPS and small CAPS is the same thing?
    a) True
    b) False
3. Which photography file format is common printed documents?
    a) TYEG
    b) GIF
    c) TIFF
    d) AVL
4. All the following are design principles for desktop publishing EXCEPT
    a) Alignment and write space
    b) Random graphics and text
    c) Proximity and unity
    d) Consistency and contrast
5. Type of publication used to give out contract information usually printed on card stock is.
    a) Business card
    b) Letter head
    c) Brochure
    d) Newsletter
6. Type of publication that includes the name and logo of the company or individual, the address, phone number, email address and tax number is.
    a) Business cards
    b) Letter head
    c) Brochure
    d) None of these
7. What is using a computer and a software program to produce high quality, printed documents that combine text and graphics?
    a) Word processing software
    b) Desktop publishing
    c) Painting software
8. What is desktop pursing?
9. List two areas of DTP application
10. What is layering?

11. What is publishing?
12. List two examples of desktop publishing software.

Oral Assessment

1. Why is layering a very useful feature in a desktop publisher?
2. Why is a desktop publisher preferred in designing documents than a word processor?

Practical Assessment

1. Contribute a desktop published article to a publication. The production will include colour and graphics. It will be based on interview and other methods of research.
2. Produce a desktop published color advertisement for web or magazine publication. This will be based on a creative brief negotiated with a client and two other methods of research.

Project

Write and desktop published a formal report or discursive paper on an issue of concern. This production will use color and include graphics it will be based on an interview and two other methods of research.

4.3.6.4 Tools, Equipment, Supplies and Materials

- Desktop computers
- Laptop computers
- Desktops
- Printers
- Storage device e.g. hard drives, flash disks
- Internet
- Desktop publishing soft wares

4.3.6.5 References

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Blakey, S. *Logging on for Desktop Publishing.*

Covington, M. M. (1995). *Barron's Dictionary of Desktop Publishing*. Barron's Educational Series Inc.

Toor, M. L. (1996). *The Desktop Designer's Illustration Handbook*. John Wiley & Sons.

4.3.7 Learning Outcome No 6: Prepare presentation packages

4.3.7.1 Learning Activities

Learning Outcome No 6: Prepare presentation packages	
Learning Activities	**Special Instructions**
6.1 Identify types of presentation packages in accordance with office requirements 6.2 Create and formulate slides in accordance with workplace procedures 6.3 Edited and run slides in accordance with work procedures. 6.4 Print slides and handouts according to work requirements.	Computer software and hardware to be provided. Activities may be carried out in groups or as individual.

4.3.7.2 Information Sheet No4/LO6: Prepare Presentation Packages

Introduction

This unit covers preparation of presentation packages through identification of types of presentation, creation, editing and printing slides in accordance with office requirement and workplace procedures. In this unit we will cover presentation of presentation packages through identification of types of presentation, creation, editing and printing slides in accordance with office requirements. A presentation package is a software package suite that contains programs designed to accompany the speaker when he makes a presentation. It is always in form of a slide show. We will also discuss presentation software like PowerPoint and Impress. A presentation software is one of the application software that is used to display information in the form of a slide show. They have three major functions: an editor, a method and a slide show system to display content.

Definition of key terms

Presentation software: This is one of the application software that is used to display information in the form of a slide show.

Presentation package: This is a software package suite that contains programs designed to accompany the speaker when he makes a presentation. It is always in form of a slide.

Microsoft PowerPoint: This is a popular presentation software developed by Microsoft. It is available in Microsoft office packages. It is used to prepare presentation slides.

Content/Procedures/Methods/Illustrations

6.1 Types of Presentation Packages are identified in Accordance with Office Requirements

A presentation package is a software package that contains programs designed to accompany the speaker when he/she makes a presentation. It is always in form of a slide. Presentation soft wares have three major functions; an editor, a method and a slide show system.

- Editor: Allows text to be inserted
- Method: Used to insert and manipulate graphic language
- Slide show system: Displays content

The types of presentation packages (software) that we will discuss under the topic are:

- Microsoft PowerPoint
- Impress
- Windows moviemaker
- Slide shark

a) Microsoft PowerPoint

This is one of the popular presentation software developed by Microsoft. It is available in Microsoft office packages. You can prepare a slide by using PowerPoint. PowerPoint is available in different versions such as Microsoft office PowerPoint 2000, 2003 2004, 2007, 2010, etc. All PowerPoint files have.pptx extensions

Advantages of Microsoft PowerPoint

- The program is very easy to use.
- We can prepare presentation slides within a short period of time.
- We can insert images, videos etc.
- Various themes are available in this program.
- Many viewings options.
- Opportunity of animation.
- Slides can be printed.
- You can make fancy transitions between your slides.

b) Impress

Created by Sun Microsystems Inc. Impress is part of a suite of programs offered as a free download. It contains a word processor, a spreadsheet program and a drawing program.

c) Windows Moviemaker

This desktop video program was created by Microsoft and is pre-installed on every windows computer. Windows Moviemaker allows you to create and edit movies to use to accompany your presentation, although you can also add graphics, create a slideshow just as in PowerPoint and Impress.

NOTE: In the following sub-topics, we will discuss Microsoft PowerPoint

6.2 Slides Are Created and Formulated in Accordance with Workplace Procedures

When using PowerPoint, start by:

i. Clicking the start button located on the task bar
ii. Clicking all programs
iii. Clicking Microsoft office
iv. Then clicking Microsoft PowerPoint

You will be prompted to use options such as open an existing presentation or create a new presentation.

PowerPoint screen

The PowerPoint screen consists of:

- The title bar: Contains the current presentation, name and also minimize, restore and close button.
- Menu bar: Contains the menu used to design presentation.
- Standard toolbar: Commands icons to open, save, print, and spell check.
- Formulating toolbar: Contains fonts, font size, bold, italic, underline, alignment, font color etc.
- Task pane: Has all common functions that you might need when designing your presentation such as creating new project, new side etc.

Creating a new presentation

a) Launch power button from the window menu or select file to display the new presentation tasks pane.
b) Choose how to create a new presentation under the new area.
    - Autocorrect wizard: Offers the highest degree of help. It walks you through each step of creating a new presentation.
    - Design template: Provides a professionally designed color, background and font scheme that applies to the slides you created.
    - You can choose to start from scratch and create a totally blank presentation that is, building the presentation from the ground.
c) Click on one of the options to choose the PowerPoint new presentation pane and start creating your presentation.

6.3 Slides Are Edited and Run in Accordance with Work Procedures

i. Use of themes

A PowerPoint template is a pattern or blueprint of a slide or a group of slides that you can save as a .pptx file. Templates contain layouts, theme colors, theme fonts, theme effects, background styles and even new contents. We follow the following steps:

- Click on design tab
- Choose available themes or click on more button to search for other different themes.
- If the color of theme needs to be changed, then click on the drop-down arrow.

- If you like to choose or make different colors, then create new theme colors. Choose the color and click on save button.
- If the background needs to be changed, then click on background styles.
- Choose available backgrounds or click on format background to change the style of pictures and colors. Finally click on the close button.

ii. Changing layouts

You can change the layout according to the information added in your slide. Follow the following steps to change the layout of content.

- Click on the slide panel of home tab.
- Choose the layout according to content.

iii. Adding video

Video clips can be added to presentation in the following ways.

- Click the insert tab.
- Click the movie button from the media clips of the insert tab

iv. Slide transitions

Transitions are effects that are seen when you switch from one slide to another. To add a transition:

- Select the slide; that you want transistors
- Click the animation tab
- Click the appropriate animation or click the transition dialog box

v. Slide animation

Slide animation effects are predefined special effects that you can add to objects on a slide to apply an animation effect.

- Select the object.
- Click the custom animations from the animation tab. animation pane will appear on the right side of the screen.
- Click the add effect and choose the appropriate effect from the pane.

vi. Adding photo albums

To create a photo album, follow the following steps:

- Click the photo album button on the insert tab.
- Click on new photo album.
- Click on file/disk to add pictures to the photo album, then the photo album dialogue box will appear.
- Browse your photo to create an album.
- Select the required photos to keep in album.
- Click on the create button from the dialogue box. Now your photo album will be created.

vii. Adjusting slide transitions

- Add sound by clicking the arrow next to the transition sound.
- Modify the transition speed.

6.4 Slides and Handouts Are Printed According to Work Requirements

Printing a presentation

There are many options for printing a presentation. Steps to print a presentation are as follows:

a) Click on Microsoft office button.
b) Place the cursor over print.
c) Click on print preview.
d) Click the arrow next to print to change the print options.
e) To click from print preview, click print, then click the print preview button.

Package a presentation

There are times when you want to package a presentation with all of the additional files attached as well. To package a presentation for CD:

a) Click the Microsoft office button and click on publish.
b) Click package for CD and type the CD name.
c) Click copy to CD or copy to folder.

Conclusion

The unit covered preparation of presentation packages. This unit covered the presentation of packages. Creating, editing and printing presentations. The types of presentation packages especially Microsoft PowerPoint.

Further Reading

Lambert, J. (2016). *MOS 2016 Study Guide for Microsoft PowerPoint: MOS Study Guide Micro Power*. Microsoft Press.

4.3.7.3 Self-Assessment

Multiple Choice Questions

1. Material consisting of text and numbers is best presented as
    a) A table slides
    b) A bullet slides
    c) A title slides
    d) None of the above
2. To start slide show of a presentation
    a) Press f5 key
    b) From slide show tab choose to start from beginning option
    c) From slide show menu chose rehearse timing
    d) Both(A) and (B)
3. The effect applied to display when slide changes in slide show view is
    a) Slide transition
    b) Slide animation
    c) Custom transition
    d) None of the above
4. When you delete a text box object from a slide in PowerPoint presentation
    a) The text box and text both are deleted
    b) The text box is deleted, and the text is posted on the slide
    c) The object is deleted but text box and the text inside is left on the side
    d) None of the above
5. In a PowerPoint presentation
    a) Movie clips can be inserted but not sound clips
    b) Sound clips can be inserted but not movie clips
    c) Both can be inserted
    d) Only movie clips can be inserted
6. From which tab can you access picture, textbox and chart etc.
    a) Home
    b) Insert
    c) Transitions
    d) None of the above
7. Which one of the following is not part of a slide design?
    a) Design template
    b) Color scheme
    c) Slide layout
    d) None of the above
8. What is publishing?
9. What is presentation package?
10. What is Microsoft PowerPoint?
11. What is the purpose of presentation?

12. What is type setting?

Oral Assessment Questions

1. How many software packages do you know?
2. Explain the procedure of creating a new PowerPoint.

Practical Assessments

1. How do you know if you followed best practices for creating effective PowerPoint presentations?
2. How do you show your presentation online in PowerPoint?
3. How do you record a slide show in PowerPoint 2013?

Project

Create a video using PowerPoint 2013

4.3.7.4 Tools equipment supplies and materials.

- Desktop computers
- Laptops
- Printers
- Storage devices e.g. hard drives, CDs, flash disks
- Internet
- Presentation/packaging software e.g. Microsoft PowerPoint

4.3.7.5 References

Barbara, B. (2016). *Teach Yourself Visually PowerPoint 2016.*

Lambert, J. (2016). *MOS 2016 Study Guide for Microsoft PowerPoint: MOS Study Guide Micro Power*. Microsoft Press.

Lowe, D. (2018). *PowerPoint 2019 for Dummies*. John Wiley & Sons.

CHAPTER 5: ENTREPRENEURSHIP EDUCATION/ DEMONSTRATE UNDERSTANDING OF ENTREPRENEURSHIP

5.1 Introduction

Demonstrate understanding of enetrpreneurship unit of competence is among the seven basic competencies units offered in all the TVET Level 6 qualification. The unit covers the knowledge, skills, and behaviour required to demonstrate understanding of enterpreneurial culture. It entails understanding of an enterpreneur , enterpreneurship and self employment by identifying enterpreneural oppurtunities, creating awareness, developing and applying business innovative strategies. This unit is important to for employment creation, bridging unemployment and increasing innovativeness in econmic development thus economic growth.

The critical aspects of competency to be covered includes; distinguish enterprenuer and business persons, identify enterpreneurship oppurtunities and their legal aspects, identify business resources for self employment, generate business ideas, analyse business life cycle,develop business and finnacail plan, prepare executive summary and present business plan in accordance with principles and policies governing enterpreneurship.The basic resources required include check list, research tools and machines. The unit of competency cover seven learning outcomes. Each of the learning outcome presents; learning activities that covers performance criteria statements, thus creating trainee's an opportunity to demonstrate knowledge and skills in the occupational standards and content in curriculum. Information sheet provides; defition of key terms, content and illustration to guide in training. The competency may be assessed through written test, demostration, practical assignment, interview/oral questioning and case study. Self assessment is provided at the end of each learning outcome. Holistic assessment with other units relevant to the industry sector workplace and job role is recommended.

5.2 Performance Standard

Apply entrepreneurship and self-employment understanding, identify entrepreneurship opportunities and develop innovative business strategies in accordance to principles of entrepreneurship, business procedures and strategies and requirement for entry into self-employment and government policies.

5.3 Learning Outcomes

5.3.1 List of learning outcomes

a) Demonstrate understanding of who an entrepreneur is
b) Demonstrate knowledge of entrepreneurship and self-employment
c) Identify entrepreneurship opportunities
d) Create entrepreneurial awareness
e) Apply entrepreneurial motivation
f) Develop business innovative strategies
g) Develop business plan

5.3.2 Learning Outcome No 1: Demonstrate understanding of who an entrepreneur is

5.3.2.1 Learning Activities

Learning Outcome No 1: Demonstrate understanding of who an entrepreneur is	
Learning Activities	**Special Instructions**
1.1. Distinguish entrepreneurs and business persons as per principals of entrepreneurship 1.2. Identify types of entrepreneurs as per the principles of entrepreneurship 1.3. Identify ways of becoming an entrepreneur as per the principles of entrepreneurship 1.4. Identify characteristics of entrepreneurs as per the principles of entrepreneurship 1.5. Explore factors affecting entrepreneurship development as per principles of entrepreneurship	Outline the qualities of a good entrepreneur.

5.3.2.2 Information Sheet No3/LO1: Demonstrate understanding of who an entrepreneur is

Introduction

This learning outcome aims at equipping the trainee with knowledge of understanding best who is an entrepreneur, who he socially is, his characteristics, how an entrepreneur differs from business person, types of entrepreneurs, characteristics of entrepreneurs, factors affecting entrepreneurship, development as per the principles of entrepreneurship.

Definition of key terms

Entrepreneur: It is a person who creates initially small business and strives to maximize potential of their venture while simultaneously minimizing risk.

Entrepreneurship: This is a process of designing, launching and running a new business which often initially a small business along with its financial risks.

Self-employment: This is where an individual is in control of his/her own business, makes decisions affecting and enjoys all the profits of that business and incurring all the losses.

Business environment: Are those factors that affect the operations of a business. They may be internal or external environment.

Small scale enterprises: It is a type of an enterprise marked by a limited number of employees and limited flow of materials and finances.

Content/Procedures/Methods/Illustrations

1.1 **Distinguish between entrepreneurs and business Persons**

Table 7. Distinction between Entrepreneurs and Business person

Entrepreneur	Business person
An entrepreneur is an investor and the first creator of a product. He invests time, energy and money on his own idea. He doesn't start business from an unoriginal idea.	A business person can make a business out of an unoriginal business or product idea. He enters into existing business, such as franchising and retailing. He chooses a hot and profitable business idea regardless of whether it is original or a borrowed idea.
Entrepreneurs are more concerned on changing the world. They want to pursue their passion and achieve an ultimate goal.	Most business persons are doing business for profit, livelihood, for reaching their own boss.
Entrepreneurs takes crazy risks, and don't care of losing time and money just to pursue their passion.	Businesspersons take calculated and managed risks. They cannot afford to lose money or suffer from bankruptcy.
An entrepreneur is a friend and a leader. He finds peers and people whom he will never treat as machines.	A businessman is an employer and a manager. He hires to help his business grow.
An entrepreneur sees customers as his source of duty and fulfillment.	Businessperson sees customers as his source of sales and revenues.
Entrepreneurs try hard to beat his worst competition.	A businessperson tries harder to beat his competitors and win the competition
Entrepreneur sees the world as duty rather than an opportunity. Works as an artist his product is a masterpiece.	Businessmen sees the world as an opportunity. Businessmen doesn't waste any time

1.2 Types of entrepreneurs

a) **Innovator:** They come up with completely new ideas and turn them into viable business ideas.

b) Imitators: They are the types who copy certain business ideas and improve upon them.

c) Small scale entrepreneur: It is a type of entrepreneur that involves small business ventures. They lack the scale to attract venture capital but are funded by family and friends. Examples are; groceries, Consultants, carpenters and hairdressers.

d) **Scalable start-up entrepreneur:** Entrepreneurs start their company believing that their vision can change the world. Their funding comes from venture capital and they hire the best employees. Finding a scalable and repeatable business is the ultimate goal of the business. Examples are; Facebook, online shops, Instagram etc.

e) **Large company entrepreneurship:** through sustaining innovation, offering new products in order to meet with changing customers' needs and advanced technology. Often companies do this by partnering with or buying innovative companies. Examples are; Microsoft, Samsung, Google, etc.

f) **Social entrepreneur:** It is where an entrepreneur creates product and services to solve social need and problems. This can be non- profit, profit or hybrid. E.g. safe point trust by Marc koska which works to redesign medical tools and introduce inexpensive non-reusable syringes for underfunded clinics the world.

Importance's of entrepreneurship

- Create jobs: As much as entrepreneurs create job themselves. They also create a number of jobs opportunities with their business venture and as their businesses grow so the opportunities available increases.
- Creates change: When entrepreneurs make a product or explores ideas, it brings in change and improvement in the world.
- Entrepreneur give to the society: The more the money they make the more in taxes they pay which in turn funds public services. E.g. Bill Gates the founder of Microsoft is the biggest donor in charities and non-profit organization.
- Entrepreneurship have independence: They are their own boss this enables to work to their capacity and towards achieving the specific goal.
- Freedom of ideas: They are free to implement and make any change in the operation of the business.

Disadvantages of entrepreneurship

- Risk of business failure - There is no certainty of success.
- Long working hours especially in early stages of implementation.
- Income is varied and uncertain - It is difficult to estimate the income that you will be able to get in particular day or month.

1.3 Identify ways of becoming an entrepreneur

- **Be a risk taker**: Humans are generally risk averse, but part of being an entrepreneur is recognizing the risk that you should take. Successful entrepreneurs know which risk to take and which they shouldn't.
- **Exercise**: That is put the idea into action
- **Learning:** Getting new ideas from established entrepreneurs.
- **Networking:** Analyzing gaps in the market where you can invest in and working together with entrepreneurs of your area of specialization.
- **Trust yourself:** Being determined to achieve your goals.
- **Challenge yourself**: Compare yourself with the already established entrepreneurs.

- **Visualize goals:** Determine the needs and requirements of your goals.

1.4 Characteristics of entrepreneurs are identified as per the principles of Entrepreneurship.

Characteristics of Entrepreneurs

- **Self-motivated**: when you want to succeed you need to be able to push yourself. You aren't answerable to anyone else as an entrepreneur and that means that it's hard to get moving without anyone to make you.
- **Risk taker**: successful entrepreneurs know that sometimes it's important to take risks. Playing it safe sometimes never lead to success as a business owner.
- **Flexible**: Have the ability to be able to change as needed. Staying on top of your industry and be ready to adopt changes in the process and product as they are needed.
- **Passion**: Successful entrepreneurs are passionate. They feel deeply about their product or service or mission.
- **Basic money management skills and knowledge**: Understand how money works so that you know where you stand and so that you run your business on sound principles.
- **Network**: Being able to connect with others and recognize partnership opportunities can take you a long way as a business owner.

1.5 Factors affecting entrepreneurship development are explored as per principles of Entrepreneurship

Entrepreneurship is influenced by various factors:

- Economic development.
- Culture.
- Technological development.
- Education.
- Political factor
- Legal factor
- Capital

These conditions may have both positive and negative influences on the emergence of entrepreneurship.

a) **Economic factors**: Economic environment exercise the most direct and immediate influence on entrepreneurship. These factors include:
    - Capital.
    - Labor.
    - Raw materials.
    - Market.
    - Infrastructure.

b) **Social factors**: These can go a long way in encouraging entrepreneurship. In fact it was the highly helpful society that made the industrial revolution a glorious success in Europe. Main components of social environment include:

- Caste factor.
- Family background.
- Attitude of the society.
- Education.
- Cultural values.

c) **Technological factors**: Technology has influenced entrepreneurship development through innovations and use of internet to gather new and existing information.

d) **Education**: Many entrepreneurial theorists have propounded theories of entrepreneurship that concentrate especially upon psychological factors. They may include:
- Need achievement.
- Withdrawal of status respect.
- Motives.

e) **Political and government** changes in government policy can have a very huge effect on the business in question. Example the tobacco industries have been on forced to put warning labels on their product and lost the right to advertise on the television.

Conclusion

This learning outcome covered on the distinction between entrepreneurs and businesspersons, identify types of entrepreneurs, identify ways of becoming an entrepreneur, identify characteristics of entrepreneurs and explore factors affecting entrepreneurship development as per the principles of entrepreneurship.

Further Reading

Read more from internet on *"Ways of coming up with a Business plan"*

5.3.2.3 Self-Assessment

Written Assessment

1. Which of the following is not a principle of entrepreneurship?
   a) Accountability
   b) Flexibility
   c) Vision
   d) Laziness
2. Which of the following does not affect entrepreneurship economically?
   a) Infrastructure
   b) Education
   c) Labor
   d) Business

3. Identify types of entrepreneurship?
    a) Large scale entrepreneurship.
    b) Researcher entrepreneurship.
    c) Small scale entrepreneurship.
    d) Medium scale entrepreneurship.
4. Identify characteristics of an entrepreneur?
    a) Passionate
    b) Risk taker
    c) Prayerful
    d) Reliable
5. Entrepreneurship is a person who create initially small business risks his/her capital to maximize profit and minimize risks
    a) True
    b) false
6. Define entrepreneurship.
7. Identify principles of entrepreneurship.
8. Give five traits of an entrepreneur.
9. Describe the factors affecting entrepreneurship.

Oral Assessment

1. Distinguish between entrepreneur and business person.
2. Discuss factors affecting entrepreneurship development.
3. Identify ways of becoming an entrepreneur.

Practical Assessment

Kamau has got a good business idea, capital and has identified a better location to conduct his business. Using examples, identify six factors that Kamau should consider that his business lasts longer.

5.3.2.4 Tools, Equipment, Supplies and Materials

- Business Plan Template
- Computers
- Video clips
- Internet
- Case studies
- Mobile phone
- Overhead projectors
- Business journals
- Newspapers and Handouts
- Writing materials
- Films

5.3.2.5 References

Angels, Dragons and Vultures (2012) by Simon Aelaud. *Venture capital advice for entrepreneurs.*

Starting a successful business. *Start up and grow your own company* (2008) by Morris, M.J.

The $100 startup (2012) by Chris Guillebeau.

The entrepreneur equation: *evaluating the realities, risks and rewards* (2011) by Roth, Carol.

To be an entrepreneur, just get on with it (2016) by Deruan Miriam.

5.3.3 Learning Outcome No 2: Demonstrate Knowledge of entrepreneurship

5.3.3.1 Learning Activities

Learning Outcome No 2: Demonstrate knowledge of entrepreneurship and self-employment	
Learning Activities	**Special Instructions**
2.1. Distinguish between entrepreneurship and self-employment as per principles of entrepreneurship 2.2. Analyze the importance of self-employment based on business procedures and strategies 2.3. Identify requirements for entry into self-employment according to business procedures and strategies 2.4. Determine the role of an Entrepreneur in business according to business procedures and strategies 2.5. Identify the contributions of entrepreneurs to national development as per business procedures and strategies 2.6. Explore entrepreneurship culture in Kenya as per business procedures and strategies 2.7. Distinguish between Born or made Entrepreneurs as per entrepreneurial traits	Provide the requirements of self-employment.

5.3.3.2 Information Sheet No3/LO2: Demonstrate Knowledge of entrepreneurship

Introduction

This learning outcome equips the trainer with knowledge on how to differentiate and understand the relationship between entrepreneurship and self-employment, the importance, the contributions to the economy and how to explore different entrepreneurship opportunities.

Definition of key terms

Entrepreneurial traits: These refer to characteristics of entrepreneurship and are always possessed by the entrepreneurs. All the entrepreneurs possess these characteristics and they distinguish them from the other persons.

Entrepreneurship culture: It is the behavior that is possessed by most of the individuals. Are also the attributes, values, beliefs, and behavior in which an individual learns from one generation to another i.e. behaviors of carrying out entrepreneurship activities e.g. starting up a business.

Self-employment: This is where one is his/her own boss, is in full control of the business, makes all decisions affecting the business and enjoys all the profits of the business or incurs all the losses of the business.an individual can even hire employees to work for him or her.
National Development: This explains the benefits accrued from entrepreneurship to the nation. It may include benefits like revenues, employment, cohesion, infrastructure [lights roads, electricity] increased imports and exports among others.

Content/procedures/methods/illustrations

2.1 Distinguish between entrepreneurship and self-employment

To distinguish means recognizing the differences between two aspects in this case entrepreneurship and self-employment.

Table 8. Differences between entrepreneurship and self-employment

Entrepreneurship	**Self-employment.**
Doesn't have to physically be at the workplace, they have partners and employees who run the entire business for them hence flexible.	The individual is very hardworking and should be at the workplace for them to make money hence rigid.
Emphasizes on creating opportunity even though there may be no actual work or no income. Hopes for growth and expansion, is tolerant of great risk i.e. he is concerned about risk and reward	Emphasizes on maintaining a secure income and remain working – not tolerant of great financial risk.
Has invested in different businesses.	Normally have one business
Not everyone can be an entrepreneur, it is a title bestowed upon you. To becomes an entrepreneur when people see you as creative, inspired and overcome challenges	Anyone can be self-employed because anyone can have a business idea, register a company and try to make the business work.
One cannot start a business as entrepreneur i.e. I am self-employees, but one day I strive to be an entrepreneur.	One can starts as self-employed and not as an entrepreneur.
You can have people go are working with you and not just under you i.e. partners.	You can have people working for you i.e. employees.
The business outruns the existence of the owner because, workers are working with him hence understand vision, mission and value of the business.	If one decides to retire, the business dies as well because workers are working for him, hence just run the business of the owner, they do not understand the mind of the owner.

2.2 The importance of self-employment

To analyze means to interpret and explain in detail the importance of self-employment based on business procedures and strategies. The importance includes:

i. **Being your own boss**

One is control of all key decisions affecting his business because it is your business you have started. You work for your clients. Clients state what results they expect from you, but they do not direct your work. You are your own boss therefore you decide when and where and how to work to get the job done.

ii. **Flexibility**

To decide hours of operation, working conditions, business location. You do not have to go where your employer forces you to do work.

iii. **Harmony with your life**

If you are working for yourself, chances are you will be doing ok that you enjoy hence self-fulfillment.

iv. **Income generating**

If all goes well and you are making money, chances are you will make more money than you did while working for someone else.

v. **Profitable**

You get to enjoy all the business profits. If your business is doing well, you may not have to share proceeds with anyone else. The fruits of your labor will all be yours because you own the vineyard.

2.3 Requirements for entry into self-employment

i. **Identify business structure**: Determine whether your business will operate as a sole proprietorship or partnership. You can also set your business up as a limited liability company or as a corporation.
ii. **Register your business**: Apply to receive employer identification number. Also register your business with state and local tax offices.
iii. **Licenses and permits:** Seek for licenses and permits required to operate a business.
iv. **Record keeping:** Create and maintain accurate records. Items to list in your records are details of customers, dates sales or purchases, amount of sales, taxes collected on sold items and unsold.
v. **Taxes** – be aware of the taxes that apply to the business to ensure you are fully compliant.
vi. **Will you enjoy your work**? – You can only run a business you are passionate about because it brings happiness that satisfies your life goals. You will have to run a business that fill the sense of your purpose.

2.4 The role of an Entrepreneur in business

- **Initiator**: One who initiates the process of creating a business by coming up with the idea for the business and planning out how to turn that idea into a reality.
- **Risk taker**:He is the biggest risk taker in business because he is the one who invests capital and accountable in the face of failure.
- **Allocator**: He allocates various resources in the organization. These resources include; manpower, machines, funds, etc.
- **Forecasting**: He should be prepared on how to deal with various forecast changes such as strikes, machine breakdowns, budget cuts, legal policies, political or social unrest, technological advancement etc.
- **Adhering to legal norms**: To ensure the enterprise adheres to legal norms and policies. Not pertaining to this can mean serious legal consequences.
- **Reduces risk**: Best achieved by bringing people that can help the organization grow. These people can be stakeholders or investors that have stake in the company.

2.5 The contributions of entrepreneurs to national development

- Entrepreneurs spur economic growth. New products or services created by entrepreneurs can produce a cascading effect, where it stimulates relate businesses or sectors that need support the new venture, furthering economic development.
- Boosts national income. Entrepreneurial ventures help generate new wealth, additionally increased employment and higher earnings contribute to better national income in the form of higher tax, revenue and higher government spending.
- Entrepreneurs create social change. Through offering unique goods and services, entrepreneurs break away from tradition and reduce dependence on obsolete systems and technologies.
- Community development. Entrepreneurs regularly nurture venture by other likeminded individuals. They also invest in community projects and provide financial support to local charities.
- Conservation of foreign exchange – You are able to produce goods hence no need to import therefore contributing to conservation of foreign exchange.
- Promotion of entrepreneurial culture – They encourage individuals to set up and manage their business and this reduces importation of goods.

2.6 Entrepreneurship culture in Kenya

- Entrepreneurship culture in Kenya is influenced by the following factors:
- Availability of funds
- Modern technology
- Availability of developed infrastructure
- Appropriate knowledge and skills
- Appropriate training
- Government policies
- Individual strength and talents

- Availability of markets
- Availability of resources
- Culture
- Natural factors
- Political stability
- Competition
- Resource persons and entrepreneurs
- Social security

Born or made Entrepreneurs traits

Born entrepreneurs dream big, take what they want and never stop trying to achieve their goals. They have the following traits:

- Believe in themselves
- Have some security
- Takes charge
- Crafty and innovative
- Outspoken
- Observed with making money
- Fearless and thrive on challenges
- Take huge financial risks
- They can have a business idea that doesn't have to bring income instantly when it is implemented.

Made entrepreneurs are those that are self-made successful individuals. They may have different traits from those who were successful before. They have the following characteristics.

- Determined.
- Enjoy what they do.
- Serious.
- Risk taker.
- Can manage money.
- High level of confidence.
- Recognizes failure.
- Plan everything.

Conclusion

This learning outcome enhanced on distinguishing between entrepreneurship and self-employment, analyzing of the importance of self-employment, and determining the roles of an entrepreneur in a business. It also tackled on requirements for entry into self-employment, understanding the role of an entrepreneur in national development and explore the various entrepreneurship cultures in Kenya in accordance to business procedures and strategies. Lastly, it covered on the distinction between Born and made Entrepreneurs as per entrepreneurial traits.

Further Reading

www.google.com/*demonstrateknowledgeofentrepreneurshipandselfemployment*

5.3.3.3 Self-Assessment

Written Assessment

1. Which of the following do not influence entrepreneurship culture in Kenya?
    a) Culture
    b) Social security
    c) Psychological factors
    d) Family
2. The following are roles of an entrepreneur, which one is not?
    a) Allocator
    b) Licensing
    c) Risk taker
    d) Business planner
3. Which of the following is not a contribution of entrepreneurship in national development?
    a) Community development
    b) Family development
    c) Boosts national income
    d) Increase in revenue
4. Which of the following is not a requirement to entry into self-employment?
    a) Registration of business
    b) Record keeping
    c) Technology
    d) Lack of interest in the business
5. Define born and made entrepreneurs.
6. Define self-employment.
7. Discuss requirements to entry into self-employment.

Oral Assessment

1. Discuss relationship between entrepreneurship and self-employment.
2. Discuss the importance of self-employment.

Practical Assessment

Identify any entrepreneurship around you. Identify management and discuss the roles of the entrepreneurs.

5.3.3.4 Tools, Equipment, Supplies and Materials

- Business Plan Template
- Computers
- Video clips
- Internet
- Case studies
- Mobile phone
- Overhead projectors
- Business journals
- Newspapers and Handouts
- Writing materials
- Films

5.3.3.5 References

Angels, Dragons and Vultures (2012) by Simon Aelaud. *Venture capital advice for entrepreneurs.*

Starting a successful business. *Start up and grow your own company* (2008) by Morris, M.J.

The $100 startup (2012) by Chris Guillebeau.

The entrepreneur equation: *evaluating the realities, risks and rewards* (2011) by Roth, Carol. *To be an entrepreneur, just get on with it* (2016) by Deruan Miriam.

5.3.4 Learning Outcome No 3: Identify Entrepreneurship Opportunities

5.3.4.1 Learning Activities

Learning Outcome No 3: Identify Entrepreneurship Opportunities	
Learning Activities	**Special Instructions**
3.1. Identify sources of business ideas as per business procedures and strategies. 3.2. Generate business ideas and opportunities as per business procedures and strategies. 3.3. Analyze business life cycle as per business procedures and strategies. 3.4. Identify legal aspects of business as per procedures and strategies. 3.5. Assess product demand as per market strategies. 3.6. Identify and evaluate types of business environment as per business procedures. 3.7. Explore factors to consider when evaluating business environment based on business procedure and strategies. 3.8. Incorporate technology in business as per best practice.	Trainees should state business ideas.

5.3.4.2 Information Sheet No5/LO3: Identify Entrepreneurship Opportunities

Introduction

This learning outcome aims at equipping students with the knowledge on many opportunities in entrepreneurship. It entails sources of business idea and its generation, analyzing life cycle of a business, legal aspects, product demand and types of business environment, factors to consider when evaluating business environment based on business procedure and strategies.

Definition of key terms

Sources of business: These are the origins of business idea that can be used for financial gain that is centered on a product that can be offered money.

Product demand: A customer's willingness to purchase a product or services at a given price.

Business life cycle: They are phases that a business idea passes through from the time it is formed in the entrepreneur's mind to the time business rolls and expands or declines.

Business legal aspects: They are legal frameworks through which a business operates.

Content/Procedures/Methods/Illustrations

3.1 Sources of business ideas include:

- **Customer surveys**: Customer needs and wants to justify for the service or product that you can offer them.
- **Interests and hobbies**: Most people have founded great successful businesses while pursuing their interests and hobbies i.e. by doing what they love doing in their leisure times.
- **Brainstorming and dreams**: This starts with identifying a problem statement or question. Designing solution to these problems lead to business ideas.
- **Franchising**: It is a situation where sole traders mark distributor of a product gives exclusive rights to independent retailers for local distribution.
- **Mass media**: Include T.V. newspapers, internet, radio, and magazines. They are also a great source of ideas, information and opportunities.
- **Personal experience and talents**: Most of the ideas are also as a result of experience in a workplace.
- **Trade fairs and exhibitions**: Attending such events regularly makes one discover new services and products.

3.2 Generate business ideas and opportunities

To generate more business ideas and opportunities, one must be able to do the following:

- Meet new people
- Tap into your interests
- Keep “pain point” journal
- Travel
- Explore new ways of thinking
- Do your market research
- Go online
- Attending educational events

3.3 Business life cycle

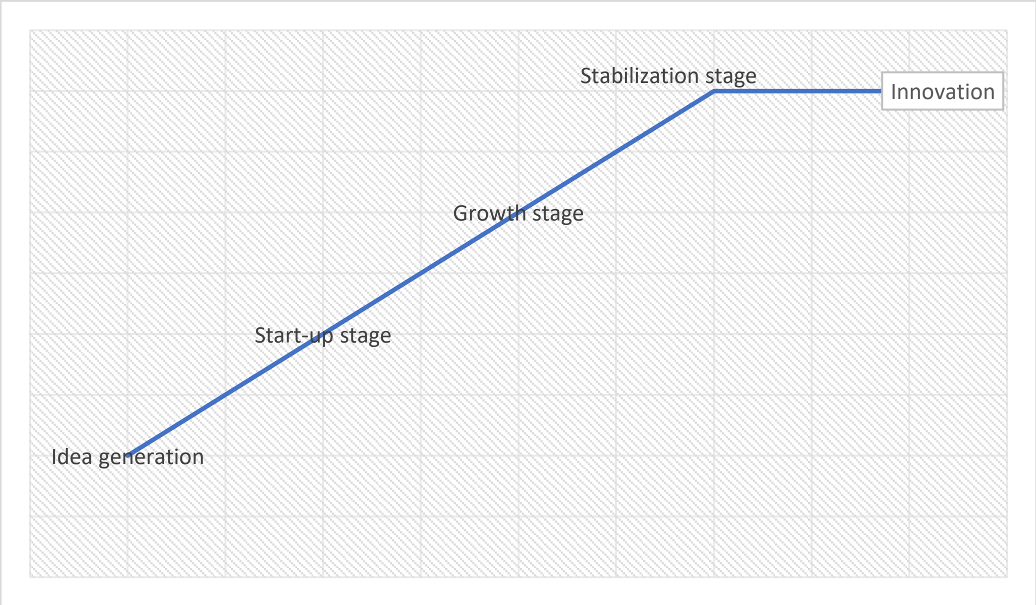

Figure 23. Business life cycle

Business life cycle refers to the phases that a business passes through from time the idea is formed in the entrepreneur's mind to the time business rolls and expands or even declines. Many businesses go through six stages in their life as shown below;

a) **Idea generation**: This is the preliminary stage for the business. Here, the entrepreneur does a lot of groundwork to access the viability of the venture he is about to get into.
b) **Start – up stage**: Activities may involve preparation of a formal business plan, registration of the business, sourcing capital, recruiting and designing the product. During this phase, sales are low but slowly increasing its sales as the time passes by. At this phase entrepreneurship concentrates with marketing their product and services to their target customers business are prone to incur losses in this phase.
c) **Growth stage**: at this stage of business common experiences may include:
    - Increased sales and profit
    - Wider market coverage in terms of geographical region
    - A growing number of employees
    - Variety of products and services
    - Increased competition
    - Need for additional expenditures
d) **Stabilization stage**: At this stage, business sales and profits stagnate. The business may also experience intensified competition. Sales may go down due to the presence of competitors in the market, profit margin starts to go down.
e) **Innovation stage**: Organizations that fail to innovate at stabilization stage are likely to decline. To ensure come back to growth, the entrepreneur is required to re-look

at the way's businesses have been conducted. The cash generation is higher than the profit on the income statement.

Among innovative attempts include:

- Change of management
- Repackage the product/service
- Change the technology
- New distribution methods
- Advertise and promote differently

f) Decline stage: This stage is not in normal plan of business. The entrepreneur does not foresee business declining at the start-up stage. Sales and cash flow all decline. Companies accept to extend their business venture by adapting to the changing environment. Firms loses their competitive advantages and finally exits the market.

3.4 Business Legal aspects

Businesses operate within a legal framework that for the most part, works. The legal aspects include:

- **Legal entity**: All businesses are categorized as some sort of legal entity that governs the way they are treated under the law. Some business structures are considered free standing entities that have special rights and the owners have limited liability. Others like sole proprietorship, the owner assumes all the liability and rewards.
- **Compliance**: Compliance to local (city and county), state and federal laws will be something that all businesses will need to deal with.
- **Contracts**: Most businesses will enter into a contract with a person or another business at some point in their existence. These contracts are what define how the working relationship will be carried out and who will be responsible for deliverables and payments.
- **Resolving disputes**: The legal system is set up to solve disputes. These disputes usually revolve around some sort of breach of contracts, violation of intellectual property or breaking the law.
- **A necessity that's not the evil**: Having good corporate counsel will make your business better.

3.5 Product demand Assessment

This involves determining how many units of products will be sold over the course of a year. Factors to include:

- Go over past sale records
- Use marketing projections to help estimate demand
- Use a competitor's sales data
- Pay attention to the local and global economy
- Estimate sales on recent performance

3.6 Types of business environment

Are factors that affect the function of the organization and how organization works directly or indirectly? They include internal environment which affects operations of a company are within the control of management and external environment which are beyond the control of the organization.

Internal business environment:

- **Financial**: Finances determine whether your company survives or dies. When money is limited it affects the operations of the business.
- **Employees and managers**: Employees are the major part of your company internal environment. They should be good at their jobs. On other hand managers should be good at handling lower-level employees and overseeing other parts of internal environment.
- **Resources**: Availability of resources can also determine how the business performs. Scarce resources will affect the number of sales made, quality of products or services produced and even the period which the business will last.
- **Company culture**: This consist of values, attitude and priorities that your employees live by. Your staff will infer your values based on the type of people you hire, fire and promote

External factors:

- **Competition**: Unless a company has unique features, competition will always be there. When you start a company, you will compete against more establishes and experienced businesses. Competition can either make or break your business.
- **Political**: Changes in government policy can have a very huge effect on the business in question. Example the tobacco industries have been on forced to put warning labels on their product and lost the right to advertise on the television.
- **Customers and suppliers**: Next to the employees, customers and suppliers are the second most important in your business. Suppliers have a huge impact on the cost and customers depend on how good your products are and whether you're advertising makes customers want to buy from you among others.
- **Economical factor**: In a bad economy, even a well-run business may not survive. High interest rates on banks and credit cards will discourage / limit the entrepreneur and customers spending on your products or services.

3.7 Factors to consider when evaluating business environment

- **Ability to manage cash**: You need to look at the ability to manage cash flow. Is there a start-up funding for your business? What about ways to keep funding your business each month. Figure out how cash flows will be managed and take a look at your business plan.
- **Passion and persistence**: Are you working with people who will get their jobs done? Do you trust they have passion for the work assigned to them? How will they

approach difficulties in case they face them in the future? You need to ensure that you have the passion to be in that business and the desire to come out of challenges.

- **Market size**: It's one of the most important factors when evaluating a business opportunity. Researching the market and figuring out whether there we market for your products and how big it is.
- **Relationships**: What is your relationship with the potential investors or customers? When you have more relationships the chances for your business to run smoothly is high.
- **Management skill sets:** What are the skills of those involved in your business? When looking for the business opportunity to invest in or expand into, look at the management. What skills do they have? Are they appropriate?

Incorporation of technology in business

- Provides for communication with customer: technology affects a firm's ability to communicate with customers. This is best achieved by use of internet.
- Efficiency of operations: Technology also helps a business understand its cash flow needs and preserve precious resources such as time and physical space.
- Security: Most businesses of the modern era are subject to security threats and vandalism. Technology can be used to protect financial data, confidential execution decisions and other proprietary information.
- Business culture and relations: Technology creates a team dynamic within a business because employees of different locations have better interactions.
- Research capacity: A business that has the technological capacity to research new opportunities will stay a step ahead of its competition. For a business to survive, it must grow and acquire new opportunities.

Conclusion

This learning outcome covered on how to identify sources of business ideas, generate business ideas and opportunities and analyze business life cycle, identify legal aspects, assess product demand, identify and evaluate types of business environment, explore factors to consider when evaluating business environment based on business procedure and strategies and demonstrate skill in incorporation of technology in business as per best practices and as per business procedures and strategies.

Further Reading

https://YouTube/f6nxcfbDFZo
https://YouTube/7bMpgBuoZY0

5.3.4.3 Self-Assessment

Written Assessment

1. Which of the following is not a legal aspect?
   a) Legal entity
   b) Compliance
   c) Franchising
2. Which one of the following is not a product life cycle stage?
   a) Innovative stage
   b) Continuity stage
   c) Growth stage
3. Which one of the following is not a source of business idea?
   a) Customer survey
   b) Personal experience and talents
   c) Business plan
4. Business life cycle is the phases that a business passes through from the time its generated in the entrepreneur's mind to the time business roll
   a) True
   b) false
5. Discuss business life cycle.
6. Identify 5 sources of business idea.
7. Identify types and factors affecting business environment.
8. Identify and discuss 5legal aspects of the business.

Oral Assessment

1. Discuss using examples business environment.
2. What is the content of legal aspects of a business?

Practical Assessment

Imagine you are the CEO of XYZ limited; you are required to come up with strategies that will see the business through for some time. Identify factors that you will consider that are beyond your control.

5.3.4.4 Tools, Equipment, Supplies and Materials

- Business Plan Template
- Computers
- Video clips
- Internet
- Case studies
- Mobile phone
- Overhead projectors

- Business journals
- Newspapers and Handouts
- Writing materials
- Films

5.3.4.5 References

Angels, Dragons and Vultures (2012) by Simon Aelaud. *Venture capital advice for entrepreneurs.*

Starting a successful business. *Start up and grow your own company* (2008) by Morris, M.J.

The $100 startup (2012) by Chris Guillebeau.

The entrepreneur equation: evaluating the realities, risks and rewards (2011) by Roth,

5.3.5 Learning Outcome No 4: Create Entrepreneurial Awareness

5.3.5.1 Learning Activities

Learning Outcome No 4: Create Entrepreneurial Awareness	
Learning Activities	**Special Instructions**
4.1. Explore Sole proprietorship, Partnership, Limited companies and Cooperatives (forms of businesses) as per business procedures and strategies. 4.2. Identify sources of business finance are as per business procedures and strategies. 4.3. Identify factors for selecting source of business finance as per business procedures and strategies. 4.4. Determine governing policies such as; (Increasing scope for finance, promoting cooperation between entrepreneurs and private sector, reducing regulatory burden on entrepreneurs and developing IT tools for entrepreneurs) on Small Scale Enterprises (SSEs) as per business procedures and strategies. 4.5. Explore problems of starting and operating SSEs as per business procedures and strategies.	Give examples of sources of business finance

5.3.5.2 Information Sheet No5/LO4: Create Entrepreneurial Awareness

Introduction

This learning outcome aims at equipping trainers with knowledge on making awareness on entrepreneurship by identifying business forms, sources of finances and factors to consider when selecting them, governing policies among others and problems that SMEs encounter.

Definition of key terms

Forms of Business: They are different business structures like sole proprietorship, partnerships, limited companies, corporations among others.

Governing policies: These are written regulations and laws laid by the government that businesses must comply with.

Small Scale Enterprises: This is a privately owned and operated business characterized by a small number of employees, require small capital to start etc. A business is regarded as small depending on the regulations of a country.

Content/procedures/methods/illustrations

4.1 Forms of businesses are explored as per business procedures and strategies

1. **Sole proprietorship**

This is a form of business that is owned by one person.

Advantages

- It needs no charter to establish it.
- There are few casts that are related to its establishment.
- All the profits go to the owner of the business without sharing with anyone.
- Easier to raise startup capital that is from the owner's savings.
- You are your own boss.
- Flexible to start your business at any location, anytime of the day.
- Motivation because you get all the profits.
- One has a personal contact with customers hence can be able to respond to their requests.

Disadvantages.

- In case of loses, the sole proprietor bears all the loses by himself/herself.
- The sole proprietor will have to work very hard to sustain the business hence leaving less time for leisure/recreation.
- A sole proprietor has unlimited liability that is a creditor with a claim against a sole proprietor would normally have a right against all of his/her assets whether business or personal.
- Poor and uninformed decisions made by the owner of the business may lead to the collapse of business completely.
- One has nobody to discuss the business problems with.
- One has limited finance or capital hence the business will remain small.

2. **Partnership**

It is a relationship that exists between two or more persons carrying on a business common with a view to making profit. It is an agreement when two or more persons combine their resources in a business with a view of making profit. When two or more persons wish to form a partnership, then it is recommended that they agree on the terms upon which to form a partnership. This is done in writing signed off as agreed by all the partners and therefore it becomes a partnership deed or agreement.

Contents of partnership agreement

- Name and address (s) of the firm and the partners.
- Capital to be contributed by each partner.
- The profit-sharing ratios expressed as a fraction or percentage.
- Salaries to be paid to the partners.
- Any interest to be charged on drawings by the partners.
- Interests to be given on partners on their capital balances.
- Procedures to be taken on retirement or admission of a new partner.

3. **Membership**

It has a minimum membership of two (2) and a maximum of fifty (50) except for professions firms, e.g. lawyers, doctors whose maximum membership is twenty (20).

Types of partnerships

- **General partnership**: in this, all the members share the management of the business and each is personally liable for all the debts and obligations of the business. Each partner is responsible for and must assume the consequences of the actions of the partner.
- **Limited partnership**: some members are general member who control and manage the business and may be entitled to a greater share of profits. A legal document setting out specific requirements must be drawn up for a limited partnership.

Advantages

- Additional capital can be raised in case a sole trader is not able to raise sufficient capital.
- There is increased expertise in certain areas of business because of existence of many partners who are skilled differently.
- Informed decisions and judgments can be made since the partners are involved in the decision-making process.
- It is a tax pass through entity.

Disadvantages

- Wastage of time in decision making since all the partners must be consulted which takes time.
- All partners are liable to payment of all the losses that accrue in the business.
- Some members have limited liability while others have unlimited liability.
- Can be dissolved at any time either due to the exit or death of a partner.
- If one partner is inefficient or dishonest, everybody loses.

4. **Limited companies**:

It is a type of business structure that has been incorporated at company's house as a legal 'person'. It is completely separate from its owners. It can enter into contracts using its own name and it's responsible for its own actions, finances and liabilities.

Characteristics of a limited company

- Separate legal existence- It is its own separate legal person from the owners of the business.
- Limited liability- Shareholders are legally responsible for the debts of the company only to the extent of the nominal value of their shares.
- Flexibility in taxation- Members of the corporation have the ability to choose the form of taxation that makes the most sense for the business i.e. can choose to be taxed as Subchapter corporation or Subchapter corporation.
- Simplicity in operation- Does not require to have shareholders meetings, appoint the board of directors to run the company i.e. Simplicity in operation while the

corporation with no shareholders meetings, therefore there is no attendant preparation of filing of minutes of the meetings i.e. simplicity in documentation.

Advantages

- Protection of the company's name- It is an entity separate from its owners, and its own rights, responsibilities and liabilities, can file a lawsuit or can be sued in its own name.
- A limited company is tax efficient i.e. tax flexibility
- Personal liability is limited. - Debts are only to the extent of the nominal value of their shares.
- Perpetual existence – Owners of the entity can change without triggering the dissolution of the company unless stated otherwise in the articles of the organization. A member's death, retirement, withdrawal etc. doesn't mean that the company must cease to operate.
- Less paperwork – Having limited company operating agreement to create rules that govern your business hence less paperwork for compliance of rules of your state.
- High status of the company will attract investors and customers.

Disadvantages

- Required to pay a registration fee to company's house to incorporate i.e. legal formalities.
- Company name is subject to certain restrictions.
- More complex and time-consuming accounting requirements.
- Strict procedures for withholding money from the business.
- Owners lose control when the original owners hold less than 51% of shares.
- Selling of shares is expensive because of the commission paid to banks to aid in selling shares and costs of printing the prospectus.

5. **Cooperatives**

It is a group of individuals who have specific common needs. Its purpose is to improve the economic status of the members.

Advantages

- Tax advantage: Exempted from income tax and surcharge on its earnings up to a certain limit.it is also exempted from stamp duty and registration fee.
- Democratic management: Managing committee elected by members on the basis of one member one vote irrespective of the numbers of shares held.
- State assistance: This is done by the government as they see cooperatives as an effective socio-economic instrument of change therefore offered grants, loans, financial assistance to make their work more effective.
- Open membership: Anyone can join irrespective of their color, age, religion, economic status and there is no limit on maximum members.
- Limited liability: The liability is reduced to the extent of their capital in the cooperative societies.

- Social service: The basic philosophy of cooperatives is self-help and mutual help. Thus, cooperative foster fellow feeling among their members and inculcate moral values in them for a better living.

Disadvantages

- Lack of mutual interest: All members are not imbued with a spirit of cooperation and such absence breeds mutual rivalries among its members.
- Corruption: In a way, lack of profit motive breeds fraud and corruption in management. This is reflected in misappropriation of funds by the officials for their personal gains.
- There is slow decision making since all members of the managing committee have to be consulted.
- Less capital incentives which does not appeal to long term investors.

4.2 Sources of business finance are identified as per business procedures and strategies

- **Owner's capital**: It is the only source of capital for the sole trader starting business. This type of capital through when invested is often quickly turned into long term fixed assets which cannot be readily converted into cash.
- **Ploughed back profit**: It is the most basic source of funds for a company. Firms profit by selling a product for more than it cost to produce.
- **Borrowings**: like individuals, companies can borrow money. This is done privately through bank loans or publicly through a debt issue.
- **Overdraft**: Is a form of a loan from a bank. A business becomes overdrawn when it withdraws more money than is available in the account. This leaves a negative balance on the account. It is often a cheaper way of raising capital.
- **Leasing**: A business has the use of an asset but pays a monthly fee for its use and will never own it. A business looking to purchase equipment may decide to lease if it wishes to improve its immediate cash flow.
- **Issue of shares:** A company can generate money by selling part of itself in the form of shares to investors which is known as equity funding.

4.3 Factors to consider in selecting source of finance of the business.

- Cost of capital: Every source of capital comes with a cost. The cost of getting capital should not be extremely high. Most businesspeople prefer debt to equity because its cost is low due to interest tax shield they are not taxed, which lowers the cost of capital.
- Risk of the business: When choosing a source of finance, one should consider how much risk the business will face when they acquire that source of capital. That source of capital should not put the business at a very high risk.
- Control of the business: Owners of the business who do not want to lose the control of the business would rather finance the business using debt rather than equity which will dilute the ownership of the business.

- Purpose of the borrowing: If the reason for acquiring the source of finance is to purchase noncurrent assets, the business would rather use long term sources of finance to fund acquisition of non-current asset.
- The size, status and ability of the business to borrow: If the business has assets which it can use as collateral, it can consider borrowing loans from financial institution.

4.4 Governing policies on Small Scale Enterprises (SSEs) are determined as per business procedures and strategies

All the state governments provide technical and other support services to businesses through their directorates of industries. The government accords the highest preference to development of the small scale enterprises by forming and implementing suitable policies and promotional schemes. Thus, government play supportive role in developing entrepreneurs. The following are common areas of support:

- Development and management of industrial estates.
- Suspension/deferment of sales tax.
- Power subsidies.
- Capital investment subsidies for new units set up in a particular area.
- Seed capital/margin money assistance scheme.
- Priority in allotment of power connection, water connection.
- Consultancy and technical support.

4.5 Problems of starting and operating SSEs are explored as per business procedures and strategies

- **Financial constraints**: Finance has made it difficult to progress and provide quality services. Financial institutions find it hard to consider lending loans to them as they have little assets that could be used as collateral.
- **Competition**: The low comparative advantage in production of certain goods as compared to our trading partners. This has restricted entry to the businesses as production costs may be higher relative to the cheap imported goods.
- **Lack of advanced technology**: Technology is fundamental and a prerequisite to higher output levels and reduced production costs. This has made them not to flourish and participate in regional trading due to low quality output because of the use of obsolete technology.
- **Insecurity**: Security poses a great challenge to small scale business owners in Kenya. Many of the businesses suffer loss due to theft or thug's invasion who steal from them which lead to loss in terms of destruction.
- **Hawkers**: Pose a challenge to small scale businesses because they sell cheaper and their goods are of high quality. Competing with hawkers on prices is debatable since hawkers move from one place to another bargaining on price. Since most of them don't consider a lot of profit but sale of goods.

Conclusion

This learning outcome was based on exploring the various forms of business, identifying sources of business finance, critical factors to consider while selecting business finance source, determine governing polices for small scale enterprises and explore challenges for starting and operating SSEs.

Further Reading

https://www.google.com/Create+Entrepreneurial+Awareness&oq=Create+Entrepreneurial+Awareness

5.3.5.3 Self-Assessment

Written assessment

1. Which one is not a form of business?
    a) Sole proprietorship
    b) Partnership
    c) Self-employment
    d) Limited company
2. Which is not source of business finance?
    a) Owner's capital
    b) Borrowings
    c) Taxes
    d) Issue of shares
3. Which is not a factor in selecting business finance?
    a) Cost of capital
    b) Risk
    c) Flexibility
    d) Purpose of the borrowing
4. Discuss partnership membership.
5. Identify sources of business finance.

Oral Assessment

Differentiate between private and public limited companies.

Practical Assessment

As the manager of your small enterprise, you are required to come up with procedures of starting and operating small and medium enterprises.

5.3.5.4 Tools, Equipment, Supplies and Materials

- Business Plan Template
- Computers
- Video clips
- Internet
- Case studies
- Mobile phone
- Overhead projectors
- Business journals
- Newspapers and Handouts
- Writing materials
- Films

5.3.5.5 References

Angels, Dragons and Vultures (2012) by Simon Aelaud. *Venture capital advice for entrepreneurs.*

Eckhardt, J. T., & Shane, S. A. (2003). *Opportunities and entrepreneurship*. *Journal of management*, *29*(3), 333-349.

Kirzner, I. M. (2015). *Competition and entrepreneurship*. University of Chicago press.

5.3.6 Learning Outcome No 5: Apply Entrepreneurial Motivation

5.3.6.1 Learning Activities

Learning Outcome No 5: Apply Entrepreneurial Motivation	
Learning Activities	**Special Instructions**
5.1. Determine internal and external motivation factors in accordance with motivational theories. 5.2. Conduct self-assessment as per entrepreneurial orientation 5.3. Carry out effective communications in accordance with communication principles. 5.4. Apply entrepreneurial motivation as per motivational theories.	State examples of motivation to entrepreneurs.

5.3.6.2 Information Sheet No3/LO5: Apply Entrepreneurial Motivation

Introduction

This learning outcome aims at enlightening students with information on how to apply entrepreneur motivation through determining both internal and external motivation factors accordance with motivational theories, the communication principle and how to apply entrepreneur motivation into the business as per motivational theories.

Definition of key terms

Internal motivation Factors: These are factors that aim to motivate the behavior of an individual arising from within the individual because it’s naturally satisfying them.

External Motivation factors: These are those factors that aim to motivate the behavior of individual in order to receive an external reward or outcome.

Motivation theories: These are the forces acting on or within a person that causes the arousal, direction and persistence of reaching a goal.

Communication Principles: These are the proven guidelines that are followed in giving and receiving a message to another person with an intention to evoke a response.

Entrepreneurial Motivation: It is the process that activates and motivates the entrepreneur to exert higher level of efforts for the achievement of his/her entrepreneurial goals.

Content/procedures/methods/illustrations

5.1 Factors for internal and external entrepreneurial Motivation

Most researchers have classified all the factors motivating entrepreneurs into internal and external factors as follows:

Internal factors

Examples;

- Participating in a sport because its fun and you enjoy it rather than doing it to win an award.
- Spending time with someone because you enjoy their company not because they can further your social standing.
- Volunteering because you feel content and fulfillment rather than needing it to meet a school or work requirement.

Factors for internal motivation

- Curiosity: The desire to know pushes us to explore and learn the sole pleasure of learning and mastering.
- Challenges: These makes us to work at a continuous pace and work hard towards achieving our meaningful goals.
- Recognition: We all have a need to be appreciated and recognized when we do something good.
- Cooperation: Cooperation with others satisfies our need of belonging and achieving our shared goal.
- Fantasy: This involves using our mental and visual image to stimulate your behavior.

External factors

Examples;

- Competing in sports for trophies.
- Completing a task for money.
- Buy one get one free sale.
- Doing things in public for fame etc.

Factors affecting external motivation factors

- Financial rewards: Commission, bonuses, stock options and employees stock plans are compensatory rewards that motivates individual to working even more harder to receive more of it.
- Praise and recognition: Some people aim to be praised and recognized when they do their assigned task properly. This is also a motivating factor as they will do more for them to be recognized.
- Social groups: The need to belong somewhere and to be accepted will trigger some actions making people to work or try things in order to keep them up with the team.
- Consequences: People will opt to do or not to do things as a result of the consequences arising for their actions.

- Promises: This is a commitment by someone to do or not to do something. It's an external motivating factor for some reason's individuals will choose to do or not to certain things in accordance to the promise in question.

Motivation Theories

Are divided into content theories that focus on what while the motivation theories focus on how. The main content theories are; Maslow's needs hierarchy, Alderfer's ERG theory, Mc Cleland's achievement motivation and Herzberg's two factor theory. Process theories are; skinners reinforcement, Victor Vroom's expectancy, lockers goal setting theory.

a) Maslow – hierarchy of needs

Earliest and mostly widely known. It was developed by Abraham Maslow.
It is often showed in the shape of a pyramid.

Figure 24. Maslow's hierarchy of needs. Source: https://www.verywellmind.com

i. **Physiological needs**: Includes most basic needs for humans to survive and are the most dominant of all needs. They include; food, water and shelter. Maslow emphasized that our body and mind cannot function well if these requirements are not fulfilled.
ii. **Safety and security**: Refer to a person's desire for protection or security. They include; personal security, financial security, health and well-being.
iii. **Belongingness and love**: Love involves giving and receiving affection. Maslow claimed people need to belong and accepted among their social groups.
iv. **Esteem needs**: It is respect for a person as a useful, honorable human being. Humans need to be valued and self-respected.

v. **Self-actualization**: Reflects on an individual's desire to grow and develop to his/her fullest potential.

NOTE: According to Maslow, "what humans can be then they must be".

b) **Alderfer –ERG THEORY**: Existence needs, relatedness needs and growth needs. ERG theory says, if the manager concentrates only on one need at a time, he/she won't be able to motivate the employee effectively. He therefore divided the needs into;

i. Existence needs: it includes needs for basic material necessities.
ii. Growth needs: is the need for self-development, personal growth and advancement form. This class contains Maslow's social needs and external component of esteem needs.
iii. Relatedness needs: these are individual need significant relationships. It contains Maslow's social needs and external component of esteem needs.

c) **McClelland theory**: Need for achievement affiliation and power.

This theory differs from Maslow's and Alderfer's theory. This dominant motivator depends on our culture and life experiences. The motivators are:

i. Achievement motivation: It's influenced by internal drivers for action and pressure used by the prospects of others. Individuals with high need of achievement like to receive regular feedback on their progress and achievements and often like high degree of independence.
ii. Affiliation motivation: It is a need for love, belongingness and relatedness. They have a strong need for friendships and want to belong within a social group, need to be liked and held in popular regard.
iii. Authority/power motivation is a need to control over one's own work or work for others. These persons are authority motivated. There is a strong need to lead and succeed in their ideas.

d) **Herzberg-two factor theory.**

Also known as motivation-hygiene theory. This theory says that there are some factors that cause job satisfaction and motivation and some separated factors (hygiene factors).

Hertzberg's five factors of job dissatisfaction

- Company policy and administration
- Supervision
- Salary
- Interpersonal relations
- Working conditions

Hertzberg's five factors of job satisfaction

- Achievement
- Recognition
- Work itself
- Responsibility

- Advancement

Process theories

a) **Skinner's reinforcement theory**

It says that behavior can be formed by its consequences.

In it is stated that reward must meet someone's needs, expectations, must be applied equitably and must be consistent. The desired behavior must be clear and realistic.

b) **Vroom's expectancy theory**

Emphasizes on the process and content of motivation. It aims to explain how people choose from the available actions.

The motivation to engage in an activity is determined by appraising three factors. They are;

i. Expectancy: A person's belief that more effort will result in success.
ii. Instrumentality: The person's belief that there is a connection between activity and goal. If you perform well, you will get a reward.
iii. Valence: It is the degree to which a person's values the reward; The result is success.

c) **Locker's goal setting theory**

It is an integrative model of motivation. It emphasizes that setting specific, challenging performance goals and the commitment to these goals are key determinants of motivation. Goals describe a desired future and these established goals can drive the behavior. Achieving the goals, the goal accomplished further motivates individuals to perform.

It is a useful theory which can be applied in various fields.

Assessment for entrepreneurial Orientation

The first dimensions of entrepreneurial orientation to be consistently identified by organizational research were innovativeness, risk taking and pro-activeness. Innovativeness refers to the propensity towards creativity and experimentation through the introduction of new products and services. Risk taking is the degree to which firms, or managers are willing to consider investing in resources. The relationship between pro-activeness and personal initiative is congruent with studies conducted in organizational settings.

Entrepreneurial Communication Principles

- Completeness: The message must be complete and geared to the receiver perception of the world.
- Concreteness: The clearness of the message
- Courtesy: Approaching the audience in a friendly manner
- Correctness: Message should be grammatically correct and avoid wrong use of verbs.
- Clarity: Clear language is characterized by short and concrete words.

Application of Entrepreneurial motivation theories

- In the case where there is need for achievement, affiliation and need for power as stipulated by McClelland.
- Where there is need to establish entrepreneurial personality.
- If there is need for high achievement in a particular form of business.

Conclusion

The learning outcome covered on internal and external motivation, self-assessment and effective communication as well as application of entrepreneurial motivation as per motivational theories, communication principles and entrepreneurial orientation.

Further Reading

https://www.google.com/Entrepreneurial+Awareness+Entrepreneurial+Awareness

5.3.6.3. Self-Assessment

Written Assessment

1. Which is not a theory in motivation?
   a) Maslow
   b) McClelland
   c) Jeanery
2. Identify entrepreneurial communication principles.
   a) Asking too many questions
   b) Being concise
   c) Taking two topics at a time
3. Which one is not among the Herzberg's factors of job satisfaction?
   a) Achievement
   b) Work it-self
   c) Self-motivation
4. Define motivation and its factors.

5. Discuss entrepreneurial communication principles.
6. Giving examples, explain internal and external motivational factors
7. Explain the following terms
8. Communication principles
9. Entrepreneur motivation

Oral Assessment

Apply entrepreneurial motivation theories.

Practical Assessment

Identify and discuss the process theories.

5.3.6.4 Tools, Equipment, Supplies and Materials

- Case studies
- Computers
- Overhead projectors
- Internet
- Mobile phone
- Video clips
- Films
- Newspapers and Handouts
- Business Journals
- Writing materials

5.3.6.5 References

Angels, Dragons and Vultures (2012) by Simon Aelaud. *Venture capital advice for entrepreneurs.*

Starting a successful business. *Start up and grow your own company* (2008) by Morris, M.J.

The entrepreneur equation: *evaluating the realities, risks and rewards* (2011) by Roth, Carol.

To be an entrepreneur, just get on with it (2016) by Daruan Miriam.

5.3.7 Learning Outcome No. 6: Develop Business Innovative Strategies

5.3.7.1 Learning Activities

Learning Outcome No 6: Develop Business Innovative Strategies	
Learning Activities	**Special Instructions**
6.1. Determine business innovation strategies in accordance with the organization strategies. 6.2. Demonstrate creativity in business development in accordance with business strategies. 6.3. Develop innovative business strategies as per business principles. 6.4. Create linkages with other entrepreneurs as per best practice. 6.5. Incorporate ICT in business growth and development as per best practice.	Have a clear understanding on innovative strategies

5.3.7.2 Information Sheet No3/LO6: Develop Business Innovative Strategies

Introduction

This learning outcome aims at equipping the trainers with knowledge on business innovative strategies in accordance with organizing strategies. It makes the students more creative and creation of linkages with other entrepreneurs and how to incorporate ICT in business for objectives to be achieved.

Definition of key terms

Business innovative strategies: A plan used by a company to encourage advancements in technology or services usually by investing money in research and development activities.

Business growth: This is a stage where the business reaches a point of expansion and seeks additional options to generate more profit.

Business Development: Is the creation of long-term value for an organization from customer, markets and relationships normally focuses in achieving long term goals.

Business strategies: Are plans put in place by an entrepreneur to undertake business operations and ensure that the strategies are implemented to achieve business goals and objectives.

Content/Procedures/Methods/Illustrations

6.1 Determining business innovation strategies

This is a plan used by a company to encourage advancements in technology or services usually by investing money in research and development activities.

Types of business innovation strategies

They can be classified as active, pro-active and reactive.

a) **Proactive**: Companies with proactive innovative strategies tend to have strong research orientation and first-mover advantage and be a technological market leader. They access knowledge from a broad range of sources and take big bets/high risks.

Types of innovative technologies used in proactive strategy are:

- Incremental: The constant technological process changes that lead to improved performance of products and services.
- Radial: Breakthroughs that change the nature of products and services.

b) **Active**: It involves defending existing technologies and markets while being prepared to respond quickly on markets and technologies are proven. Companies using this approach also have broad sources of knowledge and medium to low risk exposure. They tend to hedge their bets. They mainly use incremental strategies.

c) **Reactive**: It is by companies:

- Which are followers?
- Have a focus on operations.
- Take a wait and see approach.
- Look for low risk opportunities.

They copy proven innovation and use entirely incremental innovations like Ryan air, a budget airline which has successfully copied the no-frills service model of Southwest Airlines.

d) **Passive**: Companies with passive innovative strategies wait until their customers demand a change in their products or services.

Importance of innovation in business

Innovation refers to creating more effective processes, products and ideas. Their benefits include:

- It helps to solve problems easily in business.
- It increases the productivity of the business.
- Innovation makes it easier to market your business hence gaining market share.
- Have a competitive advantage thus making it easier to beat your competitors.
- Enables the business to sustain in any particular environment.
- A business is able to maximize on its return on investment.
- It brings about a positive impact on the company’s culture.
- Helps in communication and educational accessibility, coming up with effective innovative communication strategies that ensures that communication flows all around the organization.

Case study

BMWs innovative strategies.
Case code: BSTR060
Period: 2002-2003.
Organization; BMW.
Publication date: 2003.
Countries: Germany.
Industry: Automobiles and automotive.
The case examines the growth of BMW, a German automobile company into one of the leading automobile producers in the world.
It critically examines the circumstances that made BMW radically change the way it was handling innovative process management at its automobile division. The case discusses the various components of the new innovation process adopted by BMW and evaluates the effectiveness of these components.
Benefits that accrued to the company on account of the changed innovation process in the backdrop of its changing strategic game plan.

6.2 Creativity in business development

Business development: it is the creation of long-term value for an organization from customers, markets and relationships. The two important aspects:

- Process
- People

The process is goal oriented and designed to attain a solution to a problem. The people are the active resources that determine the solution. They will sometimes adapt a solution and at other times they will formulate a highly innovative solution. This innovator approaches tasks from unusual angels, discover problems and avenues of solution, questions basic assumptions related to current practices, is more interested in ends, has little tolerance for routine work, little or no need for con-census and often insensitive to others.

6.3 Developing innovative business strategies

The five steps for developing the strategy are:

- Determine objectives strategic approach to innovation.
- Know your market i.e. customers and competitors.
- Define your value proposition.
- Access and develop your core capabilities.
- Establish your innovation techniques and systems.

6.4 Ways of developing linkages with other entrepreneurs.

- Identify the competitive advantage of a given region and resident enterprises for certain products and services.
- Developing a joint strategy with participation of local stakeholders.
- Linking the local PSD measures to the strategy. Fostering business linkages between entrepreneurs of this sub-sector and related sub-sectors.

- Developing capacity of public and private business service providers.

6.5 ICT in business growth and development

ICT: Includes any communication device or application encompassing radio, television, cellular phones, computers, hardware and software.

ICT can be used in expanding, growing and developing the business in the following ways:

i. Social media: Refers to a wide range of internet based and mobile services that allow users to participate in online purchases, sales, advertising hence the business is able to expand the number of audiences that can be able to see and purchase their products.
ii. Blogs: These are online journals hosted on platforms that help advertise the different products of business hence a high probability of increasing market share.
iii. Wikis: A collective website where any participant can modify any page or create any new page using a browser, hence people can see images, prices of the products of your business and they can order online hence increased flexibility of the business.
iv. Media sharing sites: Allows users to post videos or photographs.

Social media platforms encourage knowledge sharing and businesses. With the current information age, most individuals are connecting using various technological platforms.

Here someone can post their products or services freely among the members and consultation is real time as answers and questions are readily available. This promotes flexibility and customers are able to order from anywhere and their products will be delivered hence convenient for the customers.

Conclusion

This learning outcome covered on business innovation strategies, creativity in business development, develop innovative business strategies, create linkages with other entrepreneurs and incorporate ICT in accordance with organizational strategies, business principles, strategies and best practice in accordance with the organization strategies. Incorporate ICT in business growth and development as per best practice

Further Reading

Read more from internet on *"Ways of coming up with a Business plan"*
https://www.google.com/search?q=entrepreneurship

5.3.7.3 Self-Assessment

Written Assessment

1. Identify business innovation strategies.
    a) Proactive
    b) Active
    c) Business plan
    d) Reactive
2. Which is not a method used in business/ICT?
    a) Blogs
    b) Media sharing sites
    c) Data
    d) Wikis
3. Which par is the most important aspect in business development?
    a) Process and data
    b) Process and customers
    c) Process and people
    d) People and data
4. Which is not an advantage of ICT
    a) Convenience
    b) Flexibility
    c) Business growth
    d) Less audience
5. Develop innovative business strategies.
6. Discuss creativity in business development.

Oral Assessment

Discuss business innovative strategies.

Practical Assessment

You are required to come up with an enterprise. Identify and discuss business innovative strategies that you will be required to use.

5.3.7.4 Tools, Equipment, Supplies and Materials

- Case studies
- Computers
- Overhead projectors
- Internet
- Mobile phone
- Video clips
- Films

- Newspapers and Handouts
- Business Journals
- Writing materials

5.3.7.5 References

Bocken, N. M., De Pauw, I., Bakker, C., & van der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, *33*(5), 308-320.

Haigh, N., Walker, J., Bacq, S., & Kickul, J. (2015). Hybrid organizations: origins, strategies, impacts, and implications. *California Management Review*, *57*(3), 5-12.

Saebi, T., & Foss, N. J. (2015). Business models for open innovation: Matching heterogeneous open innovation strategies with business model dimensions. *European Management Journal*, *33*(3), 201-213.

5.3.8 Learning Outcome No 7: Develop business plan

5.3.8.1 Learning Activities

Learning Outcome No 7: Develop Business Plan	
Learning Activities	**Special Instructions**
6.1. Describe types of Business as per business procedures and strategies 6.2. Develop marketing plan as per business plan format 6.3. Prepare organizational/Management plan in accordance with business plan format 6.4. Prepare production/operation plan in accordance with business plan format 6.5. Prepare financial plan in accordance with the business plan format 6.6. Prepare an executive summary in accordance with business plan format **6.7.** Present business plan as per best practice	

5.3.8.2 Information Sheet No3/LO7

Introduction to learning outcome

This learning outcome aims at equipping the students with knowledge on how to plan a business. The students should also know the types of business develop market plan, prepare production plan and financial plans.

Definition of key terms

Marketing plan: involves identifying target customers, how to reach them and the retention process.

Organizational/Management plan: describes how an organization or business is run.

Financial Plan: it is a comprehensive evaluation of an individual's current pay and future financial state.

Business plan: a written description of your business future, a document that tells what you plan to do and how you plan to do it.

Content/procedures/methods/illustrations

Describe types of Business as per business procedures and strategies

There are three major businesses:

1. **Service business**: is a type of business that provides intangible products. They offer professional skills, expertise advice and other products.
2. **Merchandising business**: this type of business buys products at wholesale price and sells the same at retail price. They make profit by selling the products at prices higher than their purchase cost.
3. **Manufacturing business**: it buys products with the intention of using them as materials in making new products. It combines raw materials, labor and factory overhead in its production process.

Develop marketing plan as per business plan format

To grow your business, you need a marketing plan. The right marketing plan identifies everything from:

- Target customers.
- How to reach them.
- The retention process.

Sectors to include in this plan:

a) Executive summary: it gives an overview of your plan.
b) Target customers: describes customers targeted. Describes their geographical profile (e.g. gender, age), their wants and needs.
c) Unique selling proposition: having a unique selling proposition is very critical since it distinguishes your company from its competitors.
d) Pricing and positioning strategy: it must be aligned. You should detail the positioning you desire and how you're pricing will support it.
e) Distribution channels: the advertising can be primarily done online via a search engine. We should choose best marketing network for your products.
f) Keys to success: there are several benefits of using social media to market our small business. Each of the postings on social media sites will include a traceable link. We need to know how many people click to each link.

Prepare organizational/Management plan in accordance with business plan format

It describes how an organization or business is run. It allows you to formalize your management structure and operations.

It entails:

1. Determine the need for management plan.
2. Outline your plan.
3. Describe your management structure.
4. List the different aspects of your organization being managed under the plan.

In the description of management, you should:

1. Name your board members.
2. Introduce the key management members.

3. Present the strengths of each individual I the management team.
4. Describe hiring process.
5. Name any outside consultants or advisors you will be hiring.
6. Summarize your management team abilities.
7. Describe relationships between management, ownership and employees.

Prepare production/operation plan in accordance with business plan format

Is a highly detailed plan that provides a clear picture of how a team, section or department will contribute to the achievement of the organizations goals?

It is a manual for operating your organization. It is designed to ensure you accomplish your goals.

It is a key piece of the puzzle for any goal oriented team.

The steps you can take to develop a strong operations plan. That is:

1. Start with your strategic plan.
2. Focus on your most important goals.
3. Use leading not lagging indicators.
4. Do not develop your plan in a vacuum.
5. Communication is paramount.

Prepare financial plan in accordance with the business plan format

It is a comprehensive evaluation of an individual's current pay and future financial state by using current known variables to plan.

It often includes a budget which organizes an individual's finances and sometimes includes a series of steps or specific goals for spending or saving.

It can refer to the three primary financial statements, that is:

1. Balance sheet.
2. Income statement.
3. Cash-flow statement.

Financial plans are the overall/entire financial accounting overview of a company.

Prepare an executive summary in accordance with business plan format

Is a short document or section of a document produced for business purposes?

It summarizes a longer report or proposal or a group or related reports in such a way that readers can rapidly become acquainted with a large body of material without having to read it all.

It is intended as an aid to decision making by managers and has been described as the most important part of a business plan.

Typically, an example will:

- Be approximately 5 – 10% of the length of the main report.
- Be written in language appropriate for the target audience.
- Consist of short concise paragraphs.
- Begin with a summary.
- Be written in the same order as the report.

- Only include material present in the main report.
- Make recommendations.
- Provide a justification.
- Have a conclusion.
- Be readable separately from the main report.
- Sometimes summarize more than one document.

Present business plan as per best practice

It is a written description of your business's future, a document that tells what you plan to do and how you plan to do it.

It should contain:

1. The executive summary.
2. Company description.
3. Market analysis.
4. Competitive analysis.
5. Description of management and organization.
6. Breakdown of your products and services.
7. Marketing plan.
8. Sales strategy.
9. Request for funding.
10. Financial projections.

Benefits of a business plan

1. It helps in management of cash.
2. Enables business owners to develop accountability.
3. Useful in strategic focus.
4. Priorities can be easily set.
5. Easier monitoring of the whole business.
6. Helps in strategic alignment.
7. Realistic regular reminders to keep on track.

Disadvantages of a business plan

1. Is only a plan and does not guarantee success.
2. If the plan is too rigid, some problems may arise, it must be flexible to adapt to market changes.
3. High sales expectations may cause overspending in other areas such as stocking and stuffing.

Conclusion

At the end of the unit of competency the trainee should be able to describe various types of business develop a marketing plan, organizational /management plan, operational plan, financial plan and an executive summary in accordance to business plan format and best practices.

Further Reading
Read further on best practices in developing business plan across region

5.3.8.3 Self-Assessment

Written assessment

1. Which is not a type of major business?
    a) Service business.
    b) Merchandising business.
    c) Existing business.
2. Which of the following is a section to include in marketing plan?
    a) Merchandising business.
    b) Executive summary.
    c) Service business.
3. Which is not among the primary financial statements?
    a) Balance sheet.
    b) Distribution.
    c) Income statement.
4. Prepare an executive summary.
5. Develop a business plan.
6. Discuss types of businesses.

Oral Assessment

1. Define all types of plans.
2. Identify sections in marketing plan.

Practical Assessment

You want to come up with a business. Select the industry and develop a proper business plan to use.

5.3.8.4 Tools, Equipment, Supplies and Materials

- Case studies
- Computers
- Overhead projectors
- Internet
- Mobile phone
- Video clips
- Films
- Newspapers and Handouts
- Business Journals

- Writing materials

5.3.8.5 References

Druclar peter F. (1985) Innovation and entrepreneurship
Simon Aelaud Angels, Dragons and (2012) Venture capital advice for entrepreneurs
Deruan Miriam (2016) To be an entrepreneur, just get on with it

CHAPTER 6: EMPLOYABILITY SKILLS/ DEMONSTRATE EMPLOYABILITY SKILLS

6.1 Introduction

Employability skills unit is among the seven basic competencies units offered in all the TVET Level 6 qualification. The unit covers the knowledge, skills, and behaviour required to demonstrate effective employability skills at place of work. It entails conducting self-management, demonstrating interpersonal communication, practicing safe work habits and leading a workplace team. It also involve planning and organizing work, maintaining professional growth and development, demonstrating workplace learning, problem solving skills and managing ethical performance. This unit is critical for trainees to develop skills for efficency and productivity at workplace. It is also significant in enhancing effective communication at a workplace and reduction of conflict.

The unit will cover the following critical aspects; conduct self-management, demonstrate interpersonal communication, demonstrate critical safe work habits,demonstrated the ability to lead a workplace team, plan and organize work, maintain professional growth and development, demonstrate workplace learning, demonstrate problem solving skills, and demonstrated the ability to manage ethical performance. The basic resources required include check list, research tools and machines. The unit of competency cover nine learning outcomes. Each of the learning outcome presents; learning activities that covers performance criteria statements, thus creating an opportunity for trainees to demonstrate knowledge and skills in the occupational standards and content in curriculum. Information sheet provides; defition of key terms, content and illustration to guide in training. The competency may be assessed through written test, demostration, practical assignment, interview/oral questioning and case study. Self-assessment is provided at the end of each learning outcome. Holistic assessment with other units relevant to the industry sector workplace and job role is recommended.

6.2 Performance Standard

Demonstrate employability skills by conducting self-management, demonstrating interpersonal communication and critical safe work habits, leading a workplace team, planning and organizing work, maintaining professional growth and development, demonstrating workplace learning, solving problems and managing workplace ethics as per workplace requirements, organizational and communicational policy, personal objectives, organization strategic plan and SOPs.

6.3 Learning Outcomes

6.3.1 List of learning outcomes

a) Conduct self-management
b) Demonstrate interpersonal communication
c) Demonstrate critical safe work habits
d) Lead a workplace team
e) Plan and organize work
f) Maintain professional growth and development
g) Demonstrate workplace learning
h) Demonstrate problem solving skills
i) Manage ethical performance

6.3.2 Learning Outcome No 1: Conduct Self-Management

6.3.2.1 Learning Activities

Learning Outcome No 1: Conduct Self-Management	
Learning Activities	**Special Instructions**
1.1. Formulate personal vision, mission and goals based on potential and in relation to organization objectives. 1.2. Manage emotions as per workplace requirements. 1.3. Evaluate and monitor individual performance according to the agreed targets. 1.4. Develop and maintain assertiveness based on the requirements of the job. 1.5. Demonstrate accountability and responsibility for own actions. 1.6. Develop and maintain self-esteem and a positive self-image. 1.7. Observe time management, attendance and punctuality as per the organization policy. 1.8. Manage goals as per the organization's objective. 1.9. Identify self-strengths and weaknesses as per personal objectives. 1.10. Manage critics as per personal objectives	Individual presentations Role play on conducting self at place of work

6.3.2.2 Information Sheet No 6 /LO 1 Conduct Self-Management

Introduction

In this unit trainees will train on how to formulate personal vision, mission and goals, manage emotions, evaluate and monitor individual performance, develop assertiveness and be accountable and responsible for their own actions. In addition, trainees will train on time and goals management and identification of their strength and weakness at place of employment.

Definition of key terms

Personal Objectives: This refers to job specific goals of each individual employee when completed at the individual level. Managers may add more objectives specifically designed to maximize their efforts. This goal is to achieve quantity and quality of efforts between individual and the team.

Self-esteem: This is an individual subjective evaluation of their own worth encompassing beliefs about one self as well as emotional state such as triumph, despair, pride and shame.
Self-image: The idea one has of one's abilities, appearance and personality.

Assertiveness: This is a skill that allows someone show confidence about what they believe at place of work.

Self-management: Involves understanding yourself, understanding your interests and abilities, having a positive attitude and grooming yourself in order to develop self-confidence.

Content/procedures/methods/illustrations

1.1 Personal vision, mission and goals are formulated based on potential and in relation to organization objectives

Personal vision is a picture of what and where you want to be in life. Developing of personal vision is a vital step for identifying development needs and taking action to address them to achieve career goals. Personal mission is the statement that helps one to further define their purpose and what they seek to achieve. It is a tool for making difficult decisions and a framework of how you want your life to be. It is used in expressing a person's life purpose, motivation, values and inspiration. This statement is important in helping one identify reasons for one's choices and behavior at place of work or in life generally.

Steps in formulating personal mission statement

Mission statements may vary depending on individual, area of specialization and desired organization. One could use the following steps to formulate a simple mission statement.

i. Determine one's ideal self
ii. Examine the lives of others who are your role models or you admire
iii. Consider your legacy
iv. Determine your life purpose
v. Clarify your skills, talents and abilities
vi. Define specific personal goals
vii. Craft your mission statement

Example of a mission statement

> To find happiness, fulfillment and value in living. I will seek out and experience a; the pleasures and joys that life offers. My core values are not limitation but exploring all possibilities that ensures life success. I derive my greatest joy from being respected and admired by friend's family and fellow workmates.

Figure 25. Example of a mission statement

Personal Goals

Personal goals provide a long-term direction and short-term motivation for individuals in what they want to achieve. These are very specific statements of what an individual wants to achieve in career, academics, life or spiritually. Personal goals are formulated from an individual knowledge, available resources and skills. They are time bound such that one can set specified time of achieving the goals. Setting in personal goals is key in helping one keep sight of their progress in life and at workplace. One can formulate different goals to achieve various purpose in life. Such areas that one can formulate personal goals for are;

- Academic
- Spiritual
- Career
- Ethical
- Physical
- Academic personal

Example of a personal goal is

"I want to become a nationally recognized sportsperson"

1.2 Emotions are managed as per workplace requirements

Emotional management at place of work is important. This goes a long way in one being able to understand their emotions, control reactions and recognize the effect of their emotions and action on others. People experience various emotions at place of work. These keep changing based on the situation. Five common emotions people handle at work include; frustration, dislike, anger, feeling low, and insecurity.

Management of Anger at place of work

Anger takes many forms such as slamming doors and yelling etc. It is important to note that anger is not physical. Anger can be caused by feeling of being undervalued at place of work, differences in opinion and tensions when one cannot express themselves. The following are common forms of anger at place of work:

- Being excessively critical of others
- Berating or bullying others
- Being abrupt and dismissive
- Being cynical and sarcastic
- "Sabotaging" other people's work indirectly; for example, by being consistently late to meetings, responding late to messages or not sharing information.

Anger sometimes is a symptom of fear, insecurity, depression or even substance abuse. Unless anger is managed it can be misdirected to our work or close family members without realizing it. Many of us, after a bad day at work, have gone home angry and then erupted in an angry outburst at a partner or a family member. Management of anger at workplace is vital in enhancing relationships and avoiding conflict.

Methods of managing anger

When anger is expressed in an unhealthy way it ends up destructing everyone else at place of work. The following are ways one can use to ensure they control anger:

- Observe professionalism at place of work: These will include engaging rational problem solving and maintaining a positive attitude to work and interaction with people at the place of work. Be careful to separate personal matters from official one to avoid overindulgence in unprofessional behaviors such as gossip.
- Avoid getting personal.
- Take in a deep breath.
- Take a healthy break if under pressure.
- Listen to your favorite music.

Effects of unmanaged anger

- Affects team productivity.
- Relationships, and physical and emotional well-being.
- Demoralization of team.

Insecurity

Change and the feeling of loss of control often trigger or make one feel nervous or insecure at work. Insecurity at work affects self-confidence. There are various things that can make one feel insecure at place of work e.g.

- Hearing a new downsizing rumor.
- Finding out a new manager is going to lead the team.
- Being assigned to a new project or area of responsibility.
- Learning the company may merge with another company.

With so much change in our everyday work world, it's no wonder that many of us feel more worried and insecure than ever before.

Managing insecurity at place of work

- One can ensure that they are constantly developing their skills to lessen instances where one feels insecure.
- Maintain professionalism to avoid collecting rumors.
- Being positive and ready to changes within the organization such as new management and uncertainty.
- Ensuring that you are constantly networking to scout for new opportunities.
- Having clear personal goals in career development.
- Ensuring the terms of employment are clear.

Dislike

In normal circumstance the places of work will have many people with different personalities, beliefs and values. Sometimes one might find themselves working with or reporting to people whom they dislike for one reason or another. At place of work it is important to know how to work effectively and productively with people we dislike. One should be able to remain calm and avoid confrontation with the people they dislike. Avoid being personal.

Feeling Down

Everyone feels "low" or has a bad day now and then. When we feel down, we may:

- Have low energy to work.

- Worry more than usual.
- Feel distracted or guilty about time away from family and friends.
- Feel disappointed or unhappy.
- Just not feel “up” to doing a full load of activities.

Feeling down affects work productivity and can land someone into big problem. There are various reasons for feeling low for example;

- A prolonged feeling of despair, worthlessness and personal feeling down can be a response to a setback such as not being recognized for an achievement at work or being overloaded.
- Some people feel down after they’ve finished an important or especially exciting project and return to more ordinary tasks.
- Others feel low because of circumstances in their personal lives. Most people bounce back from these occasional “blues.” But left unchecked, feeling down can interfere with productivity and with relationships with co-workers.

It’s important to keep in mind that a prolonged period of feeling low, or feelings of worthlessness and despair, can be a sign of depression, which should be treated with professional help. To manage such emotions, one should;

- Go for leave if they have one and engage in exciting supports or activities they like.
- Play a favorite music.
- Avoid people who discourage you.

Importance of emotions management

- Enabling employees handle changes and challenges at all jobs.
- Emotions control enables employees to adjust to changes like new boss or coworker.
- Enhances working in a team
- Improves handling conflict with customers and coworkers.

Ways to manage emotions

To manage emotions effectively one needs to be aware and recognize their emotions and feelings. It is also important for one to be knowledgeable on what triggers their emotions. Emotions often have a positive impact at work. Learning to manage our most challenging emotions takes effort, but the payoff is big. The following are ways used in managing emotions at place of work.

a) Learn to express your emotions in appropriate ways

Allow yourself to deal with difficult feelings in the appropriate ways for the work place. If you feel angry, take the time to consider what may have triggered the feeling and consider actions you could take to diffuse such a situation in the future. You don’t need to pretend you’re not feeling the way you are, but you do need to deal with the emotions so that they do not affect your interactions with others.

b) Recognize your emotions

Recognize your emotions in their early stages, before they feel out of control. By reviewing your day’s activities and the feelings that were triggered by them, there’s a good chance you will discover the source of whatever difficult feelings you may have experienced. If writing things down helps you clarify your thoughts, you might try doing this as you're reviewing your emotions and the work circumstances when they occurred.

c) Give appropriate feedback to clear the air

For example, if a co-worker has said something in a meeting that offended you and this is bothering you; talk with the person about it, preferably soon after the event but in private. Be matter-of-fact and focus on what was said or done and how it made you feel, without attacking the person individually. Remember, even though expressing your emotions can be useful, it's never appropriate to do so at work by yelling at or demeaning others.

d) Remember how you managed a problem in the past

If an event at work: like a conflict with a co-worker or an unusually stressful workload is triggering an emotional challenge, consider how you overcame a similar problem in the past. What worked? What didn't?

e) Problem-solved by writing it down

This can be especially helpful if a problem is keeping you awake at night. If you are having an ongoing conflict with a coworker, you might write: "Every time we talk, even about unimportant things, we end up arguing. Maybe I did something to offend him once but don't know it. Maybe ask him out for lunch and find out." This can help you come up with strategies, and can keep the problem from distracting you.

f) Seek support from your company's employee assistance program (EAP) or the program that provided this publication

Talking to a professional can help you gain perspective on problems and come up with solutions as well as specific techniques that will help you manage your emotions more effectively.

g) Build up your emotional resilience

Pay attention to your overall physical and psychological health by eating well, get enough sleep, and exercise regularly. If you're well-rested, well-nourished, and physically strong, you'll have more energy to meet emotional challenges. This will help keep you "emotionally resilient" and help you feel more in control of your emotions and your life.

h) Maintain support systems outside of work

Talking honestly about your concerns with close friends or your partner can help reduce your anxiety and keep problems in perspective. Choose someone you trust who knows you well enough to give you honest feedback when you need it.

i) Cultivate interests outside of work

These include activities with good friends. Remember, not all satisfaction comes from work accomplishments.

1.3 Individual performance is evaluated and monitored according to the agreed targets.

To manage individual performance at place of work one needs to have clear goals and expectations. Record what you are expecting from your work and what the organization expects from you. Maintain a personal work achievement diary where you could be checking on achieved goals. It is important to review your expectation periodically to ensure that you are performing well. Steps of managing individual performance are:

i. Start your development plan early.
ii. Communicate your plans to your manager or supervisor/ mentor or any relevant stakeholder in the area of your profession.
iii. Get to know the advancement opportunities that are available and adhere and strive to achieve them.
iv. Seek feedback or a pulse check on the performance of your current position.

1.3.1 Assertiveness is developed and maintained based on the requirements of the job.

Assertiveness is a very important communication skill, used in ensuring one voice is heard and the way they feel about something is understood. This is not about having your own way but being clearly understood in your goals and objectives towards achieving organization goals.

Assertiveness includes and it is not limited to;

- Taking responsibility for yourself.
- Being unafraid to ask for help and support when you need it.
- Being able to say what you think/feel without losing your temper.
- Standing up to difficult people.
- Being able to give and receive feedback.
- Knowing its okay to say 'no'.

How to be assertive

Principles to help you be more assertive;

- Always ask questions about anything you don't understand.
- Think first, react second – it's hard to do both simultaneously.
- Don't say 'yes' just to please someone, when you really mean 'no'.
- Maintain eye contact during conversations.
- Be clear and specific about what you want to say – stick to the point and don't make it personal.
- Be polite, but firm.
- Give praise where it is due.
- Explain the advantages or benefits of what you are talking about.

1.4 Accountability and responsibility for own actions are demonstrated.

Accountability is about being reliable, prepared, and setting clear goals and standards of how and what you seek to achieve at place of work. It is important in ensuring one does not lie. Taking responsibility is ensuring you are able to deliver what is expected of you at place of work.

1.5 Self-esteem and a positive self-image are developed and maintained.

Self-esteem is the extent to which a person believes that he /she is a worthwhile and deserving individual. Self-esteem is crucial in developing one's emotional stability. Developing a positive and strong self-esteem is affects behavior in organizations and social settings. A person with high self-esteem is likely to take risks in job selection, seek out high status occupation than those with low self-esteem. Employees with low self-esteem are easily swayed by the opinions of other workers than are employees with high self-esteem. They also set lower goals for themselves than do employees with high self-esteem. High self-esteem is positively related to achievement and a willingness to expend efforts to accomplish tasks.

Strategies for developing and maintaining self-esteem at work

- Select work/jobs that are in your passion
- Keep a record of your achievement
- Avoid negative thinking

1.5.1 Time management, attendance and punctuality are observed as per the organization policy.

Being habitually late or failing to report to work is not a personal and a private thing at place of work. It affects workplace in achieving its objectives. It is important for one to know the official reporting and leaving time so that they are able to attend to work punctually. In case one has an emergency or cannot be reporting to work on particular day's one need to formally place a requisition for permission to be absent according to organization policy. This should be signed by the supervisor at the place of work. Avoid faking illness so that you miss work it is unethical.

1.6 Self-strengths and weaknesses are identified as per personal objectives

Identification of one's weakness and strength is done when one is able to know about what they can do well and what they cannot do well. This is important in enhancing peoples work performance. To be able to understand one's weakness and strength is called self-awareness. Self-awareness allows one to know their inner strength and weakness, hidden talents, skills and even weakness. Self-strength and weakness enable one to understand what they can do better and what they need to improve on. This skill is required at workplace for good performance and development of training needs to enhance the weak areas.

Identifying strengths

- Take time off to think about what you do well.
- Think of anything that you are always good at.
- Think about what others appreciate about you.

Identifying weaknesses

- Point out the areas where you struggle and what you find difficult to do.
- Look at the feedback you receive from others.
- Be open to feedback and accept your weaknesses without feeling small about it. Look at it as an area of improvement.

Table 9. Questions that will help in answering individual strength and weakness

Questions on what are my strength	Questions on what are my weakness
How am I different from others? What do I do better than others? What do other people admire in me? What makes me stand out?	Where do I worry and struggle? Where, how and why do others perform better than me? What advice for improvement do I often receive from others?

Conclusion

At the end of the training learners should be able to demonstrate skills and knowledge in conducting oneself appropriately at place of work. The trainees are equipped with knowledge and skills to manage emotions, maintain attendance, punctuality and accountability at place of work. The trainees should be in a position to identify their strength and weakness.

Further Reading

1. hhttps://www.forbes.com ways of managing anger at place of work
2. Kerry Patterson's (2011) Crucial Conversations and Crucial Confrontations.

6.3.2.3 Self-Assessment

Written Assessment

1. Which of the following is not a self-management skill?
    a) Problem solving
    b) Bargaining
    c) Understanding self
    d) Confidence building
2. Grooming is a term associated with?
    a) Time management
    b) Problem solving
    c) Neat and clean appearance
    d) Self-management
3. Work reporting and leaving time is a private and personal matter that should not be discussed by anyone at place of work?
    a. True
    b. False
4. Write a short note on the factors influencing self-management?

5. Describe the importance of self-management.
6. Outline the various self-management skills.

Oral Assessment

1. Identify ways in which you can develop a positive attitude.
2. What are some of the ways one can be assertive at place of work?

Practical Assessment

1. "John a recruited to a company after college. He was so able to cope with the employees, company dress code and was always late to office. What self-management quality do you think are missing in John?
2. Prepare a checklist on your strength, weakness and action plan on how to overcome your weakness.
3. Describe the steps you should take if there is a true emergency or you are very sick and can't go to work.

6.3.2.4 Tools, Equipment, Supplies and Materials

- Computers
- Stationery
- Charts
- Video clips
- Audio tapes
- LCD projectors

6.3.2.5 References

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Stephens P.R and Langton N. (2009) *Organizational behavior*. Prentice Hall, Inc. New Jersey.

6.3.3 Learning Outcome No 2: Demonstrate Interpersonal Communication

6.3.3.1 Learning Activities

1. **Learning Outcome No 2: Demonstrate Interpersonal Communication**	
Learning Activities	**Special Instructions**
2.1. Demonstrate listening and understanding as per communication policy 2.2. Demonstrate writing to the needs of the audience is as per communication policy 2.3. Demonstrate speaking, reading and writing as per communication policy 2.4. Demonstrate negotiation skills as per communication policy 2.5. Demonstrate empathizing as per the communication policy 2.6. Apply numeracy as per the communication policy 2.7. Identify and interpret internal and external customers' needs as per the communication policy 2.8. Demonstrate persuasion as per the communication policy 2.9. Establish communication in networks as per the SOPs 2.10. Share information as per communication structure	Simulation on negation and listening skills

6.3.3.2 Information Sheet No. 6 /LO 2: Demonstrate Interpersonal Communication

Introduction

This learning outcome will be train on knowledge and skills for interpersonal communication such as listening and understanding, writing of audience needs, negations, identification of internal and external customer needs and application of persuasion at workplace. Training of interpersonal communication is important in enhancing effective communication and a requirement for place of work. In any workplace, interpersonal communication is necessary and key to develop and foster working relationships and contributes generally to increasing organizational productivity and enhancing teamwork.

Definition of key terms

Audience needs: This refers to as the needs, want, conditions or gaps in knowledge and skills the audience have and those that may require.

Communication network: These are thee channels or patterns in an organization through which communication flows and they can be informal or formal.

Communication structure: Refers to the pattern in an organization through which interactions exist. In organizations, communication structure is important in management functions.

Internal customers: A customer directly connected to an organization and involves stakeholders, employees and even shareholders. They may also include creditors and external regulators.

External customers: They are those customers that see an organization or company as providers of products and services that they need. They are customers that the organization designs product for.

Content/procedures/methods/illustrations

2.1 Listening and understanding is demonstrated as per communication policy

Interpersonal communication is the process by which people share, exchange and receive information, feelings and meaning either verbally or non-verbally. Interpersonal communication involves face to face.

Listening: Refers to the process of receiving aural stimuli (Devito, 2012). Listening is an active process of receiving and interpreting open message by a purposeful listener.

Listening skills: Involves ability to actively understand and act upon a message. It also entails giving feedback, asking questions and purposefully exchange information.

Levels of listening:

- **Reception**: This is hearing without attending to the surrounding sounds or noises. This happens when the speaker is taking his/her turn and listener listening.
- **Attention:** Listening without effort to relate or understand what is said for example listening to a song without even understanding the message.
- **Focusing:** This is the lowest level of active listening whereby isolated fact and details are attended to without any organizational plan.
- **Integration**: Relating new information to old learning such as learning new methods to solve problem or find new solution.
- **Interpretation:** Bringing together and attaching new meaning to the information.
- **Implication**: Applying information to personal experience and using it to perform a task or respond to a given situation.
- **Evaluation:** Evaluation involves judging the accurate and relevance of the information to the situation.

Listening skills are important in the workplace. Poor listening occurs daily and can result to loss of profit, job, relationship or even life (Friedrich, D'itair & Sharer, 2009). Skills in listening and understanding can lead to improved personal and professional success.

2.2 Writing to the needs of the audience is demonstrated as per communication policy

Audience refers to one or more persons who come purposefully to listen to the speaker. They may listen, respond or ask questions. It is important to know and understand the audience who help to determine your strategy as a speaker.

Types of audience

a) **Friendly audience**: The purpose of writing or communicating to them is to reinforce their beliefs and practices.
b) **Apathies**: This type of audience needs to be convinced of that which maters for them first.
c) **Uninformed**: The requirement for this type of audience is educating them first before proceeding to the course of action.
d) **Hostile:** This type needs to be respected and their viewpoints considered thereafter which you may listen to them. For instance, a speaker or the message can be framed as, "based on this information, I implore you to change". Before seeking for change, their views must be understood.

Audience needs

This refers to a need, wants, condition, or gaps in knowledge and skills the audience has or may require. Effective communication begins with audience determination and their needs. This is important in developing the message in the ways they are likely to listen, engage and act in response. The audience needs to be informed through proper conveyance of the message, to be captured which will capture their attention and interest and to be inspired. This will fulfill their expectations and impact them.

2.3 Speaking, reading and writing is demonstrated as per communication policy

Speaking

This is to develop a language through the mouth. This creates sounds through which information can be conveyed. Speaking outlines, the ability to inform and persuade others.

Public speaking

Public speaking entails speaking to a larger audience. It involves a single speaker and a group of listeners. Public speaking is an important skill and yet dreaded by many people. It can have an impact on the speaker who has acquired the public speaking skills. The aim is to win over the crowd, motivate people and inform them.

Public speaking is important in leading things such as career, development, business growth and relationships with other people. Public speaking increase self-confidence makes one confident around others, effective communication, and professional growth.

Reading

According to Smith (2004), reading is an interaction between the reader and the author. Readers read to get information and thus should be able to understand the printed or written words, signs and letter then attach meaning to them. The purpose of reading is;

- Pleasure or entertainment.
- Acquiring general information.

- Get directions and instructions.
- Academic purposes.

Reading effectively entails strategies that will save time, acquire and retain more information. Such includes preview text to get an overview. This is about getting an idea of what the text is all about without actually reading the main text body. Previewing is done by reading;

- Title and author details.
- Abstract.
- Main heading and subheading.
- Illustrations, graphs, tables.
- First sentence of each paragraph.

Skimming

Involves running your eye quickly over text to pick the main ideas and without paying attention to details. Skimming is done through;

- Noting any bold print.
- Reading quickly over text.
- Reading just few words.
- Familiarizing with reading material.

Scanning

This is sweeping eye over text to find specific information. Aim is to quickly locate specific information. Scanning is done through identifying text that need to be read, moving quickly over to a page, and then slaving to read relevant information.

Intensive reading

This is the detailed and found study of the important chapter. Done through;

- Staring at the beginning.
- Highlighting and making brief point.
- Maintaining main ideas.
- Noting bibliographic information.

Writing skills

Writing involves language, symbols and graphics to represent information. The thoughts, ideas and information to be related are put into a readable form. Writing skills involve the ability to convert through ideas and information into a readable form. Writing skills form an important part of communication and enable one to reach a large audience than in a one to one communication; the better the writing skills the better the impression in the message. When in the part of listener, writing will enable you remember the important points. Writing can involve taking notes or preparing a speech to deliver. In attaining writing skill, one is able to explain ideas for others and present them.

2.4 Negotiation skills are demonstrated as per communication policy

The ability to influence and persuade others is the core of successful business. This depends on the ability to communicate effectively and build relationship for business growth and organization improvement. Negotiation skills are useful in satisfying interest and getting what is needed. They form persuasive communication and help in getting others to what we want them to do. They also offer an opportunity to solve problems or collaborate with portion. A good negotiation can leave both parties fulfilled.

Stages in negotiation:

i. **Preparation**: Entails knowing what you want, why you want it, resources at hand, strategies to empty, knowing the other party, formulate option and knowing the environment.
ii. **Bargaining**: This may involve face to face conversations, phone calls, and letters among others. At this stage, there are offers to make, clarifying, understanding and hopefully arriving at a conclusive agreement.
iii. **Timing issue:** Time should be considered for effective negotiation. Deadline should be set and agreed upon.
iv. **Venue and setting:** A good venue should be set for the bargaining phase. Appropriate place should be identified to avoid distractions and ensure success.
v. **Seating**: The seating arrangement communicates a message and opens room for more frank discussion and bargaining.
vi. **Setting an agenda:** This should be set before engaging to other party. This create control over the situation.

Effective negotiation skills entail;

- Asking question.
- Listening actively.
- Emphasizing.
- Considering and explaining.
- Creative thinking.

Negotiation skills are important and create success in business. Differences will always exist; thus strong negotiations and negotiation skills are required in a workplace (Goldwch, 2011).

2.5 Empathizing is demonstrated as per the communication policy

According to Keen (2007), empathy means recognizing other persons' feelings, their cause, and effects in their emotional experience without becoming part of it. It is simple to put oneself into another's shoe. When you have empathy, you can understand the feelings of other people. Empathy enables us to communicate ideas in such a way that they can make sense to other. It will also enable one understand others when communicating.

2.6 Numeracy is applied as per the communication policy

Numeracy is required in carrying out roles effectively. This involves ability to use numbers and solving problems in real life. Numeracy skills entail expressing ideas and solving problems numerically. They are key in development of logical thinking and reasoning in day to day activities. An example of numeracy is balance checking customer or client money.

2.7 Internal and external customers' needs are identified and interpreted as per the communication policy

Understanding customer needs: The organization should identify and take care of customer needs. This is crucial for company growth and organization since it enables the company to focus on customer satisfactions which are important to the business. Additionally, customer satisfaction and loyalty are enhanced by the company (Gronroon, 1995). Some of the ways of identifying customer needs;

- Analyzing organization competitor through SWOT rule. Identify competitor strength, weakness, opportunity and threats.
- Conducting voice of customer surveys about their activities and expectations of existing customer both internal and external.
- Interviewing customer to ask problems they face and what they need which can result to successful innovation.
- Daily studies to record experiences, frustrations, positive experience and thought.
- Paying attention to new customer of the expectation.
- Attain future customer needs through updating content to avoid losing customers to your competitors.

2.8 Persuasion is demonstrated as per the communication policy

Persuasion has a sole purpose of getting the listeners to transform their ideas and belief in favor of the perspective of the communicator. The intent of persuasion is influencing the audience and make them support and idea or perform a certain task. Persuasion skills are vital as they will motivate even the customer to support or join the organization. This will win client and establish their loyalty at the heart of the organization. Effective persuasion should equally address customer queries.

2.9 Communication networks are established as per the SOPs

A communication network is a pattern through which information flows in an organization. It can also imply the methods used to pass information. In organizations, communication network includes;

Chain information: Information travels up in a hierarchical manner. Communication occurs only with the next higher hierarchy and follows a chain of command.

Network: Information is transmitted up and down through hierarchy. This resemble an upside Y here the number of individuals reaching to a supervisor wider.

Wheel network: In this network, information flows to and from a single person and the network relied on the leader in communication.

Circle network: Employees only communicate with adjoining organization members such that communication is with immediate neighbor no other. The network should be established as per the standard operating procedure.

Assertiveness

This is a core communication skill which can define and standing up for your views, through and belief while also respecting right and beliefs of others. This can enable one boast his or her self-esteem and earn respect. In Communication, being assertive will enable an individual to pass information easily without upsetting others or being upset. Assertiveness enables individuals to thrive in the workplace.

2.10 Information is shared as per communication structure demonstrate writing to the needs of the audience

Sharing information

Information in an organization should be shared among different structural levels. This increases efficiency of communication. The ability to share information also impact organizational productivity. When this is the case, instructions and clarifications are well received; thus, all members are aware of the expectations. The result will be stronger relationship, sharing of ideas and knowledge to improve performance. Sharing information will equally make work environment comfortable.

Conclusion

In conclusion, the trainee is equipped with knowledge and skills that demonstrate their listening and understanding, writing needs of the audience, speak and read effectively, demonstrate empathy, and apply numeracy. The trainee is able to identify external and internal customers, establish communication networks and share information as guided by the communication policy and structure.

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6.3.3.3 Self-Assessment

Written Assessment

1. Which among the following is not a language skill?
    a) Listening
    b) Negotiation
    c) Speaking
    d) Writing
2. The best way to negotiate a good outcome is to
    a) Play hardball.
    b) Master tactics.
    c) Prepare thoroughly.
    d) Help your counterpart get what s/he wants.
3. Which of the following is the best definition of empathy?
    a) Feeling what someone else is feeling.
    b) Feeling sorry for another.
    c) Feeling sympathy for another.
    d) Feeling that you want to help another.
4. In comparison to small group communication, in an organization communication;
    a) Feedback is easier and more immediate
    b) Communication roles are more formal
    c) Messages can be better adapted to the specific needs of the receiver.
    d) People are closer to one another in space.
5. Skimming is done through the following except?
    a) Noting bold prints.
    b) Reading just few words.
    c) Reading to find specific information.
    d) Familiarizing with reading materials.
6. What is the meaning of public speaking?
7. Why should you be assertive in the workplace?
8. What is an audience need?

Oral Assessment

1. State three significance of listening skills.
2. State one difference between skimming and scanning.

Practical Assessment

In groups of threes, discuss how you can prepare a speech for public speaking and the importance of preparing for public speaking.

6.3.3.4 Tools, Equipment, Supplies and Materials

- Computers
- Stationery
- Charts
- Video clips
- Audio tapes
- Radio sets
- TV sets
- LCD projectors

6.3.3.5 References

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6.3.4 Learning Outcome No 3: Demonstrate critical safe work habits

6.3.4.1 Learning Activities

Learning Outcome No 3: Demonstrate critical safe work habits	
Learning Activities	**Special Instructions**
3.1. Manage stress in accordance with workplace procedures. 3.2. Demonstrate punctuality and time consciousness in line with workplace policy. 3.3. Integrate personal objectives with organization goals based on organization's strategic plan. 3.4. Utilize resources in accordance with workplace policy. 3.5. Set work priorities in accordance to workplace procedures. 3.6. Recognize leisure time in line with organization policy. 3.7. Observe abstinence from drug and substance abuse as per workplace policy. 3.8. Demonstrate awareness of HIV and AIDS in line with workplace requirements. 3.9. Demonstrate safety consciousness in the workplace based on organization safety policy. 3.10. Deal with emerging issues with in accordance with organization policy.	Stimulation of stress management skills and personal objectives.

6.3.4.2 Information Sheet No 6/ LO 3: Demonstrate critical safe work habits

Introduction

In this unit the trainee will learn how to demonstrate critical safe work habits. This will involve training in skills, knowledge and behaviors to; mange stress, maintain punctuality, integration of personal objectives to organization goals, setting work priorities, abstinence from drug abuse and awareness of HIV and Aids. Trainees will also be trained on safety consciousness and handling emerging issues at place of work.

Definition of key terms

Work priorities: This refers to what that is more important and that need attention thus dealt with first before others.

Safety: This involves all measures and practices taken to prevent potential harm or injury.

Safety consciousness: This is being aware or alert of the hazards. It is a potent factor in preventing accidents. Safety conscious enable all organizational members to undertake operations in a way that the risk of accidents is reduced.

Content/procedures/methods/illustrations

3.1 Stress is managed in accordance with workplace procedures.

The international labor organization (ILO) defines stress as "the harmful physical and emotional imbalance between the perceived demands and resources and abolition of individuals to cope with the demands. Stress is caused when demand of the job does not match with or exceed abilities, need and resources available. (Beehr, 2004).

Stress management.

This includes all the strategies and process which can be employed to eliminate or adapt to the stress which will restore normal functioning in everyday activities. Some of the ways of stress management include:

- Setting priorities: Using time management which will ensure one deals with immediate priorities thus eliminating stress.
- Examining expectations: Setting realistic goals that are achievable will enable people understand that making mistakes offers an opportunity and presents time to learn?
- Hearing to manage change: Change is part of life and thus adaptability is key. Support networks of friends and relatives need to be developed.
- Hiring a healthy lifestyle: This involves eating a balanced meal, relaxing, prayer, yoga, exercise and mediation.
- Creating support programs: In the workplace to help employers deal with work related stress.

3.2 Punctuality and time consciousness is demonstrated in line with workplace policy.

Punctuality is the quality associated with being on time. It is a sign of professionalism in the workplace. For example, not completing tasks on time can lead to delayed goal achievement and being late for meetings can also waste others peoples time.

Time consciousness

This implies using the available time wisely since time wasted is never recovered. It entails being aware of the importance of time and what to do with the time. To manage time wisely, one needs awareness of the time wasters. The person should identify duties that need to be done and take others to ensure that the tasks are completed on time. Effective time usage and punctuality will enable one to make key decisions in time, complete tasks, reduce anxiety and stress, improved job performance and develop better interpersonal relations.

Leisure

Leisure is the time when are is free or not occupied with tasks that demand time and performance. Leisure time is important in a number of ways:

- Reduces stress and depression by providing time and chance to balance work and life.
- Improves the quality of life such as when taking part in recreation time.

- Relieves boredom by engaging in other activities.
- Enhances communication and self-esteem of individuals who engage in leisure activities.

Leisure time should be managed wisely through engaging in meaningful activities which will lead to realization of the benefits listed above.it is thus important to "take care" of our free time.

3.3 Personal objectives are integrated with organization goals based on organization's strategic plan.

Integrating personal objectives into organizational objective.

Each individual has got a purpose and a reason for existence and so do organization.

Objectives act as a driving force in an organization. They set the direction of the organization and act as a motivating force. In an organization, every individual should work to achieve the objectives of the organization. Alignment of individuals to organizational goals direct efforts towards their realization. In the organization, strategic plan, objectives show the intended direction of where the organization wants to follow. Personal objectives are framed for individuals at all levels of the organization and should be consistent with organization goals.

Often, personal objectives satisfy individual goals such as completing tasks leading to payment. This can lead to conflict with organization goals. For these reasons, the individual goals should be in harmony and not conflicting or supersede organization goals. Some of the ways of integrating personal goals with those of the organization include:

- Setting over company goals as reflecting in the strategies – plan for all to strive to achieve in their daily roles and tasks.
- Relentlessly communicating organization objectives and vision and this should be done often and clearly.
- Employees to set their goals within the organization framework.
- Hiring employees who fit the organization culture such that they will strive to achieve their objective and at the same time attaining or enabling the organization to attain its goals and strategy.

3.4 Resources are utilized in accordance with workplace policy.

Resources are tangible and intangible assets used by an organization to attain or implement its strategies. They include all assets, organization attributes, information and knowledge controlled by the organization to implement strategies and form resulting into efficiency and effectiveness.

Resource mobilization

This refers to the process of acquiring additional resources to achieve organizational goals.it entails having the right type of resources at the right time and cost and ensuring proper utilization of the same (Desha, 2012)

Resource utilization

This refers to making use of the resources in the best way possible to achieve organizational goals and objectives. Resources can be costly and thus should be carefully handled and utilized for the benefit of the organization at large.

Resource utilization measures how effective the available resources are used. Resources should be well utilized as per wastage can hamper performance. Even human resources should be utilized well to ensure sustained productivity. Utilization of resources should be evaluated and tracked since they greatly impact the organization.

Resource allocation

In an organization, resource allocation is the assignment of the available resources assigned to various uses to attain goals of the organization .resource allocation should be prioritized according to the priority structure. This also ensures that all areas and sectors within the organization have resources to run the operations.

In the case of a large organization, effective resource allocation can take care of all projects to boost production.

3.5 Work priorities are set in accordance to workplace procedures.

Work prioritization is the activity of arranging tasks I order of their urgency and importance relative to the others. Urgent ones are established and completed first.

Setting work priorities.

All tasks that need to be done need prioritization. All tasks cannot be completed at the same time. Some things need to be done first before others. The steps to prioritize work include:

- Collecting a list of all the tasks: In the work place, all activities that need to be done should be listed which will then make it possible to accomplish them in order.
- Identifying urgent vs. important tasks: The tasks are weighed in terms of urgency. There are those that cannot be postponed due to the consequences or urgencies. This narrows them to the most urgent and important tasks e.g. sending office mails cannot be postponed.
- Assessment of the value: Tasks or work priority can be set depending on the value to the organization. Things to consider may include: Assessing impact of task to the clients or people involved.
- Allow for flexibility and adaptability: Priorities are not to cast on stone and can change even when least expected. But still, focus on the tasks at hand that should be involved to complete them.
- Knowing when to cut: Not everything can be done in the list and after prioritization, the remaining tasks should be cut from the list and focus be redirected to those tasks that can be completed for the day.

3.6 Leisure time is recognized in line with organization policy.

Rojek (2000), human culture did not begin with the need to work but with language, dancing, laughing and playing in a functionalism place, work was a solution to the "leisure problem"

Work is seen as a means of human progress but still, leisure is important.

Organizations should recognize leisure time. Failure to recognize the leisure time makes employees feel weary, absent and unproductive. Leisure is important to employees and they should be given leisure time to refresh and rejuvenate.

3.7 Abstinence from drug and substance abuse is observed as per workplace policy.
Drug and substance abuse.

A drug is a substance that when absorbed in to body and affects the psychological functions. Drug and substance abuse affect all people at all levels. Drug and substance abuse in the workplace can adversely affect the organization. When employees are under the influence of drugs, they will become less productive and organization goals may never be realized. (Denenberg and Denenberg, 2011). According to the national realization for alcohol and drug information (NCADI), companies in the United States lose 100 billion due to alcohol and drug abuse by employees. The employees also cause problems in the workplace such as tiredness, poor decision making, and low morale among them. The issue of drug and substance abuse in the work place should be addressed and abstinence observed. The employees and the workplace should be free from drugs and substance abuse (Cohem, 2008).

3.8 Awareness of HIV and AIDS is demonstrated in line with workplace requirements.
HIV/AIDS

The endemic continues to claim may live since the first case was designed in Kenya more than two decades ago. The pandemic is a global crisis hindering development and social progress.

In Kenya, the ministry of state for public service put in place in a national public sector workplace policy on HIV/AIDS where every public organization is to develop their own policies. The aim is providing guidance to management of employees infected and affected by HIV/AIDS. It also advocates for awareness and prevention of further infection. It outlines employees' rights, responsibilities and expected workplace behavior. HIV/AIDS is a great challenge in the work place and thus awareness should be created in accordance with the workplace policy on HIV/AIDS. Such awareness will promote good health through the policies and initiatives.

Developing healthy relationships

Healthy relationships are built and understanding each other's expectations and needs.

There is need for open communication and mutually trust in the organization. Creating boundaries also enhance healthy relationships.it is an expression of what makes others comfortable or uncomfortable. Healthy relationships are important and also human vital to both emotional and mental wellbeing and survival.

3.9 Safety consciousness is demonstrated in the workplace based on organization safety policy.

Organizations should show their commitment in provision of a healthy and safe working environment which is integrated in to the daily working routines. Employees should also be aware of their responsibility in precautions to prevent illness and injury. Safety consciousness is the awareness of dangers and hazards. Employees need regular reminder on safety to prevent accidents. This enables them to take action and responsibility towards workplace. Many at times, injuries occur due to lack of safety consciousness and therefore, safety consciousness should be comprehensive in all meetings, strategic positions and performing work in such a way that safety is assured and chances of accidents are minimized.

3.10 Emerging issues are dealt with in accordance with organization policy.

Emerging issues involve but not limited to terrorism, social media, national cohesion and open offices. Such issues need to deal with in Accordance with organization policy.

Open offices

This is an open plan work environment where employees work better together often in the same room and besides each lther.in this plan, the work environment becomes noisy and security is reduced and privacy is limited. Open offices have increased in number due to desire to increase interactions and collaboration among workers. Therefore, this issue should be addressed.

Conclusion

At the end of the unit the trainee should be able to manage stress, observe punctuality, integrate personal objectives into organizational goals and utilize resources effectively. One will also be expected to be able to set work place priority, recognize leisure, abstain from drugs and substance abuse, be aware of HIV and AIDs and be conscious of safety. This will be important in maintaining safety habits at workplace.

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6.3.4.3 Self-Assessment

Written Assessment

1. The following are reasons for conducting awareness on HIV/AIDS except one.
    a) Promote good health.
    b) Prevent further infection.
    c) Stigmatization reduction.
    d) None of the above.
2. Which one of the following is not a strategy of effective time management?
    a) Focusing on the task at hand.
    b) Prioritizing which tasks are more important.
    c) Texting with your friends.
    d) None of the above.
3. Which one is a method for managing destructions?
    a) Using headphones.
    b) Studying in an office.
    c) Studying in a crowded place.
    d) All of the above.
4. Which of the following is not a common time management problem area?
    a) Insensitivity to the needs of others.
    b) Procrastination.
    c) Over planning.
    d) Too many meetings.
5. Examples of social stresses are?
    a) Financial problem
    b) Divorce
    c) Loss of loved ones
    d) All of the above
6. What thoughts come to the mind when under negative stress?
    a) You think that you can cope with the situation.
    b) You think that you cannot cope with the situation.
    c) You think that everything will be fine eventually.
    d) You think that you need help immediately.
7. Is a form of human activity carried out for intrinsic rather extrinsic purpose?
    a) Play
    b) Leisure
    c) Recreation
    d) Tourism
8. State the difference between stress and stressors
9. Define the term drug
10. State the importance of punctuality
11. Distinguish between resource mobilization and resource utilization.

Oral Assessment

1. Discuss the importance of leisure time
2. Explain how work procedures can be set.

Practical Assessment

In groups of five, conduct awareness on HIV/AIDS within your environment.

6.3.4.4 Tools, Equipment, Supplies and Materials

- Computers
- Stationery
- Charts
- Video clips
- Audio tapes
- Radio sets
- TV sets
- LCD projectors

6.3.4.5 References

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6.3.5 Learning Outcome No 4: Lead a workplace team

6.3.5.1 Learning Activities

Learning Outcome No 4: Lead a workplace team	
Learning Activities	**Special Instructions**
4.1. Set performance expectations for the team. 4.2. Assign duties and responsibilities in accordance with the organization policy. 4.3. Identify team parameters and relationships according to set rules and regulations. 4.4. Establish forms of communication in a team according to office policy. 4.5. Carry out communication as per workplace place policy and requirements of the job. 4.6. Supervise team performance. 4.7. Collect and analyze feedback on performance based on established team learning process. 4.8. Resolve conflicts between team members in line with organization rules and regulations. 4.9. Undertake gender mainstreaming in accordance with set regulations. 4.10. Adhere to human rights in accordance with existing protocol. 4.11. Develop and maintain healthy relationships for harmonious co-existence in line with workplace.	Develop a team and allocate duties to every member. Present communication model in the team.

6.3.5.2 Information Sheet No. 6 /LO 4: Lead a workplace team

Introduction

In this learning outcome trainees will train on setting performance expectation for teams, assigning duties and responsibilities and identification of team parameters and relationships. Trainees will also be given skills and knowledge of establishing forms of communication, carrying out communication at workplace, supervision and providing feedback for team performance. Other skills, knowledge and behaviours from this unit will be; collection and analysis of feedback, conflict resolution adhering to gender mainstreaming and human rights as well as creating healthy relationships.

Definition of key terms

Performance expectation: They are the requirements of an employee including actions, behavior and expected results.

Forms of communication: Various ways of exchanging information, ideas, thought, feelings and emotions.

Conflict: It is a disagreement among groups or individuals characterized by antagonism and hostility.

Gender Mainstreaming: A strategy of realizing gender equality.

Healthy relationships: It is having good interactions with fellow employees and working in harmony to achieve the set goals.

Content/Procedures/Methods/Illustrations

4.1 Performance expectations for the team.

Setting performance expectations is to move towards a specific goal and creating workplace accountability from one employee to another. It is applied to assess the progression and position expectations as performed by individual employees. To communicate and manage expectations effectively is important to know what is expected from the employees and teams and set realistic reasonable tasks.

Team performance expectations

Team expectations are similar to individual expectations except that team expectations are something every member of the team should be accountable for while also holding others accountable. They are shared expectations. They are behaviors that occur while the team accomplishes said tasks. They are for the team to be productive and work cohesively. Each member of the team should be accountable for the following:

- Respect each other and be courteous.
- Be flexible about job and tasks assignments.
- Ask for help when needed.
- Work safely together.
- Be motivated and reliable.
- Shared ideas for improvement.

How team performance expectations are set.

Setting expectations for a team for excellent performance communicating clearly about the specific tasks being assigned, results that should be accomplished, the degree of accomplishment, the expectation of each step and how it will be monitored. By knowing the specific requirements of each task, the expectation at each step in the process the employee will have no doubt about what the task that is about. Expectations are set in the following steps:

- **Having standards**: Standards are levels or degree to which all are expected to strive. This is mostly referred to as a norm. It is for the good of the company and all the team members must work towards it.
- **Set goals**: The goals are set with a direction, connection to the company standards. The goals may be challenging but realistic and set up to reach levels that are a progression upwards.
- **Objectives are set**: These are steps on a timeline that keep the workers towards moving the goal in a specific and measurable way.

Requirements of performance expectation

- A requirement to conform to the core values of an organization.
- Compliance to laws, regulations, standards and policies is a requirement.
- Adhere to the norms of professionalism in the areas of specialization.
- Be adoptable which the ability to embrace change and learn.
- Compliance with applicable standards external or internal.
- High standards of work produced by the team.

4.2 Assigning duties and responsibilities.

This means putting a person in charge of tasks. When team leaders assess the scope and feasibility of the work assigned to the team. The primary consideration is the strength of each team member. From the strengths, leaders assign roles and responsibilities. Assigning roles and responsibilities improve the work of the team in the following ways:

- Productivity: Productivity is enhanced when the responsibility assigned closely align with team members' strength.
- Morale: Issuing of duties and responsibility to team members gives each person a sense of ownership. They become invested in projects outcome hence increasing their effort to create quality product. Without assigning roles to members, they may grow disinterested and detached.
- Efficiency: Assigning responsibilities boosts efficiency having a clear understanding of the work roles allows leaders to develop timelines. This lists who is in charge of which task and when the specific portion of the work is expected to reach completion.

Guidelines for delegating tasks to team members/assigning duties

i. Identify key opportunities for delegation: Not all can be delegated. A leader has to determine which duties and responsibilities can be assigned or delegated.
ii. Establish a clear set of objectives for each task- no matter the task being delegated; make sure all the objectives are clarified so as the task can be accomplished.
iii. Construct timelines: Timelines keep people focused and hold all members of the group accountable to meeting goals on time.
iv. Establish authority and respect: When assigning duties, it is important to set the tone for your position in the relationship. This sets a tone of respect o they understand they are being relied upon and appreciated.

4.3 Identifying Team parameters and relationships.

Team parameters and relationships is how the team members engage with each other. This will highly be influenced by how the leaders engage with the time. Team parameters and relationships involves finding a balance point. In order to achieve this, a team leader shouldn't lead a team too highly or too loosely.

Ways of finding a balance point in the team.

- Encourage discussion but not too much of it- discussion and the exchange of ideas allow for greater creativity and innovation. Through dialogue a team expands its problem-solving capability.
- Celebrate the collective and recognize the individual- team leaders have to maintain a sense of who contributes what to the team. Team can be celebrated for completing major tasks but the team members who accomplished and made significant contributions should be celebrated.
- Give autonomy but define parameters- the team should know the general direction, where it is heading and trusts everyone enough to carry on. If the work is going too far off the rails, the leader has to step in and keep everyone on track and moving forward.
- Encourage opposing views but beware of obstructions – opposing views are important to energizing teams and stimulating creativity. However, there is a thin line between well-meaning critics and obstructionist rhetoric.

By keeping the above ways in mind, a leader can hit the balance point between loose and tight leadership. If the balance is achieved, the parameter and the relationship of the team is identified.

4.4 Forms of communication establishing

These are the various ways of establishing and exchanging of information, ideas, thoughts and feelings. Communication is categorized into two:

Informal communication: This is any communication that takes place without following the formal channels of communication. It is often referred to as grapevine as it spreads without the organization and in all directions without any regard to the levels of authority.

Formal communication: This is the type of communication that flows through official channels designed in the organization chart.it may take place between a superior and a subordinate, a subordinate and a superior or among the same cadre of employees or managers.

Formal communication can be classified into:

- Vertical communication: As the name suggests, information flows vertically upwards or downwards through formal channels. Downward communication flow is communication from superior to subordinate while upward communication flows from the subordinate to a superior.

- Horizontal communication - this occurs between members of equal rank or positions like between heads of departments or units. It helps to maximize achievements of the set goals.

4.5 Carrying out Communication

There are three basic methods of communication:

- Written communication: this is one of the most important and frequently used mode of communication in organizations. Written communications includes: letters, electronic mail, fax transmissions or other device that is transmitted via written words or symbols.
- Oral communication: this type of communication is through word of mouth. This can be in meetings, or in any other event.
- Nonverbal communication /silent communication: This is the non-word human response and the perceived characteristics of the environment through which the human and non-verbal messages are transmitted. There are two forms of non-verbal communication i.e. physical/symbolic language and body language.

4.6 Team performance is supervised

Supervision is an act or instance of directing, managing or oversight. Supervision is focused on directing people to get work done where team leadership is focused on developing an environment where people are motivated to do their work. There are two capabilities required in team supervision:

Leading people capabilities: This includes giving feedback, coaching others, performance management, managing reward and recognition and setting measurable objectives, and

Managing work capabilities: This includes: Planning work, monitoring progress, setting measurable goals and facilitating meetings.

Team performance supervisors may play different roles which include:

Advocate: Responsible in representing the employee's requests to management and representing the employees' case for deserving a reward.

Boss: The supervisor is deemed to be the boss when people in the department are ultimately looking for direction and guidance in their job.

Coach: supervisors might guide their employees to increase performance and satisfaction in various ways such as advising them.

Facilitator: The work of a supervisor is to support a group hence making the supervisor a facilitator.

Trainer: The supervisor is often the first person who is considered when a new employee needs to learn the job. The supervisor is responsible to ensure that training occurs.

There are core competency skills that are suggested in supervision. These skills include: communication, decision making, delegating, meeting management, problem solving and planning skills. The supervision skills are improved over time.

4.7 Collecting and analyzing feedbacks on performance.

Feedback is the sharing of perspectives on work experiences in the organization by employees.

Importance of collecting feedback

This is to ensure that employees are engaged and satisfied. These leads to:

- More production.
- Improve customer experience
- Employees become advocates for the company.

Ways of collecting and analyzing feedback.

- Anonymous surveys- it can be in house or via survey form solutions which can be distributed.
- Non anonymous surveys- it creates an open culture based on open honest and respectful feedback to replace fear in the workplace.
- Pulse surveys. - They are shorter surveys distributed more frequently.
- Suggestion boxes- employees who are hesitant to express unpopular ideas may want to leave feedback in an anonymous way, but feel like surveys haven't been a good idea to express them.
- Feedback meeting – they are a great way to connect staff and managers in more effective ways.

Collecting and analyzing feedbacks are the initial steps to increasing employee satisfaction. But they are not enough. the information you learn from surveys must channeled into action.

4.8 Conflict resolution between team members

This is the process by which two or more parties engaged in disagreements, dispute or debate to reach an agreement resolving it.

Conflict resolution process

- Recognition by the parties involved that a problem exists.
- Mutual agreement to address the issue and find some resolution.
- An effort to understand the perspective and concerns of the opposing individual or group.
- Identifying changes in attitude, behavior and approaches to work by both sides that will lessen negative feelings.
- Recognizing triggers of episodes of conflicts.
- Interventions of third parties such as human resources representatives or higher level managers to mediate.
- A willingness by one or both parties to compromise.
- Agreement on a plan to address differences.
- Monitoring the impact of any agreement for change.
- Disciplining or terminating employees who resist diffusing conflicts.

Some conflicts are essentially arbitrary which means it doesn't matter who wins only that the problem is relived to everyone who can get back to work. Conflict is normal occurrence in a workplace hence the need to resolve them.

4.9 Undertaking Gender mainstreaming.

It is a strategy towards realizing gender equality. Gender mainstreaming requires both integrating a gender perspective to the content of the different policies and addressing the issue of representation of women and men in the given policy area. An effective implementation of gender mainstreaming requires preparation and organization. People in decision making positions can make a particular difference as they have more power to introduce changes. The changes introduced they should at all-time distribute them across both genders in a balanced way.

4.10 Adhering to Human rights.

Human rights are basic right of each human being of independent of race, sex, political affiliation, religion, social status or any other character. Human rights provide a universal benchmark for minimum standards of behaviour. Many national laws and regulations have evolved as a result of a state's obligation to implement human rights standards. Businesses must also observe such laws in all countries and jurisdictions in which they operate. If the human rights are not adhered to, it is against the law and action should be taken against those not adhering to them.

4.11 Developing and maintaining healthy relationships.

It is having a good interaction with fellow employees and working in harmony to achieve the set goals. Developing a work relationship involves the actions that create a positive empowering motivational work environment for people. It also entails helping other employees to achieve this greatness.

Conclusion

At the end of the unit the trainee is equipped with knowledge and skills that enable then to set and assign duties and responsibility to teams, establish forms of communication collect and analyze feedback and carry out workplace communication. The trainee also acquired skills ability and knowledge in conflict resolution, gender mainstreaming, adherence to human right and establishing healthy relationships.

Further Reading

The Universal Declaration of Human Rights 2015 United Nations

6.3.5.3 Self-Assessment

Written Assessment

1. Which of these should not be avoided for effective communication?
   a) Noise
   b) Planning
   c) Wrong assumptions
   d) Semantic problems.

2. Both encoding and decoding of messages are influenced by emotions.
   a) True
   b) False.

3. Which is the first enemy of communication
   a) Noise
   b) Clarity
   c) Politeness
   d) Completeness

4. Which one of the following is not a characteristic of a team?
   a) Minimal and formal knowledge sharing
   b) Collective output
   c) Individual and collective responsibility
   d) Fluid dimension to roles and tasks.

5. The process which begins when one party perceives that others have frustrated or is about to frustrate, some concern of this is known as?
   a) Conflict
   b) Risk
   c) Uncertainty
   d) Poor management

6. Most conflicts have roots in uncertainty and negotiation is a way of managing the
    a) Resultant risk
    b) Failure
    c) Uncertainty
    d) Inputs
7. When employee's high expectations confront reality of a boring job.it is called?
    a) Promotions
    b) Transfers
    c) Reality shock
    d) Formal training.
8. What is gender?
9. How many forms of communication do we have?
10. What is conflict resolution?
11. Which are the leadership qualities you know?

Practical Assessment

Assuming you are a group leader and there is conflict between the group members. How will you solve the conflict?

6.3.5.4Tools, Equipment, Supplies and Materials

- Computers
- Stationery
- Charts
- Video clips
- Audio tapes
- Radio sets
- TV sets
- LCD projectors

6.3.5.5 References

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6.3.6 Learning Outcome No 5: Plan and organize work

6.3.6.1 Learning Activities

Learning Outcome No 5: Plan and organize work	
Learning Activities	**Special Instructions**
5.1. Identify task requirements as per the workplace objectives. 5.2. Interpret task is in accordance with safety (OHS), environmental requirements and quality requirements. 5.3. Organize work activity with other involved personnel as per the SOPs. 5.4. Mobilize, allocate and utilize resources to meet project goals and deliverables. 5.5. Monitor and evaluate work activities are in line with organization procedures. 5.6. Document job planning in accordance with workplace requirements. 5.7. Review planning and organizing of work activities as per the workplace requirements. 5.8. Manage time to achieve workplace set goals and objectives	Stimulate task in accordance to OHS Stimulate job planning, organizing and evaluation.

6.3.6.2 Information Sheet No. 6/LO 5: Plan and organize work

Introduction

Trainees will be acquired skills knowledge and the right behaviour for planning and organizing work. Specifically, the trainee will be trained on identification and interpretation of task requirements, organization for work with other personnel involved and mobilization and allocation of resources to meet project goals. The trainees will also acquire skills in monitoring and evaluation of work activities, documenting work plan, review of work and time management at work place.

Definition of key terms

Tasks – The smallest identifiable essential piece of a job that serves as a unit of work and as a means of differentiating between various components of a project.

Work Activities – It is a systematic purposefully cooperate human action where several actors work in an organized manner upon a shred object of work to transform it to intended outcome.

Work Plan – It is a road map detailing the work that is to be done from the beginning to the end.

Content/procedures/methods/illustrations

5.1 Identify Task requirements

These are the collection of physical, functional, mental and administrative needs that should be covered by the assigned resources. The requirements can be derived after the tasks analyses is completed.

What should be considered in identifying task requirements?

- The type of tasks required.
- The instruction words in the task.
- The components of the task
- The scope of the task.

This will enable you come up with the needed requirements for the completion of the tasks by the work place objectives.

Task is interpretation safety

These are the details on how a task is going to be accomplished. Task means specific work assignment. Task interpretation safety is an integration which helps give the accepted safety and health principles and practices into a particular task of operation.

Steps of task interpretation

i. Selecting the task to be interpreted.
ii. Breaking the task down into sequence of steps.
iii. Identifying potential hazards.
iv. Determining preventive measurements to overcome these hazards.

Organizing Work activity

Planning and organizing makes use of time at the office more effective. Organizing work activities and projects ensures you tackle all necessary steps to success. The following steps help to organize work activities:

i. Identify the scope and goals of the planning process related to each of work activity.
ii. Break down the major tasks for the activity into smaller steps that are needed to be taken for completion.
iii. Establish the timeline for completing the work activity.
iv. Write each due date for the assigned work on the calendar or set up reminders that pop up when the deadline approaches.
v. Identify potential problems or barriers that may surface for the work activities.
vi. Schedule planning meetings when active participation and feedback is needed.
vii. Send out regular updates and communication to all other employees who are working.
viii. By following these steps, the work activities will be organized and the work will flow as expected without any delay.

Utilizing, allocating and mobilizing resources.

Resource allocation is setting aside the resources that are needed for the completion of a task. Resource utilization on the other hand is the process of strategically measuring how effective resources are. Resource mobilization is all the activities that are involved in securing new and additional resources for the organization.

Importance of resource mobilization

- Ensures the continuation of organizations service.
- Supports organization sustainability.
- Allows for improvement and scale up of products and services.
- It's a way of greeting new business to stay in business.

Benefits of resource planning

- It maintains productivity.
- Work is managed with proper visibility reducing risk oversights.
- Using resources to maximize the potential.
- Ensures specific resources are not being over or underutilized.

Resource utilization, allocation and mobilization serve the purpose of managing the resources that may be available for use to gain maximum while reducing wastage.

5.5 Monitoring and evaluating work activities

Monitoring is the routine collection and analysis of information to track progress against set plans and check compliance to established standards.
An evaluation is an assessment of an ongoing or completed project of work.
The aim is to determine the effectiveness of the strategy used. It involves identifying and reflecting upon the effects of what has been done and judging their work.
Monitoring is a routine part of the employee and employer relationship/Most employees make some checks on the quantity and quality of work produced by either staff.

Ways of monitoring at work

- Create a written explanation of the work policies.
- Make sure employees are aware of the policies.
- Follow disciplinary guidelines exactly.
- Keep policies within reason.
- It provides the only consolidated source of information showcasing projects.
- It contributes to transparency and accountability.
- It reveals mistakes and offers paths for learning and improvements.
- It provides basis for questioning and testing assumptions.
- It provides away to assess the crucial link between implementers and beneficiaries on the ground and decision makers.

5.6 Documenting Job planning

It is documenting the expectations of employee and employer into working schedule. It ensures that the post delivers .it aims and requirements of the contract of employment.

Principles of a good job plan

- It should be developed collaboratively between the employer and the employee.
- It should include all the duties.
- Workload should be broadly defined.

Importance of work plan

- A work plan is practical it gives the direction of the work to be done.
- It is useful throughout the period it covers providing milestones to assess progress.
- A relevant and well researched work plan performs the important task of highlighting potential difficulties and proactively offering solutions.
- It clarifies the specific tasks and outcomes that each team member achieves, paving the way for accountability and successful collaboration.

5.7 Planning and organizing of work activities.

Planning and organizing makes efficient use of time by keeping employees focused from beginning to completion of a project. A comprehensive plan for work activities and projects ensures you tackle necessary steps for success.

Steps of planning and organizing work activities.

i. Identify the scope and goals of planning process related to each work activity.
ii. Break down the major tasks for the activity into smaller steps that you need to take for completion.
iii. Establish the timeline for completing the work activities.
iv. Write each due date for the task.
v. Identify potential problem or barriers you may face in the work activities.
vi. Send regular updates and communication to all other employees who are working on the project.

Planning and organizing work activities reduces time wastage. Ensures materials are used in the right way for maximum benefit of the organization.

5.8. Time is management

Time management is the process of planning and excursing conscious control of the time spent on specific activities to work smarter than harder. Improving time management at work enables ne to enhance performance.

Benefits of time management

- Delivery of work on time.
- Provide better quality work.
- More productivity and efficiency.
- Much less procrastination i.e. I will do it later.
- More opportunities and career growth.

Steps for better time management

- Plan what you are to do.
- Prioritize on what to do.
- Minimize multitasking.

- Cut off distractions at work.
- Schedule your break time.

Effective time management skills can have a positive impact on your works. When time control is practiced the ability of things done is improved, makes better decisions and most importantly is the gaining of the key priorities.

Conclusion

This learning outcome provided knowledge that the trainee should be able to plan and organize work as per workplace objectives, SOPs, and set objectives and goals for the organization.

Further Reading

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6.3.6.3 Self-Assessment

Written Assessment

1. To what time frame do strategic plans relate?
    a) Long term
    b) Medium term
    c) Short term
    d) Unspecified term
2. Which one of the following is not a key management skill in planning?
    a) Conceptual skills
    b) Analytical skills
    c) IT and computing skills
    d) Communication skills.
3. Studying the future, arranging the means for dealing with it is part of the process of?
    a) Organizing
    b) Commanding
    c) Controlling
    d) Planning
4. Evaluation measures?
    a) The timeliness of program activities
    b) The outcome and impact of a program activities
    c) How closely a program is kept to its budget
    d) How the program was implemented

5. At what stage of a program should monitoring take place?
    a) At the beginning of a program
    b) At the midpoint of the program
    c) At the end of the program
    d) Throughout the life of the program
6. An unsafe state is of course a state that is not?
    a) Require
    b) Safe
    c) Run
    d) Control
7. Which of the following would not normally be considered as part of a person's work habits?
    a) Commuting
    b) Promoting setting
    c) Sending and receiving mail
    d) Organizing
8. What is time management technique?
9. What is decision making?
10. What is planning?
11. How is monitoring done?
12. Why is evaluation done?

Oral Assessment
1. What are the qualities of a good time manager?
2. What is organizing resources?

Practical Assessment
Ask the trainees to plan on the task they will be doing the following week.

6.3.6.4 Tools, Equipment, Supplies and Materials
- Computers
- Stationery
- Charts
- Video clips
- Audio tapes
- Radio sets
- TV sets
- LCD projectors

6.3.6.5 References

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6.3.7 Learning Outcome No 6: Maintain professional growth and development.

6.3.7.1 Learning Activities

Learning Outcome No 6: maintain professional growth and development	
Learning Activities	**Special Instructions**
6.1. Identify and assess personal training needs are in line with the requirements of the job. 6.2. Identify and avail training and career opportunities based on job requirements. 6.3. Mobilize and allocate resources for training-based organizations skills needs. 6.4. Obtain and renew licensees and certifications relevant to job and career 6.5. Pursue personal growth towards improving the qualifications set for the profession. 6.6. Manage work priorities and commitments based on requirement of the job and workplace policy. 6.7. Seek recognitions as proof of career advancement in line with professional requirements.	Stimulate personal training needs

6.3.7.2 Information Sheet No. 6 /LO 6: Conduct Self-Management

Introduction

Trainee will acquire skills, knowledge and behavior in maintaining professional growth and development. Specifically, the trainee will be impacted with skills to identify and assess personal training needs and career opportunities, mobilize and allocate training resources and obtain relevant licenses and certification for particular jobs and allocation of training resources, professional growth and development. The trainees will be trained on pursuing personal growth, managing work priorities and commitments and seeking recognition for proof of career advancement.

Definition of key terms

Training needs: This refers to the gaps in the knowledge, skills and competencies that employees have and those that they require to efficiently accomplish tasks.

Career opportunities: These are considerations to take when enrolling for a course or training.

Career advancement: Refers to the upward progression in an individual career.an individual can move up into managerial position in a given job or form one occupation to another.

Content/Procedures/Methods/Illustrations

6.1 Personal training needs are identified and assessed in line with the requirements of the job

Staff training and development is a vital element in an organization. Training and development leads to improved performance, employee satisfaction and morale, increased competency and reduced employee turnover. Personal training needs are identified through training needs analysis. (TNA). Training needs arise when there is need to do things differently. Analysis of needs at personal level has two prerequisites:

a) The parameter of job performance has been defined- there may be individual performance measures defined at managerial levels. Failure to meet personal objectives, you do not indicate a training need.
b) The prerequisite of review against performance parameter. Other techniques include self-assessment, 360 degrees feedback.

In examining training needs each of employees, performance appraisal systems, gather information? Other ways include: surveys, questionnaires, focus groups and intervention (Boydeal, 1971)

Avenues for professional growth

This entails ways of approaching a problem or progressing towards a goal.in this accredit is professional development and growth. Avenue for professional growth can include professional development course, additional college course for further training, reading websites and professional journals, benchmarking, joining professional organizations among others.

Training and career opportunities are identified and availed based on job requirements.

In the workplace, training and development should be a continuous and ongoing process. Even the skilled employees need training programs. Employees should offer training and cover opportunities to the employees throughout their career. They should be committed to develop their employee potentials. Organizational objectives may also offer a training opportunity or contain implications. New production, processes, methods, technology, legislation, customer or market can lead to organizations considerations for training (Wilson, 2005).

Assessing training

Training needs assessment which serves as a tool for determine the training needs to take place.

Data is collected which is used to determine development needs that will enable the organization attain its objectives. After identifying training needs, objectives are determined which will measure success. Assessing training needs reduces gaps between the skills of the employees and those required by the job. Assessing training needs also determines effectiveness of the training and development program.

6.3 Resources for training are mobilized and allocated based organizations skills needs

- **Mobilizing training resources**

When employees are trained, they are better and develop professionally. The training program requires resources human, physical and financial to be carried out successfully**.** There is a positive correlation between organization revenue and employee training (Snell and Bohlander, 2012.) Training has become part and parcel of organization which offers several advantages to the organization. Training is expensive and resources to support it should be well mobilized and this decision should be based on the employees' ability to learn and the likelihood that they will be impacted by the training and development program. The resources mobilized should be well utilized and the consideration is to get employees take advantage of the program.

6.4 Licensees and certifications relevant to job and career are obtained and renewed

Licenses and certificates for professional growth and development

Licenses are granted to individuals after some form of examination or proof of education through the licenses program whereby authority is granted to the individual or organization to operate or engage in a profession or occupation. The license regulation ensures that the organization or individual meets minimum standards stipulated by the law in the profession. Certification is a process by which an authorized body evaluates and recognizes an individual or organization as meeting some predetermines criteria.

When an individual is certified, it means that he or she has received additional education and training and demonstrated professional standards and competences beyond the minimum license requirements. The purpose of the license and certification is to improve quality, maintain quality, ensure public safety, validate specifications, outline capabilities of an individual or organization, monitoring purpose and risk management among others. Organizations should ensure that they are licensed and certified by relevant authorized bodies. Incenses are valid for some time after which they expire. This calls or renewal of licenses and certification. Failure to renew or obtain such documents can lead to crackdown in the business. As a professional standard, license and certifications should be obtained and renewed.

6.5 Personal growth is pursued towards improving the qualifications set for the profession

Personal growth includes job growth, career mobility, networking, job gains among others. Intellectual growth starts from birth and ceases only at death. In many cases, some people underestimate this assumption and think that they have reached the pinnacle in life if they acquire decent paying job. Personal growth should be pursued by the individual and the best way to grow is to meet new people, explore new ideas and challenges and participate in other activities. The more the growth, the more skills you acquire and then improving qualifications set for profession.

Pursuing personal and organization goals

Goal setting should be a priority. Research has shown that many people do not know what they want in life and if they do, they have no plan in getting it. Those who achieve their personal goals are those who note them and develop plans for achieving them. Effective goal keeping is one of the keys to success. Individuals should pursue both personal and organizational goals. However personal growth should not conflict organization goals. Employees joining organizations have personal goals they seek to achieve through their membership in the organization. The personal goals and organization goals should be congruent. Individuals need to work towards realization of organization goals. (Buller Schuller, 2000).

6.6 Work priorities and commitments are managed based on requirement of the job and workplace policy

Managing work priorities and commitments

In the workplace, completing tasks to the best of ability is enhanced through having work practices; prioritization ensures that what is important is done first before others which equally limit time wastage. Work practices and commitments need to be organized and managed then focus applied in completion of meaningful tasks. These are sets to guide task completion. Prioritizing competing demands involve development of strategies by managers to effectively prioritize work and maintain a good work line balance.

For instance, using the urgent important matrix is one strategy to manage work priorities and having sound control. Managers should use the latest technologies, embrace and adopt to change. The ability to control work, related stress lies in effective work prioritization. This enables one to be calm and to have increased productivity. Elements to manage work prioritization and commitments include:

i. Establishing personal goals- serving a positive role model through personal work planning. Reflecting organization plan in personal goal, measuring and maintaining personal performance in varying work conditions.
ii. Set and meet work practices- take initiative to prioritize and facilitate competing demands to personal, tea, and organizational goals. Using technology to manage work priority and commitment. Maintain appropriate work life balance and manage stress.
iii. Develop and maintain professional competences- this is through assessment of personal knowledge and skills against competency standards to determine needs

and priorities. Seeking feedback and using it to improve competency. Identify, evaluate and select develop opportunities for company. Develop new skills. Participate in networks to enhance personal knowledge and relationships.

6.7 Recognitions are sought as proof of career advancement in line with professional requirements.

Employee recognition is acknowledgement of an individual or team for effort and accomplishment. This creates friendly atmosphere and enhances the sense of belongingness in the workplace. Motivation is also induced through recognition.

Recognizing career advancement

Career advancement refers to individual's upward progression in his or her career. Appreciation and recognition is essential in the workplace. People need to be appreciated and their achievements recognized. This sense of achievement makes one seek recognition for their contribution to the organization. Recognition should be given to those who deserve it.

Ways of seeking recognition.

- **Application for awards**: Organizations honor and recognize good performance and thus the employees should seek out how to qualify and awards for such qualifications and achievements.
- **Public speaking:** This is one of the dread arts but speaking in an articulate manner and minus fear will make employees or one to be recognized.
- **Information sharing**: You should be contributing ideas that you relate one helpful and give complement when it is due.
- **Sharing achievements with the employer:** This involves using the appropriate method of communication to give timely updates to the employees on achievements both for individual and the organization.
- **Volunteering for activities**: Getting involved in voluntary activities help the employee connected to the market place.it does not necessarily mean that when there is a task, then it is valuable to one. Employees can even seek for tasks from the employer.

Conclusion

This learning outcome offered skills of maintaining professional growth and development by effectively identifying personal training needs, career opportunities, obtain relevant licenses and certifications manage workplace priorities and be able to seek recognition for proof of career advancement.

Further Reading

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6.3.7.3 Self-Assessment

Written assessment

1. Refers to the learning opportunities designed to help employees grow.
    a) Training
    b) Development
    c) Education
    d) All of the above.
2. How does training and development offer competitive advantage to an organization.
    a) Removing performance decision
    b) Deficiency is caused by lack of ability
    c) Individual have the aptitude and motivation to learn
    d) None of the above.
3. Which of these is a benefit of news assessment?
    a) Assessment makes training department more accountable.
    b) Higher training cost
    c) Loss of business
    d) Increased overtime wastage
4. Which of the following is not one of the job-related experiences for successful job performance?
    a) Innovation
    b) Knowledge
    c) Skills
    d) Behavior
5. Is the identification of tasks to complete and the order I which they will be completed?
    a) Planning
    b) Procrastination
    c) Prioritization
    d) Program
6. Distinguish between license and certification.
7. What is the importance of assessing training needs?

8. Differentiate between personal and organizational goal.

Oral Assessment

1. Explain the significance of training and development.
2. Discuss reasons why employees seek recognition.

Practical Assessment

Develop a simple training program to enable employees utilize ICT successfully in the workplace.

6.3.7.4 Tools, Equipment, Supplies and Materials

- Computers
- Stationery
- Charts
- Video clips
- Audio tapes
- Radio sets
- TV sets
- LCD projectors

6.3.7.5 References

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6.3.8 Learning Outcome No 7: Demonstrate workplace learning

6.3.8.1 Learning Activities

Learning Outcome No 7: Demonstrate workplace learning	
Learning Activities	**Special Instructions**
7.1. Own learning is managed as per workplace policy. 7.2. Learning opportunities are sought and allocated based on job requirement and in line with organization policy. 7.3. Contribution to the learning community at the workplace is carried out. 7.4. Range of media for learning are established as per the training need. 7.5. Application of learning is demonstrated in both technical and non-technical aspects based on requirements of the job. 7.6. Enthusiasm for ongoing learning is demonstrated. 7.7. Time and effort is invested in learning new skills-based job requirements. 7.8. Willingness to learn in different context is demonstrated based on available learning opportunities arising in the workplace. 7.9. Awareness of Occupational Health and Safety procedures are demonstrated in use of technology in the workplace. 7.10. Initiative is taken to create more effective and efficient processes and procedures in line with workplace policy. 7.11. New systems are developed and maintained in accordance with the requirements of the job. 7.12. Opportunities that are not obvious are identified and exploited in line with organization objectives. 7.13. Opportunities for performance improvement are identified proactively in area of work. 7.14. Awareness of personal role in workplace innovation is demonstrated.	Group discussion and identify learning opportunities in various work place.

6.3.8.2 Information Sheet No. 6/LO 7: Demonstrate workplace learning

Introduction

In this learning outcome trainees will be trained on how to demonstrate learning at workplace**.** Trainees will get skills and knowledge in managing and seeking learning opportunities, contributing to the learning community, awareness of health and safety procedures and developing new systems for exploring learning opportunities at workplace.

Definition of key terms

Own learning: This is a personal initiative to acquire skills and knowledge.

Mentoring: Is a system of semi-structured guidance whereby one shares their knowledge, skills and experience to assist others to progress in their own lives and careers.

Coaching: This is a professional relationship that helps people produce extraordinary results in their lives, careers, businesses or organizations helping them to bridge the gap between where they are now and where they want to be.

Content/Procedures/Methods/Illustrations

7.1 Own learning is managed as per workplace policy.

When taking ownership of your learning, you have to ensure that the time invested in learning a new skill was the right decision, and you find application for it in real life. When you are an independent learner, you have to trust yourself. You are the only person to decide what and why you will learn. By taking ownership of your earning, you have to be open for feedback and constantly seek an environment that stimulates your personal growth. Every single learning process consists of two parts:

- Independent hard work to master new skills.
- Feedback from experts who already mastered the skills.

Taking ownership of your learning implies have intrinsic motivation for growth. The learning process is faster and way more efficient when your motivation comes from the desire to master the new skill to become a better version of yourself. There is no doubt that grades, money and promotion contribute to motivation, but it is why component of learning that has to become a driving force. Taking ownership of your learning is hard, but it is also extremely rewarding as you gain independence and understanding of what you are capable of.

7.2 Learning opportunities are sought and allocated based on job requirement and in line with organization policy.

Employees are constantly being assessed on their knowledge and skills. Whether we like it or not, employees are constantly being judged on their capabilities and benchmarked against their peers. And, unlike studying for a qualification, the goal post in the workplace keeps moving. This might be because of new technology, customers' demands, legislation

or simply because there is a new chief executive with a different vision. All these changes inevitably have implications on the staff.
Some organizations are good at providing learning opportunities when they can see a direct benefit to the organization. What is offered however may not always be in line with what you really want or need for your career. So, if you want to protect your employability, you need to take charge of your personal development, According to learning survey by Niace (2012), the adult learning organizations, there is a strong correlation between learning and sustained employment. Staffs who undertake learning activities are more able to adapt to the changing requirements of an organization and gain a competitive edge in the job market.

7.3 Contribution to the learning community at the workplace is carried out

Even when individuals participate in learning to develop their own skills and knowledge, (human capital) social impact on both individuals and their communities has an opportunity to grow Catering confidence study (2004) set out to capture changes in confidence during a learning experience. It identified how individuals reported increases in well-being and community involvement. They felt that raised confidence, through new skills and knowledge, helped them to deal with challenges in work and in life, generally. Also, learning helps to build social capital and enables social networks to develop a curriculum framework. The citizens' curriculum embraces human, social and identifies capital and co-creates learning relevant to participants' everyday lives. It starts from an understanding that participants have capita to invest in and add to the process and its outcomes.

7.4 Range of media for learning are established as per the training need

As a result of rapid changes in technology, much is discussed about the use of social media. Organization should look closely at the potential for using social media. Using social media in the workplace is becoming very common. Social media plays a fundamental role in our day-to-day lives and there is no exception to that in the workplace. An article publishes by the Pew Research Center states that "34% of people use social media while at work to take a mental break from their job, 27% of people use it to connect with friends and family while at work, 24% use it to make or support professional connections, 17% use it to build or strengthen personal relationships with coworkers, 17% of people use it to learn about someone they work with, 12% of people use it to ask work-related questions to people outside of their organization, and 12% of people use it to as such questions of people inside their organization."

7.5 Application of learning is demonstrated in both technical and non-technical aspects based on requirements of the job

Technical does mean something which needs techniques to be implemented in the process. Non-technical does deal with things, does not actually take concepts or technics, something like physical work. Technical means you do something with different execution way if you can pass it to others. There is always a hope of improvement and it's scale-able. Valued employees do not just do the right job-they treat supervisors, subordinates and peers right too. Applying equal values to the two people's cores namely: technical and non-technical. Training develops competence and capability in the following areas:

- Technical: plant operations, new hire fundamentals.
- Non-technical: personal, interpersonal skills, leadership and team building.

Factors affecting the application of learning

a) Workplace culture is vital

A workplace culture, supporting continuous learning that is integrated into the workflow is more likely to report improved results such as increased learner engagement and increase responsiveness to business change and increased responsiveness to business change. Culture is the character and personality of your organization. It's what make your business unique and is the sum of its values, traditions, beliefs, interactions, behaviors, and attitudes. Positive culture attracts, drives engagement, impacts happiness and satisfaction and affects performance.

b) Work environment

Work environment includes the objects, artifacts and other physical signs in your workplace. These include what people place on their desks, what the organization hangs on its walls, how it allocates space and offices, what those offices look like (color, furniture, etc.), and how common areas are used.

c) Workplace support

Workplace support affects motivation to transfer too. This concerns your efforts throughout the organization that signal to employees how much learning is important.

- Ensure Senior Managers provide resources and endorse training activities.
- Ask managers to communicate their expectations for employees to put their learning into practice.
- Build a culture of psychological safety in teams, so that people feel they can take risks, try new behaviors and propose new ideas.

7.6 Enthusiasm for ongoing learning is demonstrated

Continuous learning is a response to the modern workplace: things change constantly, including in technology, staff, and company direction. The modern workforce is curious: they grew up with a world of information on their fingertips. They love being able to pursue their curiosity and find learning things stimulating. Continuous learning can help companies foster the lifelong learning instinct in their workers. The most beneficial result of creating a culture of continuous learning is an educated enthusiastic employee workforce trained and ready to “step up” in succession planning and expansion needs for the company. Hence create a workplace that is responsive to an ever-changing world. Keep employees up to date by assigning continuous learning on new technology relevant to their field. Understanding the latest technologies in the industry is important to keeping your company futures proof.

7.7 Time and effort is invested in learning new skills-based job requirements

The following scenarios demand that you train your employees:

- The introduction of new technology, tools, or equipment: You may have to train both the internal users (your employees) and external users (vendors, third-party service providers)
- The introduction of new procedures or modification of the current ones
- The induction of new employees: New employees have to be trained in the specific concepts, policies, procedures, technologies, and know-how of a company to help perform their duties efficiently.

Ways to motivate employees and promote learning in the workplace

i. **Align Interests**

Try to find skill training that is valuable to both the business and the employee as an individual. The training should teach them skills that will benefit them just as much in the long-term as it does in their current role - and this benefit should be emphasized.

ii. **Model Behavior**

Show initiative and take an interest in your own learning and continuing education. Seeing you take a proactive role in your skill development will make others far more likely to do the same. If you would like to have attentive and engaged employees who enthusiastically devote time and energy to ongoing training, then you should lead by example.

iii. **Coaching and Mentoring**

It is important that employees feel they have support, and that they have somebody they can turn to if they have questions or concerns about their learning. One way to be an effective coach is to provide candid feedback and debriefing.

iv. **Recognize Success**

Track the learning of employees, and make sure to recognize and reward success in some way so that they know you appreciate their effort. Acknowledge the meeting of targets and achievement of goals, and let particularly hard-working employees know that you see and are impressed by their progress.

7.8 Willingness to learn in different context is demonstrated based on available learning opportunities arising in the workplace

You may have hard-fought education and training in one area of work, but if you are not communicating a strong sense of willingness to learn new skills, you may be overlooking opportunities and a critical way to engage with your employer in the modern era. Willingness and desire to learn demonstrates your motivation for personal improvement and achievement. Your willingness and desire to learn a soft skill employer's value says a lot about you.

Employers look for potential, capability, and the ability to withstand change. Desire for a new challenge communicates it all. Your life will happen one way or another so it is a good idea to take charge of its direction and a life span is the way to do it- no matter your age, the purpose of a life span is to capitalize on opportunities and avoid regrets. Learning always takes place in a particular context and the issues involved in the analysis of social practices oriented towards learning within different settings includes:

- Opportunities for learning
- Spaces for learning
- Expectations for learning
- Creating supportive learning contexts
- Pressure of work
- Expectations, rewards and punishment
- Challenge and value of work

Contexts for learning at work include meeting context; 'on the job' context; 'working alongside' context and 'work encounter' context. Richard Edwards (2005) acknowledges that all social practices are contextualized and involve learning, but argues how those practices are conceptualized is more contentious, and that learning contexts can be used in various ways

7.9 Awareness of Occupational Health and Safety procedures are demonstrated in use of technology in the workplace

The health workplace concept provides a valuable tool for developing or reinforcing occupational health and safety standards so that conditions continuously improve for the working population. However, a healthy workplace is not only free of hazards but also provides an environment that is stimulating and satisfying for those who work there. The healthy organization acknowledges all of these elements in the development of policies and programs for the well-being of its workers (WHO, 1999), Abraham Maslow in the hierarchy of needs theory on human motivation used the terms of physiological safety, belongingness and love, self-esteem, self-actualization and self-transcendent needs, to describe the patterns that human motivations generally move through safety at work rank as an important factor on job satisfaction.

The occupational safety and Health Act 2007 aim at securing the safety, health and welfare of workers and the protection of persons other than the workers against the risk to safety and health arising out of or in connection with the activities of person at work. The act sets objectives to promote and improve occupational safety and health standards. Technology is improving the safety and health of employees. Technology in the workplace is not just for improving workers' productivity or acquiring more accurate data. Workplace technology is also about improving employee health. Employee safety monitoring training, reporting and worker compensation are just a few ways technology is improving workplace safety for employees. There have been many positive effects of technology in the workplace when it comes to workplace safety. Business is combining technology and safety with 3D visualization technology. Thus, software technology is allowing employees to become better aware of their workplace surroundings and the danger they may encounter and so on.

7.10 Initiative is taken to create more effective and efficient processes and procedures in line with workplace policy.

Initiative and creativity move the world. They foster the realization of innovative ideas in various industries and contribute to constant development. Sometimes wok is pieced together out of necessity, and nobody really gives it any strategic thought or considers how it will affect the big picture. Six lean principles that can make you more efficient:

- **Focus on your customer**

Ultimately, what all customers want is value, value creation occurs when the quality of services received is perceived as high compared to their cost.

- **Figure out how the work gets done.**

We have lots of assumptions about how work gets done that don't mirror exactly what happens. After all, during the day-to-day grind, we don't think about how we do the work, we often just do it.

- **Remove inefficiencies and waste.**

Once you know what the workflow of your process looks like, take a second look at any step in the process that doesn't directly create value for the customer. Manage, improve, and smooth your process flow to eliminate non-valued-added activity, for example, wasted movement, wasted time, unnecessary steps, customer delays, waiting for approvals and duplication of effort.

- **Track numbers and manage by evidence.**

Sometimes what should work well does not. Test out your process, collect data on how well it is working, highlight and eliminate errors, and seek continuous improvements in value.

- **Empower the people operating the process**

The best person to improve a process is the person who carries out the process. Utilize the employees' full skill sets.

- **Go about all this in a systematic way**

Your process is not perfect and by some miracles it is, it won't stay that way for long. Changes will occur that demand changes in the process. Being able to replicate the steps of process improvements is the key to delivering long-term, sustained value

7.11 **New systems are developed and maintained in accordance with the requirements of the job**

The purpose of organizational policies, procedures and systems are to establish the practices and standards that a company will follow about compliance with work health and safety act guidelines. Introducing technology change into an organization presents a different set of challenges management then does the work of a competent project administration. However, the managers are responsible for shepherding technical innovations, development than to manage its implementation. Each day, whether your organization runs programs, provide services or pursues advocacy, you should make sure that the right people are in the right times to do the work of the organizations. In addition, someone has to check out the everyday procedures (record-keeping, attention to how well particular techniques are working, etc.) that make evaluation possible. Someone has to keep track of finances and make sure that the books are kept properly; this has to be deployed by developing new systems and monitoring.

7.12 Opportunities that are not obvious are identified and exploited in line with organization objectives.

Opportunity and identification and exploitation have gained increased attention especially in entrepreneurship. Based on Hayek (1945), they argue that information and knowledge are not evenly dispersed among people. No two individuals share identical information and knowledge about the economy, and these differences are suggested to highly influence who identifies and exploits entrepreneurial opportunities.

How to find and exploit a gap in the market.

Once you have an idea, challenge it and break it down. A gap in the market idea and have one or more of the three attributes, namely:

- It is something new and original.
- It improves on something that already exists.
- It takes something that exists and finds it a new market.

7.13 Opportunities for performance improvement are identified proactively in area of work.

Proactive behavior is applicable to either one own role or to 'extra-role' responsibilities. Within one's own role, for example, a person may find a more efficient war to complete one or more of their responsibilities. Proactivity requires that you be organized. This can be done by improving the execution of strategy across business functions, for example, enhancing strategic communication. Investing in process tools and training to achieve greater productivity. The sectors vary in the degree to which cost optimization or staff developments are emphasized in seeking productivity. Investing in IT is also typically either the top or second high priority for executives. This can only be hindered by lack of focus or investment, excessive conservatism, lack of sufficient expertise and inflexibility. Innovation in management principles and the process can create long-lasting advantage and produce dramatic shifts in the competitive position.

7.14 Awareness of personal role in workplace innovation is demonstrated.

New technologies change the way we live, consume and meet people. The digital revolution is happening that is why the European commission launched the European Workplace Innovation Network (EUWN) in 2013. The organization of workplace plays a vital role in a company to compete and innovate. Workplace innovation can be described as those workplace practices and cultures which enables employees at all levels to use their knowledge, competencies and creativities to the full. It builds organizations in which people to work to do two things: To undertake their functions in the most effective way possible and to improve the business. Such workplaces are likely to include empowering job designs, self-organized team working, open and fluid organizational structures, delegated decision making and simplified administrative procedures, a coaching style of line management, regular opportunities for learning and improvements, high involving innovation practices, the encouragement behaviors and employee presentation in strategic decision making. Evidence shows that workplace innovation leads to significant and sustainable improvements both in organizational performance and in employee engagement and well-being.

Conclusion

This learning outcome has demonstrated that the trainee should be able to demonstrate workplace learning in accordance with workplace policy, training needs and job requirements.

Further Reading

Marsick, V. J & Watkins, K (2015). *Informal and Incidental Learning in the workplace* (Routledge revival). Routledge

6.3.8.3 Self-Assessment

Written Assessment

1. Which of the following are the benefits of mentoring programs?
   a) Personal fulfillment
   b) Development of managers
   c) Career advancement
   d) All of these
2. Why is coaching and mentoring important for an organization?
   a) It increases employee morale
   b) All of these
   c) It helps in the employee growth and development
   d) Help an employee to adjust to company culture
3. The basic functions of the management process include all the following except
   a) Planning
   b) Outsourcing
   c) Organizing
   d) Leading
4. Studying the future and arranging the means for dealing with it is part of the process of?
   a) Organizing
   b) Cementing
   c) Controlling

d) Planning
5. How do you identify opportunities in the workplace?
6. What are the cultural aspects of work?
7. What is coaching?

Oral Assessment
1. Define the term mentoring based on the workplace?
2. What is managing own learning?
3. What is the contribution of learning to the community?

Practical Assessment

Examine the application of learning in both technical and non-technical aspects in the workplace?

6.3.8.4 Tools, Equipment, Supplies and Materials
- Computers

6.3.8.5 References

Arors, R. & Rengnekar S. 2014. *Workplace mentoring and career resilience:* An empirical test. The psychologist manager journal 17(3), 205

Bakers D. & Hodges A. (2017). *Corporate social opportunity. Seven steps to make corporate social responsibility work for your business*. Routledge

Connor M. & Pokoraj (2012) *Coaching and mentoring at work:* Developing effective practices: Mc Grill Hill Education (UK)

6.3.9 Learning Outcome No 8: Demonstrate problem-solving skills

6.3.9.1 Learning Activities

Learning Outcome No 8: Demonstrate problem solving skills	
Learning Activities	**Special Instructions**
8.1. Creative, innovative and practical solutions are developed based on the problem. 8.2. Independence and initiative in identifying and solving problems is demonstrated. 8.3. Team problems are solved as per the workplace guidelines. 8.4. Problem solving strategies are applied as per the workplace guidelines. 8.5. Problems are analyzed and assumptions tested as per the context of data and circumstances.	Brainstorm ideas in class that are creative, innovative and practical solutions to problems.

6.3.9.2 Information Sheet No. 6 /LO 8: Demonstrate problem-solving skills

Introduction

Trainees will acquire skills, knowledge and behavior in developing creative, innovative and practical solutions, demonstrate independence and initiative in identifying and solving problems solving team problems, applying problem solving strategies and analyzing in testing assumptions.

Definition of key terms

Team Problems: These are the challenges that teams experience while carrying out their assigned activities.

Problem-solving strategies: These are strategies of working through details of a problem to reach a solution that may be favorable to the situation at hand.

Problem assumptions: These are something or problems that are assumed to be the case even without proof.

Content/procedures/methods/illustrations

8.1 Creative, innovative and practical solutions are developed based on the problem

In today's evolving world solutions for the emerging issues must be creative, innovative and practical for them to effectively get a perfect solution to the problem at hand. In order to come up with this kind of solution, the following criteria should be considered:

a) Figure out the problem to be solved

This being the first step it is crucial a crucial one. At this stage, we should make sure the right problem is being solved and be given a priority. The problem has to be clearly identified so as the direction of solving it can be defined.

b) Analyzing the problem

At this stage, the problem is scrutinized and all the variables and values that are the cause of the problem. The focus should be on how often the problem occurs, how intense is it, the perceived causes and if any special circumstances impact on it. All the primary causes should be on the time frame of the problem. The duration it has been occurring if not are there factors that could make it recur. In the future, critical thinking is involved which is the ability to analyze information objectively? Good critical thinking leads to reasonable conclusion and solutions

c) Classify the decision criteria.

In this stage, all factors leading into the decision-making process are identified. Decisions making is the process of making choices by identifying decision gathering information and assessing alternative resolutions. Solutions decisions should be based on solely existing standards.

d) Coming up with more than one solution.

At this stage, you come up with a variety of solutions. Evaluate all the solutions and scenarios as objectively as possible. Assess the pros and cons of each solution to ensure that the pursued solution is the most competitive.

e) Picking the best solution.

After evaluating all the options and values from steps one through four, the best scientific solution to move forward with is picked and this is the one that is to be implemented.

The above stages give the beast criteria of coming to a solution that can be implemented practically and effectively in any development.

8.2 Independence and initiative in identifying and solving problems is demonstrated.

Independence and initiative are important skills that everyone should have. It works effectively in a team. Teams are made up of people that work together to arrive at a common goal. Each individual in the team needs to take the initiative to fulfill their responsibilities. They need to be able to plan how you are going to fulfill responsibilities that we assigned to the individual as part of the team. This means close communication with other team members. But the individual has to determine:

- What needs to be done?
- How it is going to be done?
- When each task is going to be completed?

- What the potential roadblocks are?

The above give details about the independent skill that an individual should show in order to be able to solve problems. In order for this skill to be portrayed in an individual, they need to be able to follow through the task individual have without being monitored. This means that the individual has to:

- Complete the task on time.
- Pay attention to details and produce high-quality work in an ethical manner.
- Use problem-solving skills take the initiative to help.

Independence and initiative skills are individualized skills that are necessary in any problem-solving scenarios in the workplace context.

8.3 Team problems are solved as per the workplace guidelines

Solving team problems is an act of defining a problem, determining its cause, prioritizing, identifying and selecting alternatives for the solution and finally implementing a solution. There are 4 steps of problem-solving in teams:

- Define the problem
- Generate an alternative
- Evaluate and select an alternative
- Implement and follow up of the solution

i. Define the problem

The situation within the team is diagnosed fully. Flowcharts to identify the expected steps of a process and cause an effect diagrams are used to define analyze the causes in the team.

ii. Generate an alternative

Several problem-solving alternatives are proposed. The selection of the solution should not be implemented until an alternative is found. The consideration of the alternatives can enhance the value of the solution. Once a decision on what should be model has been achieved. The target standards become the basis for developing a plan for investigating alternatives. Any alternative solutions to the problem are generated before the final evaluation. If someone focuses on trying to get the results the team wants the potential of learning something new will be lost.

iii. **Evaluate and select an alternative**

A series of consideration are considered when selecting and evaluating a solution. The considerations are:

- The alternative should solve the problem without causing another. Some problem-solving technique should not lead to causing a different problem of a different nature that may lead another round of problem-solving and yet it could have been avoided.
- The alternative should be generally accepted by all teams involved. The alternative taken will be taken as the accepted solution to the problem. The solution will be implemented hence it should be generally accepted by the majority of the team members hence it can be implemented.
- Implementation of alternative if possible. The alternative selected should be implementable within the team. There are three basic stages involved in implementing an alternative to a solution.
- Planning and preparing to implement the solution. Planning of action describes. The more important or complex the problem is the more thorough the planning and preparation of the alternatives to solve it will be. The solution that may be chosen should not be difficult to plan and prepare to implement.
- Implementing and monitoring: the alternative solution should be implemented in the easiest way possible. The monitoring of the solution should be possible to easily monitored using different monitoring techniques such as observation.
- Reviewing: reviewing involves how the alternative will solve the problem. Will it solve the alternative effectively or not? If it won't, come up with a different alternative.

iv. **Implement and follow up of the solution**

The solution selected should be the one that can implement and can be followed up. There are solutions that are difficult to implement or impossible in a particular area.

The above steps enable effective problems solving skills process within a team.

8.4 Problem solving strategies are applied as per the workplace guidelines

Problem-solving is the process of working through details of a problem to arrive at a solution. Strategies are things that could guarantee the solving of the problem at hand. The following are known strategies for solving a problem:

i. **Identify the issue**

The issue needs to be clearly known. Different people might have different views of what the issues of the problem maybe. The first strategy is to identify this problem clearly. Separate the listing of issues from the identification of interests. Identifying the issue is the key to solving it.

ii. Understand everyone's interest

Interests are the needs that are supposed to be satisfied by a given solution. The best solution is that satisfies everyone's interest. This is done through active thinking and listening. The issues that are to be solved have to be solved entirely.

iii. List the possible solutions

This involves doing brainstorming. Creativity is encouraged so as to give a different perspective of the possible solutions. Brainstorming is the process of generating creative ideas and solutions through intensive and free willing group discussions. All the participants are encouraged to think and suggest as many ideas as possible. Analysis, discussion or criticism of the aired ideas is allowed only when the brainstorming is over. There should be a separation of listing of options from the evaluation of the options.

iv. Evaluate the options

The given solutions to the problem need to go through an evaluation test. This test is meant to come up with the most suitable option that can effectively be the best solution to the problem at hand.

v. Select an option or options

From the many options available the best option possible that effectively handles the problem should be considered. It should be the best option that is likely to give the intended results of the problem.

vi. Document the agreements

It is good for the agreement to be given a proper agreement document. Writing it down will help you think through the details and implications. As opposite to memory which may not be reliable in the future because of distortion. The document should be agreed upon by those that are solving the problem.

vii. Agree on contingencies, monitoring and evaluation

In problem-solving there should be a contingency agreement about foreseeable future circumstance. There should be creation of opportunities to evaluate the agreements and their implementation.

The above strategies can be used in a large group, between two people or by an individual who is faced with a difficult decision. The more the difficult and important the problem is the more necessary and helpful it is to use the above strategy.

8.5 Problems are analyzed and assumptions tested as per the context of data and circumstances

Problem analyzing involves identifying a problem and establishing the causes and effects related to a problem. The key element to problem analyzing is ensuring that the root cause is identified. There are techniques that are used in problem analyzing.

Techniques of problem analyzing

a) **Identifying priorities**

Many problems are complex, involving a whole range of causes. The priorities will give you ways of handling the problem that is at hand, identifying the priorities will also enable you to know the need for the problem solving and how it is going to influence the result of the problem.

b) **Analyzing to find root causes**

This is the heart of the problem. Before taking action the causes of the problem must be distinguished. Many problems may be described and various solutions suggested as the way to remedy the problem. It could not be wise to ignore anything said. We should listen carefully and analyze any situation for ourselves before agreeing to a solution. Any solution suggested should be a solution that is going to work and the most appropriate one after analysis.

c) **Developing alternatives**

Various approaches exist for developing alternatives. There are various approaches for developing an alternative. This includes brainstorming and critical thinking. This also involves the creativity of individuals to develop alternative, there is always another way of the problem if we can find it.

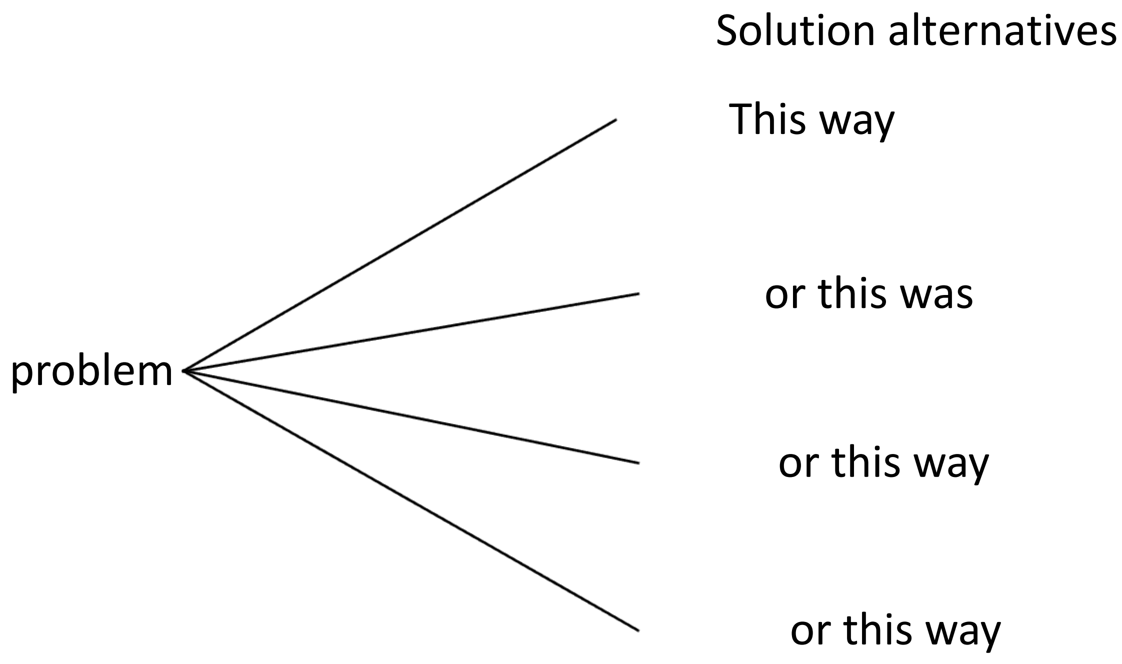

Figure 26: Solution alternatives

d) Decision making

Choosing between an alternative can involve technical actors, human factors and risks. It involves setting out the facts in a logical way so that the overall decision is made as a result of many minor ones. The decision is made based on the various alternatives that are at hand.

e) Follow up

Having tackled the problem, there must be something learned from it. What new procedures will help prevent similar problems in the future? Where decisions are made can we monitor their effectiveness? The effectiveness of a solution should be monitored so as to see if the goal has been achieved.

Assumption testing

An assumption is something taken to be true or the case even without proof. The data provided can be used to make an assumption. The assumption made is testing so that it can be justified as a problem to the solution of the problem. Assumption testing has three phases:

a) List assumptions

Start by listing the assumptions that are made in the problem.

b) **Assess the assumed**

Once there is a list of the assumptions, start to assess them. How much would you assume that your assumptions are right? Asses the risk of what happens if the strategy is wrong.

c) Test your assumptions

Before spending time on assumptions tests you would like to do, sort the list of assumptions by the confidence and risk score from the worst to the best. The one with the best score can be taken as the one with enough proof to be implemented and the one with the worst score can be rejected.

Conclusion

At the end of the training, trainees should have skills, knowledge and attitude in developing independent and innovative strategies solving problems at workplace.

Further Reading

Nevel, A & Simon, H. A (1972). *Human problem solving* (vol. 104, no 9). Englewood Cliffs, N J: Prentice-Hall

6.3.9.3 Self-Assessment

Written assessment

1. How many steps are there in problem-solving and decision-making process
    a) Seven
    b) Eight
    c) Five
    d) Nine
2. What is intuitive decision based on?
    a) Guesswork
    b) Gambling
    c) Instinct
    d) Rationality
3. A hostile situation resulting from opposing views
    a) Brainstorming
    b) Compromise
    c) Conflict
    d) Consensus
4. A group technique used to develop many ideas in a relatively short time
    a) Brainstorming
    b) Compromise
    c) Conflict
    d) Consensus
5. A problem-solving method in which each side gives up something of value to help solve a problem
    a) Compromise
    b) Consensus
    c) Constraint
    d) Problem-solving
6. The last step in the process of problem-solving is?
    a) Design a solution
    b) Define a problem
    c) Practicing the solution
    d) Organizing the data
7. Thing to keep in mind while solving a problem is?
    a) Input data
    b) Output data
    c) Stored data
    d) All the above
8. What are the steps of problem-Solving?
9. What are team problems?
10. What is decision making?

11. How is testing assumptions done?

Oral Assessment

1. What is a team?
2. What is a problem?

Practical Assessment

In a team of ten given a problem to solve using the problem-solving process techniques

6.3.9.4 Tools, Equipment, Supplies and Materials

- Computers
- Stationery
- Charts
- Video clips
- Audio tapes
- Radio sets
- TV sets
- LCD projectors

6.3.9.5 References

Mayer, R. E. (1992). *Thinking, problem-solving cognition.* W H Freeman, Times Book, Henry Holt & co

Rickard T (1974). *Problem-solving through creative analysis*. Epping, England. Gower Press.

Snyder, L. G. & Snyder, M. J. (2008) *Teaching critical thinking and problem-solving skills.* The journal of research in Business education 50(2) 90

6.3.10 Learning Outcome No 9: Manage workplace ethics

6.3.10.1 Learning Activities

Learning Outcome No 9: Manage workplace ethics	
Learning Activities	**Special Instructions**
9.1. Observe policies and guidelines as per the workplace requirements. 9.2. Exercise self-worth and profession in line with personal goals and organizational policies. 9.3. Observe code of conduct as per the workplace requirements 9.4. Demonstrate personal and professional integrity as per the personal goals. 9.5. Demonstrate commitment to jurisdictional laws as per the workplace requirements .	Provide policies and guideline per the workplace policy.

6.3.10.2 Information Sheet No. 6/ LO 9: Manage workplace ethics

Introduction

Trainees will be trained on skills, knowledge and behavior in managing work ethics. Specifically, trainees will train on observing policies and guidelines, exercising self-worth and profession, observe code of conduct and demonstrate personal and professional integrity and commitment to commitment to jurisdictional laws.

Definition of key terms

Self-worth: This refers to having a high estimate of self and implies a strong belief in oneself and feeling worthy of things that are good.

Jurisdictional law: These are laws that applies jurisdiction to courts in a country to determine any dispute in employment within employee locality.

Code of conduct: This refers to the guide or set of rules that outline expected roles and responsibilities, expected behaviors and sanctions for violation of the policies and laws.

Work place policies and guidelines: A set of rules and procedures that inform the managers and employees of how to behave or act in the work place. They help determine actions and decisions.

Content/Procedures/Methods/Illustrations

9.1 Policies and guidelines are observed as per the workplace requirements

Policies are actions containing goals and the means of attaining them. Policy guide action (Dye, 1972). Guidelines: this refers to rules, principals or advice which streamlines particular process or actions. Policies or guidelines should be observed in the workplace because they are essential in the organization. Policies can be used in resource mobilization and utilization. Solution to problems in the workplace such as tardiness in the organization by employees. Accountability purpose a policy establishes accountability mechanism in the work place. Establishing work standard, policies and guidelines in the work place should be communicated well to all members and made accessible.

9.2 Self-worth and profession is exercised in line with personal goals and organizational policies

The only person to find self-worthiness is the employee himself or herself. He or she cannot control others to depict self-worthiness. Employees should have a high estimate of themselves of how they feel and think of themselves. Individuals with self-worthiness feels that they are good and that they deserve the best and to be treated with respect. Employees should demonstrate the elements of self-worthiness in line with their personal goals and the organization goals. Such include:

- Ability
- Effect
- Performance
- Self-worth

Employees use their performance and abilities to determine their self-worth.

9.3 Code of conduct is observed as per the workplace requirements.

The code of conduct defines employee behavior and is unique to the organization represented.

Ethical behavior is essential in the organization and should be taken seriously. Each and every individual needs to be held accountable for their work and behavior. Observing the code of conduct is mandatory and thus the employees must be familiar with the code of conduct and adhere to it (Bloch and Coddy, 1996). In most cases, failure to comply with the code of conduct leads to dismissal, disciplinary action or even prosecution. Employees must observe the code of conduct at all times and have a responsibility of reporting any violation of the code. In observing the code of conduct, behavior that is likely to interfere with the ability of the employee in performing their duties thus creating safe and positive work environment.

9.4 Personal and professional integrity is demonstrated as per the personal goals

Integrity is the quality of having strong morals and being honest. Personal integrity entails being honest and sharing consistency in adherence to ethical values and principles. An integral person follows moral conviction in all circumstances.in ethics integrity is honesty and accuracy of an individual action

Meaning of ethics

Ethics refers to the moral principles that guide a person's behavior. They stipulate what is right and wrong. Ethics defines human beings morally by defining wrong and right good and evil.

Ethical perspectives

Ethics use different ethical perspectives to defend their position and such include;

i. **Moral Rules:** Actions are judged as right if they ascribe to moral rules. The action and not the result of the caution is considered. Rules not only means to the end but should be used to treat all equally.
ii. **Virtues:** Actions are judged as right if they conform to defined attributes in a community. Character should be considered as acceptable and desirable. Virtues include honesty, courage, forgiveness, etc.
iii. **Principles:** Actions are judged as right if they follow principles such as respect of individual, beneficiaries, minimizing harm and justice where others are equally treated and benefits fairly distributed and shared.
iv. **Outcomes:** Actions are right if in the outcome, good consequences outdo bad ones. This perspective looks at results of actions to judge whether they are good or acceptable.
v. **Care:** Actions are right if it acknowledges value of interpersonal relationships. for example, which solutions are fair to the involved parties.

Principles of ethics

i. **Truthfulness:** This principle is about testing the truth to individuals who require knowing the truth in a situation, the one urged not to conceal facts or lie.
ii. **Confidentiality:** Entails keeping secrets and concealing information that one has a right to. Confidentiality means that information is not shared to other people unless permission is granted.
iii. **Autonomy:** Refers to an individual right of self-determination that ought to be respected.
iv. **Beneficiaries:** As an ethic principle, one should do well for the client. All actions should promote good to the client.
v. **Justice:** Entails being fair to all clients and individuals while delivering services.
vi. In other words, the service provider should be impartial in dealing with others.

Ethical standards

Ethical standards are a set in the organizational and can bring organizational benefits and enhance productivity. Adhering to ethical standards can even attract employee, reduces turnover and enhance sustainability. Ethical standards are derived as:

a) Legal Ethical Standards

There are a company policies and guidelines based on laws and regulations from authority.

b) Morally based ethical standards

They have got foundations in legal standards. This involves doing the right thing and the organization maintain n and a high level of ethics practices to attract customer and efficiently deliver services. Ethical standards are principles that the organization founders use to communicate moral values and use them as recent positions in making decisions. Ethical standards dictate the behavior of the organizational members and act as a moral compass (De Geiorge, 1993).

Organizational code of ethics

The code of ethics in the organization describes the code of conduct expected based on laws and regulations to enable the organization to conduct its business effectively. The code of ethics offers guidance and sets standards that each and very organizational member adheres to consistently.it also governs actions and relationships from success of organization.

It requires compliance and adherence of all people.

Common Ethical Dilemmas

Ethical dilemmas refer to a situation in which a decision intended to be made between two options and neither resolves the problem ethically. Common ethical dilemmas include:

- Taking credit for others work
- Selling poor quality production for benefit
- Conducting personal business on organization time
- Inappropriate behavior
- Stealing in the job

Organizational culture

This refers to the e collective belief values and behaviors in an organization. This means within the organization regulate employee performance, service to clients and vision execution (Broiwn, Melian, Sol). Organization culture is unique to every organization. Culture is significant in a number of ways i.e.

- Forms organizational identity
- Outlines organizational norms
- Improves organizational effectiveness
- Unites members of the organization
- Draws commitment of organization members towards goal achievement

Corruption, bribery and conflict of interest

Responsibilities and ethical behavior are significant in an organization. However, the above factors are obstacles in responsible behavior.

Corruption

According to Him (2013), corruption is the abuse of office for private gain and that one is hiding under the cloaks of above of power with violation of the code of ethics stipulated. Corruption is wrong and leads to erosion of culture, wastage of resources, mistrust and poor service delivery. Corruption can be caused by;

- Organizational factors: Such as lack of accountability system, weak management, negative culture etc.
- Individual factors: Include greed, disregard for values, opportunity to squander resources
- Societal factors: Weak laws in society, bad governance, poor role modelling etc.

Bribery

This is the act of giving or receiving something in exchange of something or with the intention of influencing the outcome of a situation .it is unlawful to bribe or to be bribed and to gain illegal advantage.

Conflict of interest

Involves a conflict between personal interests and duties as an employee. The result is that private interests improperly influence public activities and decisions. Individuals in positions have conflict of interest when they have competing professional and personal interest. This leads to advantage to oneself. All individuals in public office positions should be alert to any form of conflict of interests, act to avoid such conflicts and directions. The interests when aware of them, then finally turn away from the advantages causing the conflict of interest.

Privacy and adapt protection

Privacy is an individual’s right to their personal information. Data and information resources need to be carefully managed and safeguarded. Data is critical in informing decisions and thus presents a vital concern. All acts the workplace should ensure data management is committed to protect individual’s privacy. This is key in maintaining trust and also in development. Privacy is a human right and then privacy and data protection is a pillar of human dignity. Data should protect against misuse and all possible channels of intrusion to data privacy eliminated.

Diversity, harassment and mutual respect

Diversity

Workplace diversity is important in building reputation of the organization by increasing globalization, interaction with people of diverse backgrounds and maintains diversity for competence advantage.

Harassment

This refers to the threatening behavior directed to an individual or group of employees. This is a form of employment which violates the employment act. Harassment is unwelcome as it results in fear, low productivity and turnover of employees. Workplace harassment is common and employees should be sensitized and measures taken to prevent any form of workplace harassment.

Mutual respect

Mutual respect enables the individuals to feel that their ideas and presence is valued.
The manager should not allow disrespectful behavior in the workplace which can lead to toxic culture and cause employee turnover. Instead, mutual respect should be cultivated to reduce workplace stress, increase productivity and performance. In demonstrating mutual respect, employees should manage anger, communicate politely and encourage one another (Baron Baron 2003).

Financial accountability /responsibilities

Financial responsibility is the process of managing financial resources in productive ways and in the best interest of the individual and organization. Financial accountability refers to holding an individual accountable for financial activities and transactions. Financial accountability and responsibility establish effective financials processes. Financial resources should be effectively utilized in pursuit of organizational goals.

Etiquette

In the workplace etiquette is important because understanding the expected behavior in work situations impacts have people coercive work. Etiquette which is a behavioral code outlive exceptional in terms of behavior in the workplace should be integrated in all tasks. Visitors should be welcomed and attended properly, care taken handling hard customers and employees to know how to conduct themselves in and around the workplace.

Commitment to jurisdictional laws is demonstrated as per the workplace requirements

An employment commitment to jurisdiction contract states the country laws that all applies and purports to offer jurisdiction in courts in the same country in determining a dispute. Different nations got different employment laws and policies (Kidner, 2009). Employers resolve jurisdiction issues by outlining in the employment contracts that dispute will be considered within employee locally. The employees need an understanding of eth jurisdiction laws when they negotiate employment contracts and to know the courts that are likely to have jurisdiction in the event a dispute case.

Emerging issues in ethics

Ethics and ethical issues in the workplace continue to receive attention in organization. This presents challenges, opportunities and improvements.

Accountability: Individuals are held responsible for their actions, ethics and accountability are important elements to modern organizations. The individual should provide information and justify their actions.
Corruption: This is an issue that is greatly undermining ethics. This is demonstrated and evident in governance structures by individuals who gain unlawful or illegal benefits either through bribery or even misusing resources.

Conclusion

Trainees will be trained on skills, knowledge and behavior in managing work ethics. Specifically, trainees will train on observing policies and guidelines, exercising self-worth and profession, observe code of conduct and demonstrate personal and professional integrity and commitment to commitment to jurisdictional laws.

Further Reading

Solomon, R, (1992) *Ethics and excellence*. Cooperation and integrity in business

6.3.10.3 Self-Assessment

Written Assessment

1. A written statement of policies and principles that guides employee behavior is called
    a) Code of ethics
    b) Word of ethics
    c) Ethical dilemma
    d) No of the above
2. Which of the following is not an objective if a code of ethics?
    a) To create an ethical workplace
    b) To evaluate ethical components of the proposed employee actions
    c) To improve the public image of the company
    d) To enhance the profits of the business continuously.
3. Which of the following shape ethical behavior in organization?
    a) Supervisor behavior
    b) Organizational culture
    c) Code of ethics
    d) All of the above
4. Which statement best describes workplace diversity?
    a) A physical difference among employees
    b) Social differences among employees
    c) Historical differences among employees
    d) Managerial differences among employees
5. The mainstream approach to diversity supports
    a) Business case

b) Affirmation case
c) Radical approach to equal opportunities
d) Social justice

6. The purpose of employee relations is to
    a) Adhere to laws pertaining to worker rights
    b) Maintain a harmonious working environment
    c) Undertake conflict resolutions
    d) All of the above
7. What is the meaning of ethics?
8. What is jurisdiction law?
9. What is organizational culture?
10. What is workplace integrity?

Oral Assessment

1. State four ethical perspectives.
2. Discuss the importance of the code of ethics.

Practical Assessment

Demonstrate how you would enhance workplace diversity in the capacity of an employer in a work environment.

6.3.10.4 Tools, Equipment, Supplies and Materials

- Computers
- Stationery
- Charts
- Video clips
- Audio tapes
- Radio sets
- TV sets
- LCD projectors

6.3.10.5 References

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CHAPTER 7 : ENVIRONMENTAL LITERACY/ DEMONSTRATE ENVIRONMENTAL LITERACY

7.1 Introduction

Demonstrate environmental literacy unit of competency is among the seven basic competencies units offered in all the TVET level 6 qualification. The unit covers knowledge, skills and behaviours and also entails complying with workplace sustainable resource use, evaluating current practices in resource use, developing, and adhering to environmental protection principles. The significance of environmental literacy is to equip the learners with skills to create a sustainable and friendly environmental world for quality life for all.

The aspects of competency to be covered include control of environmental hazard, pollution, demonstrate sustainable resource use, evaluate current resource use practices and monitor activities on environmental protection according to the different environmental issues and based on management standards procedures. The basic resources required include workplace storage facilities, trash bags, cleaning materials and tools, PPE, manuals and references among others. The unit of competency comprises nine learning outcomes. Each of the learning outcome presents; learning activities that cover performance criteria statements, thus creating in trainees an opportunity to demonstrate knowledge and skills in the occupational standards and content in curriculum. The Information sheet provides; definition of key terms, content and illustration to guide in training. The competency may be assessed through written test, demostrations, practical assignment, interview/oral questioning and case study. Self assessment is provided at the end of each learning outcome. Holistic assessment with other units relevant to the industry sector workplace and job role is recommended.

7.2 Performance Standard

Apply storage and disposal methods of hazardous materials, demonstrate sustainable resource use, evaluate and monitor environmental protection activities according to environmental regulations and OSHS, workplace procedures, environmental management and coordination Act 1999.

7.3 Learning Outcomes

7.3.1 List of learning outcomes

a) Control environmental hazards.
b) Control environmental pollution.
c) Demonstrate sustainable resource use.
d) Evaluate current practices in relation to resource usage.
e) Identify environmental legislations/conventions for environmental concerns
f) Implement specific environmental programs
g) Monitor activities on environmental protection/programs
h) Analyze resource use
i) Develop resource conservation plans

7.3.2 Learning Outcome No. 1: Control Environmental Hazard

7.3.2.1 Learning Activities

Learning Outcome No 1: Control Environmental Hazard	
Learning Activities	**Special Instructions**
1.1. Follow storage methods (…) for environmentally hazardous material according to environmental regulations and OSHS. 1.2. Follow disposal methods (…) of hazardous waste according to environmental regulations and OSHS. 1.3. Use PPE (masks, gloves, goggles, safety hat, overall, hearing protector) according to OSHS.	Personal protective equipment should be used at all times. Trainees to handle hazardous waste storage and disposal in groups.

7.3.2.2 Information Sheet No7/LO1: Control Environmental Hazard

Introduction

This learning outcome covers storage methods for environmentally hazardous materials, disposal methods of hazardous waste and use of PPE in accordance with environmental regulations, such as Environmental Management and Coordination Act (EMCA) 1999, and occupational safety and Health Standards (OSHS)

Definition of key terms

Environment: Literally it refers to the surroundings. It is an integration of physical, chemical and living factors that act upon an organism determining its form and survival. It includes both living and non-living things.

Environmentally Hazardous materials: These are the substances which have the potential to threaten the surrounding by affecting plants' and animals' health, pollution causing natural disasters.

Personal Protective Equipment (PPE): These are the garments or materials worn in order to safeguard a person from hazards such as injury or infection.

Environmental Management and Co-ordination Act (EMCA) 1999: It is a legal framework that provides for environmental management and conservation in Kenya. The original act was recently revised in 2015 to align to the2010 Kenyan Constitution.

Occupational Safety and Health Standards (OSHS): These are guidelines or principal set in order to foster a safe a safe and health work environment.

Content/Procedures/Methods/Illustrations

1.1 Storage methods for environmentally hazardous materials are strictly followed according to environmental regulations and OSHS

Environmentally hazardous material are items or agents (chemical. biological, physical or/and radiological) that potentially have the ability to cause harm to the surroundings. The control of environmentally hazardous materials in Kenya is governed by the National Environment Management Authority (NEMA) under the Kenyan Constitution. NEMA was formed by an act of parliament in May 1996, starting operations in July 2002, serving as the national body to implement environmental policies within Kenya across all sectors. In addition, it is also tasked with supervising and coordinating environmental activities. NEMA is able to enforce its roles and responsibilities using environmental Management and Co-ordination Act (EMCA), the law framework on environmental management and conservation in Kenya. The principal act of 1999 was amended in 2015 in accordance with the 2010 constitution. EMCA is thus tasked with the management of environmentally hazardous substances and waste shall not be imported into Kenya without the authority, (NEMA) issuing a valid permit. Hazardous materials under the globally harmonized Systems are categorized into three classes:

- Health Hazards
- Physical Hazards
- Environmental Hazards

These classes are further classified into different categories. In line with our topic focus, environmental hazards are divided into:

- Acute
- Aquatic Toxicity
- Chronic Aquatic Toxicity.

Storage methods for environmentally hazardous materials must follow the below procedures according to Occupational Safety and Health Standard (OSHS):

i. Follow all the storage instructions on the product label. Storage requirements vary based on the material's hazardous properties.
ii. Be sure to store all volatile products in well ventilated areas. Fumes can be toxic to living things, both plants and animals.
iii. Make certain you store flammable products in the recommended temperature range. The container will expand if you store them in too high temperatures. In too low temperatures, liquid materials will expand, freeze and burst if you store them
iv. Keep all hazardous materials out of children's reach and away from all animals. This can be done through:
    - Covering materials with safety lids whenever possible
    - Putting all hazardous materials stared behind locked doors.
v. Use the original container to store the hazardous material.
vi. Reduce the amount of hazardous materials you keep in storage. Buy only the amount required for your task.

vii. Do regular maintenance of storage areas. Regular clean-ups and inspections of storage areas.
viii. Storage methods for environmentally hazardous materials can be resolved by answering four questions.
ix. What materials are being stored? Understanding the properties of a hazardous material is paramount. Be it physical or chemical or biological properties. The material being stored may be incompatible with some conditions and/or substances. For example, flammable liquids should not be stored with an oxidizing agent.
x. Why is the material being stored? Ways should be developed to either use less hazardous materials or reduce the quantity of materials stored?
xi. Where is the material being stored? Ensure that storage is clearly defined as permanent, temporary or transient location?
xii. How is the material being stored? It reviews local, state and federal regulations and the manufacture's specifications? What type of container? Is also answered here.

Storage Methods

In Environmental Health Requirements, materials should be stored in a manner that does not harm or threaten human health or the environment. It is in line with this, that storage methods of environmentally hazardous materials are considered. These methods are;

Storing in tanks and containers.

Containers are portable whereas tanks are stationary. Tanks and containers chosen for storage should meet the following criteria:

- Good condition
- Closed/sealed
- Chemically compatible
- Impervious surface
- No floor drains
- Under cover, if outside

Container Management involves;

- Can only accumulate in containers and tanks (criteria for container choice)
- Inspection logo
- Adequate aisle space-Not less than an adjacent distance of two feet.
- Container/Tank marking
- Storage time=be less than 90 days.
- Outdoor security measures such as controlled entry and barrier creation

Onsite waste storage facilities

They include open waste piles and ponds. Must be constructed over an impervious base and be in compliance with regulatory requirements. The pile must be protected from weather conditions such as wind, rain and direct sunshine. Used to store temporary hazardous waste before disposal.

Open pit or holding pond (lagoon)
Used to store temporary hazardous liquid waste. Lagoons must be lined with impervious soils and ground water must be protected by flexible membrane liners.

1.2 Disposal methods of hazardous waste are followed according to environmental regulations and OSHS

Disposal methods of hazardous waste
Disposal of hazardous waste is governed and overseen by NEMA**.** The major guideline under which NEMA enforces its mandate is the Environmental Management and Coordination Act (EMCA). Just as storage methods, disposal methods of hazardous waste can be resolved by answering the following four questions:

- What waste is being disposed? All properties (chemical, physical and biological) of the waste must be put into consideration.
- Why is the waste being disposed? Some materials may be marked for disposal yet they may be useful for another function though not the one originally purchased for?
- Where is the waste disposal taking place: The waste can be disposed far away from human and animal settlement? If it is a specific area, then certain regulations must be adhered to. Different counties or states have different policies and legislations of hazard waste disposal
- How is the waste being disposed? It involves reviewing local, state and federal regulations and the manufacturer's specifications.

Disposal Methods

a) Incineration
This involves burning the substance in high temperatures. Incineration destroys and terminates most of the waste. This method is beneficial as flammable waste can also be used as energy sources when burned. The backside that comes with incineration is the release of toxic gases to the environment. This has however been solved by the current technology which has developed more efficient incinerator units that limit the amount of emissions released.

b) Recycling
E-waste is mostly disposed in the form. For example, part of a dead phone or computer maybe used to fix a broken-down phone or computer.

c) Landfill disposal
This technique involves storing solid hazardous waste into the ground. Landfills for hazardous wastes are lined with a double layered non-porous material such as clay to inhibit

leaching. After dumping, the landfills are covered to prohibit animals such as rodents and insects from entering. Unfortunately, this method occupies a huge space.

d) Dumping at sea

Hazardous waste is deposited into the deep sea after treatment to minimize its impact on ground water sources. This method however is currently under heavy scrutiny or even banned around the world to preserve the blue economy.

e) Underground disposal

Termed to be the most ideal and economical for radioactive waste. It is only conducted on inhabitable lands such as inactive mines which must meet a particular geological and technical criterion. It involves injecting the hazardous waste deep into the ground. They are also referred to as injection wells. The hazardous waste that can use this method include medical treatments, brine from mining of radioactive ores and the production of nuclear fuel.

1.3 PPE (masks, gloves, goggles, safety hat, overall, hearing protector) usage according to OSHS

Personal Protective Equipment.

Personal Protective Equipment (PPE) is protective clothing or garments or instruments designed to protect the body of the wearer from hazards that may cause injury or infection. It should be noted that PPE does not eliminate the hazard or danger at the source but rather protects the wearer's body in case the hazard happens, that is, an accident happens. PPE are provided under the Occupational Safety and Health Standards (OSHS). OSHS are formulated guidelines that safeguard an employee's economic and social well-being as well as his/her physical health and safety. OSHS strives to foster a healthy working environment. OSHS in Kenya is guided by the Occupational Safety and Health Act (OSHA) 2007 and implemented by the Directorate of Occupational Safety and Health Services (DOSHS). OSHS provides for PPE in any working environment to reduce risk of harm or injury. OSHS requires PPE to be offered to employees free of charge. PPE must be carefully chosen and training offered to employees on how to use them properly and know how to detect and report any damages. When selecting and using PPE, the following should be considered;

- Who and what is exposed?
- Duration of exposure
- Extent of exposure

Types of PPE

i. Eyes: Safety spectacles, face screens, goggles, face shields, visions: Hazards include dust, metal or chemical splash, radiation, gas and vapour.
ii. Head and Neck: Bump caps, helmets. Hazards include impact from falling or flying objects, risk of head bumping, drips, splashes.

iii. Ears: Ear muffs, earplugs, semi-insert/canal caps. Hazards include noise (combines duration, intensity and exposure time)
iv. Hands and arms: Gloves and gauntlets. Hazards include cuts, punctures, abrasion, electric shock, radiation, extreme temperatures.
v. Feet and legs: Safety books. Hazards include slipping, cuts, punctures, falling objects, splashes, vehicles.
vi. Lungs: Respiratory Protective Equipment (RPE). Hazards include toxic gases, dust
vii. Whole body: Overalls (Conventional and disposable), boiler suits, aprons. Hazards include heat, splashes, sprays, impact, entanglement of own clothing.

Conclusion

At the end of this learning outcome, the trainee should have learnt; how EMCA regulates storage and disposal of environmentally hazardous materials, classification of hazardous materials and waste to know how best to store and dispose them. The trainee should be able to know what OSHS entails and how it is used to perform its roles. The trainee should able to provide PPE for various working environment in accordance with OSHS and environmental regulations.

Further Reading

Revised Environmental Management and Co-ordination Management (EMCA) 2015
Occupational Safety and Health Act (OSHA) 2007

7.3.2.3 Self-Assessment

Written Assessment

1. Which is the environmental governing body in Kenya?
    a) EMCA
    b) NEMA
    c) Ministry of Environment
    d) Government of Kenya

2. In which year was EMCA amended to align with the Kenyan Constitution?
    a) 2015
    b) 1999
    c) 2007
    d) 2010
3. Among the following, which is not a hazardous material?
    a) Mine Brine
    b) Used oil

c) Natural gas
d) Broken computers

4. Which of the following is a storage method of environmentally hazardous material?
   a) Open Tanks
   b) Open pits
   c) Injection wells
   d) Incineration
5. Which disposal method is most ideal for hazard waste from Uranium mining?
   a) Landfills
   b) Recycling
   c) Injection wells
   d) Sea dumping
6. What does OSHS not deal with?
   a) Provision of PPE
   b) Employability
   c) First Aid training
   d) Workplace safety
7. Chemical splashes are common hazard at Coca Cola Company. Which PPE does not protect from this?
   a) Goggles
   b) Overall
   c) Safety boots
   d) Earplugs
8. Name three aspects to be considered when choosing a suitable storage method for hazardous materials.
9. Briefly explain four disposal methods for hazardous waste.
10. Describe PPE you can recommend in a welding industry.
11. Differentiate between OSHS and OSHA.

Practical Assessment

1. Develop an instruction manual describing procedures on how to store and dispose-off a hazardous chemical material
2. Write a report on the storage and disposal methods of hazardous materials used in school.

7.3.2.4 Tools, Equipment, Supplies and Materials

- Standard operating and/or other workplace procedure manuals
- Environmental Management and Co-ordination Act 1999
- Machine/equipment manufacturers specifications and instructions
- Personal Protective Equipment
- Occupational Safety and Health Act 2007

7.3.2.5 References

Government of Kenya (1999). *Environmental Management and Co-ordination Act.* Nairobi. Kenya

Government of Kenya (2007). *Occupational Safety and Health Act.* Government Press. Nairobi. Kenya

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7.3.3 Learning Outcome No. 2: Control environmental pollution

7.3.3.1 Learning Activities

Learning Outcome No. 2: Control Environmental Pollution	
Learning Activities	**Special Instructions**
2.1. Comply with environmental pollution control measures (methods for minimizing or stopping spread and ingestion of airborne particles, gases, fumes and liquid wastes) following standard protocol. 2.2. Observe procedures for solid waste management according to environmental management and coordination Act 2.3. Comply with methods for minimizing noise pollution following environmental regulations.	Personal protective equipment should be used at all times. Group discussions on pollution and their specific control measures.

7.3.3.2 Information Sheet No7/LO2: Control Environmental Pollution

Introduction

This learning outcome covers environmental pollution control measures, procedures for solid waste management according to standard procedure, Environmental Management and Coordination Act 1999 (EMCA) and environmental regulation.

Definition of key terms

Waste management: Waste management is the collection, transportation, processing or disposal of solid or liquid waste, usually produced by human activities, in order to reduce their effect on human health and natural ecosystems such as lakes, forests and oceans.

Control measures: These are activities taken to prevent, reduce or eliminate an environmental hazard that has been identified. In this learning outcome, the control measures that are going to trained on concern solid waste and noise pollution.

Environmental Management and Coordination Act 1999 (EMCA): This is the principal framework law on environmental management and conservation in Kenya. First enacted in 1999, it has been amended to align to the 2010 Constitution. The latest amendment to the principal Act was in 2015.

Standard Protocol: This is a mandated, statutory or fixed procedure for completing a task or complying with regulations. The procedure may be expressed through a flow chart, or spelled out as text. Standard protocol may be nationally recognized or be part of an organization structure.

Content/Procedures/Methods/Illustrations

2.1 Environmental pollution control measures compliance following standard protocol

Types of pollution

Air Pollution

Air pollution may result from a quantitative change by increasing the concentration in air of some of the gases, for example Carbon (iv) Oxide or a qualitative change due to introduction of external compounds (synthetic organic substances), or a combination of these two phenomena. The source of these gases may be from anthropogenic activities (from human activities) or from natural events such as volcanism, respiration of living things or forest fires. Some pollutants in the atmosphere can result from the reaction between many substances to give new highly toxic compounds, for example Sulphur (IV) Oxide can react with water vapor in the atmosphere to give Sulphuric acid.

Table 10. Sources and nature of atmospheric pollutants

Nature of Pollutant		Source
Gas	1.Carbon dioxide	• Volcanism • Respiration of living things • Fossil fuels
	2.carbon monoxide	• Volcanism • Combustion engines
	3.hydrocarbons	• Plants • Bacteria • Combustion engines
	4.Organic compounds	• Chemical industries • Incineration of refuse • Various combustions
	5.Sulphur dioxide and Sulphur derivations	• Volcanism • Sea spray • Bacteria • Fossil fuels
	6.Nitrate derivatives	• Bacteria • Combustion
	7.Radio nuclides	• atomic power stations • nuclear explosions
Particles	1.Heavy metals Inorganic compounds	• volcanism-meteorites • wind-spray erosion • various industries • combustion engines
	2.Organic compounds Natural or synthetic	• forest fire • chemical industries • various industries • combustion engines
	3.Radionuclide	• nuclear explosions

Impacts of air pollution

- Air pollution has effects on health and the nature. The effects of air pollution on natural ecosystems can be felt at different geographical levels, and they can spread to water and land ecosystems in the form of dry or wet deposits.
- Over acidification and over fertilization**.** Sulphur and Nitrogen inputs are responsible for acidification and over fertilization of ecosystems such as forests, rivers, lakes and swamps.
- Necrosis on plants. Necrosis is the death of cells in tissue. High concentration of pollutants can cause death to plants and animal cells, leading to organ failure or death of tissues.
- Air pollution can cause reduction in plant growth (stunted growth) or reduce the ability of plants to resist diseases and infections.
- Air pollution can also change the chemical composition of the atmosphere, therefore affecting biogeochemical cycles such as the nitrogen cycle, water cycle and carbon cycle.

Control Measures

Control measures to prevent, reduce or eliminate pollutants in the air are guided by the Environmental Management and Co-ordination Act (No 8 of 1999). The regulations to be followed can be found in the Environmental Management Co-ordination (air quality) Regulations of 2014. The air quality regulations of 2014 have different ways in which they ensure air quality standards are fit for humans, animals and plants. The following are measures to ensure safety of workers:

- The owner of the facility should inform the workers of the hazards in specific work environment.
- Train the workers on the potential hazards of any hazardous substance to which they are exposed, and the safety precautions to be taken to prevent any harm to their health.
- Ensure that measurements of pollutants are carried out by a laboratory designated by Environment Management Authority in order to determine compliance with the prevailing allowed levels of exposure.
- Ensure that record of measurements carried out, are reported to the Authority on a quality basis.
- Take exposure reduction measures.

Ambient air quality limits

Ambient air quality standards, means these ambient air quality standards which are required to protect the human health and allow adequate margin of safety. Under the Environmental Management and Coordination Act, limits have been set for the following gases, Sulphur oxides, Oxides of Nitrogen, Nitrogen Dioxide, Suspended particulate, Respirable particulate matter, carbon monoxide, Carbon Dioxide, hydrogen Sulphide and Ozone among others.

2.2 Procedures for solid waste management observed according to environmental management and coordination Act

Solid waste is discarded material that is disposal and is considered garbage. Refuse and sludge from wastewater can be in solid, semi-solid, liquid or contained in gaseous material.

Types of Solid Waste

Domestic Waste

Domestic waste is also referred to as garbage, refuse, or trash. It consists mainly of biodegradable waste which is food and kitchen waste, green waste paper and non-biodegradable such as plastics, glass bottles, cans, metals and wrapping materials.

Waste Tires

These are tires that have reached their end due to wear or damage and cannot be recycled or reused. The bulk of the tires are informally collected and often illegally burnt in open to recover steel for recycling.

Construction and Demolition Waste

This type is generated as a result of construction works, remodeling or demolition. It comprises debris, steel, timber, iron sheets, tiles and ceramics among others.

Industrial waste

This is waste produced by industrial activities which includes any material that is rendered useless during manufacturing process industries produce both hazardous and non-hazardous waste. They include chemical solvents, paints, sand paper and paper products, industrial by products, metals, municipal solid waste and radioactive waste.

Bio-Medical Waste

Bio medical waste refers to waste generated in health facilities, research institutions or during immunization of human beings and animals. It is classified into; infectious waste sharps, pharmaceutical wastes, chemical waste and pathological waste. Biomedical waste pose risks to human health

Sewage Sludge

This is a sediment material that accumulates over time. In the sewage treatment plants and ponds. Sewage sludge that is contaminated by heavy metals from industrial effluent can severely contaminate agricultural land to which it is applied.

E-Waste

This is waste generated from electrical and electronic equipment (EEEs) becoming obsolete e-waste comprises of heavy metal components and materials used in the manufacture of electronic goods. They include; mercury, brominated flame retardants and cadmium, which are considered hazardous.

Procedure for solid waste management

Waste Generation

Most of the waste is generated at household, market places, cities, town, institutions and industrial zones. The waste generator should endeavor to minimize waste by reducing, reusing, refusing, returning waste or by adopting cleaner production technologies. Waste should be segregated at the source; this can be made possible by county governments providing coded bags and bins.

Waste Collection
Collection centers or transfer stations should be established at strategic areas within a town. These collection areas should be properly managed and maintained with frequent and timely collection of waste to avoid scattering into undesignated areas. Adequate measures should be put in place to manage any leachate from the waste receptacle and collection areas.

Waste transportation
This involves transportation of various segregated solid waste types. Waste transportation trucks should be closed and suitable for the transportation of various types of waste to waste treatment facilities and landfills. These transportation vehicles should be lincensed to be operated by NEMA.

Waste treatment

a) Recycling

This is the processing of waste materials. Into a new product of similar chemical composition. Recycling prevents wastage of potentially useful materials, reduce the consumption of raw materials and ultimately reduces pollution.

b) Composting

Composting is the biological decomposition of biodegradable solid waste under controlled aerobic conditions to produce compost. Compost is used as an organic fertilizer in agricultural production.

c) Thermal treatment of waste

This is the combustion of waste at specific temperatures with or without air supply as part of the process and includes waste incineration, gasification and pyrolysis. This process reduces the volume of waste and inert any hazardous components.

Waste Disposal
Disposal refers to the depositing or burial of waste in land. The sanitary landfills should be filled with systems to collect leachate and methane gas. There should be frequent spreading, compacting and covering of waste with soil or any other appropriate covering material so as to avoid environmental pollution and scavenging birds.

2.3 Methods for minimizing noise pollution with compliance following environmental regulations
Noise pollution or sound pollution is the transmission of sound in levels that have harmful impacts on the functioning of humans and animals. High sound frequency can be from activities of human beings or be caused by natural events such as volcanic explosions. Sound intensity is measured in decibels (dB).

Types of Noise Pollution
Industrial Noise
This is high intensity sound caused by machinery, such as generators, turbines and shredders from industry process. Noise from mechanical saws and drills is unbearable and

protective equipment for workers is needed. Industry noise does not only affect only workers but also those who are close to the factory may suffer the effects.

Transportation Noise

Transport noise mainly is from traffic from road, rail and aircraft. With increase in population, there has been an increase in the number of vehicles on roads, like motorcycles, cars, and buses, trucks, and diesel engines vehicles. This has aggravated the noise pollution problem. Noise pollution from aircrafts can be experienced by staff who work in airports and military airbases and those living nearby. This type of noise pollution is usually experienced in urban areas where traffic is high.

Neighborhood Noise

This type of noise includes disturbance from household electronics and community activities. Common source of this type of noise pollution include TVs, loudspeakers and musical instruments. Community activities carried out in neighborhoods such as parties, cultural functions and wedding and burial ceremonies.

Methods of Minimizing Noise Pollution

Source Control

This involves reducing the transmission of sound from the source. This includes modifications such as acoustic treatment to machine surface, design changes to factory facilities, limiting operations to a certain time.

Transmission path intervention

This involves containing the source inside a sound insulate, enclosure, construction of a noise barrier or provision of sound absorbing materials along the path of travelling sound.

Receptor control

The protection of the receiver by changing the work schedule or provision of Personal Protective Equipment (PPE) such as ear plugs when operating noisy machinery. It may also include the dissipation and deflection of sound that it may not reach humans and animals.

Machinery Maintenance

Proper oiling and maintenance of machinery will reduce noise from machines that are rusty or will avoid friction from moving parts of a machine. Maintenance of vehicles will reduce noise produce by automobiles.

Conclusion

At the end of this learning outcome, the trainee should have gained knowledge on; types of pollution, environmental pollution, control measures, types of solid wastes, procedures for solid waste management, different types of noise pollution and methods for minimizing noise pollution. The trainee will also have clear understanding of the control measure applied in Kenya in accordance to the Environmental Management and Co-ordination Act (EMCA) and other guiding regulations.

Further Reading

Air Quality Regulations (2014)
Environmental Management and Coordination Act (1999)

7.3.3.3 Self-Assessment

Written assessment

1. Which of the following is an example of solid waste?
    a) Bio-medical waste
    b) Carbon Dioxide
    c) Vibrations
    d) Noise from house electronics
2. Which of the following is NOT an impact of air pollution?
    a) Over-fertilization
    b) Stunted growth
    c) Improve health
    d) Acidification
3. Which of the following is a type of noise pollution?
    a) Sewage sludge
    b) Waste tires
    c) Industrial
    d) E-waste
4. Identify which is not a source of air pollution from the option below
    a) Audio-Visual equipment
    b) Carbon dioxide
    c) Sulphur oxides
    d) Volcanism

5. Which one of the following ways can be used to minimize noise pollution?
    a) Recycling
    b) Source control

c) Composting
   d) Thermal treatment
6. Which one of the following is the principal Act that guides Environmental management in Kenya?
   a) Water Act
   b) County government by laws
   c) Environmental Management Co-ordination Act
   d) Air quality regulation 2014
7. Define the following terms
   i. Sewage Sludge
   ii. Necrosis
8. List four methods of minimizing noise pollution

Practical Assessment

1. Identify a waste solution source from an institution or area near, where you live and up with practical measures to control the solid waste pollution
2. Write a report on the effects of air pollution on biogeochemical cycles

7.3.3.4 Tools, Equipment, Supplies and Materials

- Environmental Management and Co-ordination Act 1999
- The Environmental management and Co-ordination (Air Quality) regulations, 2014

7.3.3.5 References

African Forest Forum (2019). *Basic Science of climate change*. A compendium for technical training in African Forestry, Page 32-34

Government of Kenya (2014). *The Environmental management and Co-ordination* (Air Quality) Regulations, Government Press. Nairobi. Kenya

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http://mjcetenvsci.blogspot.com/2013/11/noise-pollution-causes-ypes-effects.html?m=1

7.3.4 Learning Outcome No. 3: Demonstrate sustainable resource use

7.3.4.1 Learning Activities

Learning Outcome No. 3: Demonstrate Sustainable Resource Use	
Learning Activities	**Special Instructions**
3.1. Comply with methods for minimizing wastage. 3.2. Employ waste management procedures following principles of 3Rs (Reduce, Reuse, Recycle). 3.3. Practice methods for economizing or reducing resource consumption.	Personal protective equipment should be used at all times. Group discussions.

7.3.4.2 Information Sheet No7/LO3: Demonstrate sustainable resource use

Introduction

This learning outcome covers complying with methods for minimizing waste, employing waste management procedures following principles of 3Rs (Reduce, Reuse, Recycle) and practicing methods for economizing resource consumption.

Definition of key terms

Waste management: These are activities carried out to control unwanted or unusable materials from its inception to its proper disposal. It includes waste collection, transport, treatment, storage and disposal, in conjunction with regulation and monitoring of the process as a whole.

Resource consumption: It is the usage of resources in any form to meet our own needs and wants. Consumption is spending for acquisition of utility of resources.

Reduce: It is when resources are utilized in a manner that limits the amount of waste created or toxicity of waste created.

Reuse: It is a waste management concept that involves using resources again after cleaning up or treatment. Although the items reused still end up as waste, by reusing them, waste produced at a given time is reduced and the lifespan of the item expanded.

Recycle: It is a process that involves converting already waste materials into new materials and products. Recycling prevents wastage of potentially useful materials and reduces the use of fresh raw materials.

Content/Procedures/Methods/Illustrations

1.1 Methods for minimizing wastage

Types of Environmental resources

They are categorized in the following groups:

a) **Renewable and Non-renewable Resources**

Renewable Resources

They are also known as infinite resources. These are resources that are consistently available despite their utilization. After usage, they can be fairly replaced or recovered. Examples include air, water, vegetation and energy from the sun. Animals can also be categorized as renewable resources since they reproduce offspring to replace the older generation. It is important to note that as much as these resources can be replaced, it may take a long period of time to do that hence need to use then sustainably.

Renewable resources are further divided into two categories:

- Organic renewable resources. These are those that are extracted from living things, that is, plants and animals.
- Inorganic renewable resources. These come from non-living things like sun, wind and water.

Non-renewable Resources.

These are resources that cannot simply be recovered or substituted once they have been extracted and utilized or destroyed. They are also known as finite resources. Example includes minerals, fossil fuel. Even though minerals and fossil fuels occur naturally, they are categorized as non-renewable resources as their formation take a very long period of time. Most recently, some animals, mostly the endangered species are also regarded as non-renewable resources as they are at the verge of extinction.

b) **Biotic and Abiotic Resources**

Biotic Resources

These are resources that come from organic and living materials, that is, the ecosphere. They include animals and plants and other materials obtained from them such as fossil fuels, as they are produced from dead and decaying organic matter.

Abiotic Resources

These are resources generated from non-organic and non-living materials. Examples include water, land, air, minerals.

c) **Stock, Reserve, Actual and Potential Resources**

Stock resources

They are resources that are present and have been surveyed but their usage is limited due to lack of technology to extract them. An example of such a resource is hydrogen.

Reserve Resources

These are resources that have been surveyed and their quantity and quality determined butt are not currently been used. They are however to be developed for profits in the future.

Actual Resources

These are resources present in a region whose quality and quantity have been surveyed and determined, and they are currently being used as the required expertise and technology is available.

Potential Resources

These are resources whose knowledge and existence in a region is present and can be exploited in the future. For instance, in a region that sedimentary rocks rich in petroleum; it is a potential resource until its actual quality and quantity is surveyed and determined.

From the above resources, we learn that environmental resources are classified according to the following criteria:

- Based on their renewability
- Based on their source of origin.
- Based on their development stage.

Wastage minimization entails limiting the amount of waste that is produced hence aiding in eliminating the production of harmful waste effectively supporting efforts that promote a society that is sustainable. Minimizing waste includes a change of society patterns that relate to production and consumption as well as redesigning products to eliminate the generation of waste.

Benefits of minimizing waste

- Improved product quality. Innovations and new technological practices will not only reduce wastage but also contribute to improved quality input leading to improved products.
- Economic benefits. Efficiency and effectiveness in resource use translates to reduced cost when it comes to purchasing value of products hence affecting financial performance significantly.
- Efficiency of production practices. Wastage minimization will attain more output of the product in relation to raw materials and environmental resources.
- Environmental responsibility. Minimizing or eliminating wastage makes it easier for one to adhere to set environmental policies, regulations and standards.
- Public image. Embracing wastage minimization of resources boasts an organization's image, as it is a reflection of proactive movement in the bid to protect the environment.

Wastage minimization techniques

Optimization of resources.

This involves full exploitation of resources once they are extracted from their natural setting. For example, a dressmaker will arrange the pieces of a pattern in a certain manner along the length of the fabric in the quest to use a small portion of the fabric.

Optimization also includes use of all products achieved in the manufacturing or processing of the main products. These products include by-products and waste products. Waste products and by-products from one process are used as raw materials for other processes.

Quality control improvement and process monitoring.

Wastage minimization can be put in place to limit number of rejects and wastage generated. Can be attained through increased frequency of inspection and increase of inspection guidelines.

Resources used in manufacture can be scrutinized through monitoring and evaluation to make them more effective and efficient minimizing wastage.
These methods of minimizing wastage are practically similar to the methods for economizing or reducing resource consumption. Reducing or economizing resource consumption is a priority sustainability issues because we all share the burden of responsibility to leave the environment fit if not better for ongoing prosperity and quality of life for future generations.

3.2 Waste management procedures following the principles of 3Rs (Reduce, Reuse, Recycle)

These principles are the most commonly preferred methods for minimizing wastage. They are the easiest and commonly used techniques.

Reduce

It calls for usage of resources that are just enough to cater to your needs for example, building a small house. It lowers cost in resource consumption. Reducing can be attained through attaining accurate measurements to ensure that there is little or no wastage of the resources. The process of reducing begins with determining what you are using and for what purpose. There are three simple steps used to assess the reduction value of an item. They are:

- Is there something else that can be used for this purpose? Use of multi-purpose items is essential in reduction. This reduces the amount of energy used or packaging material used.
- Is there something that needs to be done? A lot of waste materials are considered disposable in the sense that means whether or not the item allows you to do any real purpose or meaning.
- Is the item a part of something that you need to do or want to do in your life? There is a limit to what you need in preparation for your life. For example, when living in the forest, you won't need a car equipped to handle a desert sandstorm. Always make certain that what you use matches reality of potential opportunity in your life. Some of the things you can do to minimize wastage may include; printing on both sides of the paper, using cloth napkins instead of proper paper napkins and avoid using disposable utensils

Reuse

It involves re-purposing items for a use different from what it was initially produced for. One appropriate example is the modular construction of homes and offices that is being created out of discarded shipping containers.

Recycle

Recycling means that an item will be transformed again into a raw material that can be shaped into a new item. The following approaches can be used to enhance efficient recycling:

- By products that are made up of recycled materials, i.e. products that are environmentally friendly.
- Buy recyclable products such as glass bottles.
- Create and invent new methods to recycle different items.
- Buy non-toxic products whenever possible.
- Buy items made from recycled materials.
- Use recycled paper for printing.

3.3 Methods for economizing or reducing resource consumption

Measuring Techniques of Current Resource Usage

Current usage of resources needs to be measured as most of these resources are exhaustible meaning they are available in a limited quantity and can be used up. Measuring techniques are thus crucial in order to avoid depletion. Currently, there is a huge tug of war centered on resource depletion (increased scarcity) and the exploitation of resources.

A measuring technique involves a six-stage process that involves understanding your current resource consumption and waste production, understanding how to measure it, using the data and ultimately making informed decisions.

Stage 1: Understanding resource consumption and waste production. This is undertaken in two parts: Initial reviews and process mapping.

Initial Review

Helps in gathering basic information. Assists one in understanding how various resources are being used highlighting areas that can be improved on.

Process Mapping

Having acquired an insight from the initial reviews, process mapping helps controlling resources usage by adopting the most efficient and effective resource consumption to minimize waste collected, cost and environmental impact.

Stage 2: Data Collection

This stage involves quantifying the exact amount of resources used. Some of the data collected may be exact figures while others may be estimates depending on nature of the resources in question. Data can be collected: by taking measurements, estimating, financial data and bills, and mass balances.

Stage 3: Data Analysis

This section involves managing and collating the data previously collected. Collected data is represented in tables, graphs and charts.

Stage 4: Data Interpretation

This stage involves relating data analyze to measuring indicators such as carbon metrics and carbon footprints. It outlines the current resources usage with trends cropping up in the sector.

Stage 5: Summary

It involves coming up with a conclusion of the process in relation to knowledge gathered from the data. It helps identify priority areas to target, how to go about target setting and to plan on improving on resource consumption to be sustainable.

Stage 6: Reviews and progress communication

This section involves giving a way forward from all you have gained from the process. A report is developed outlining the whole process and how/what next from the knowledge gained.

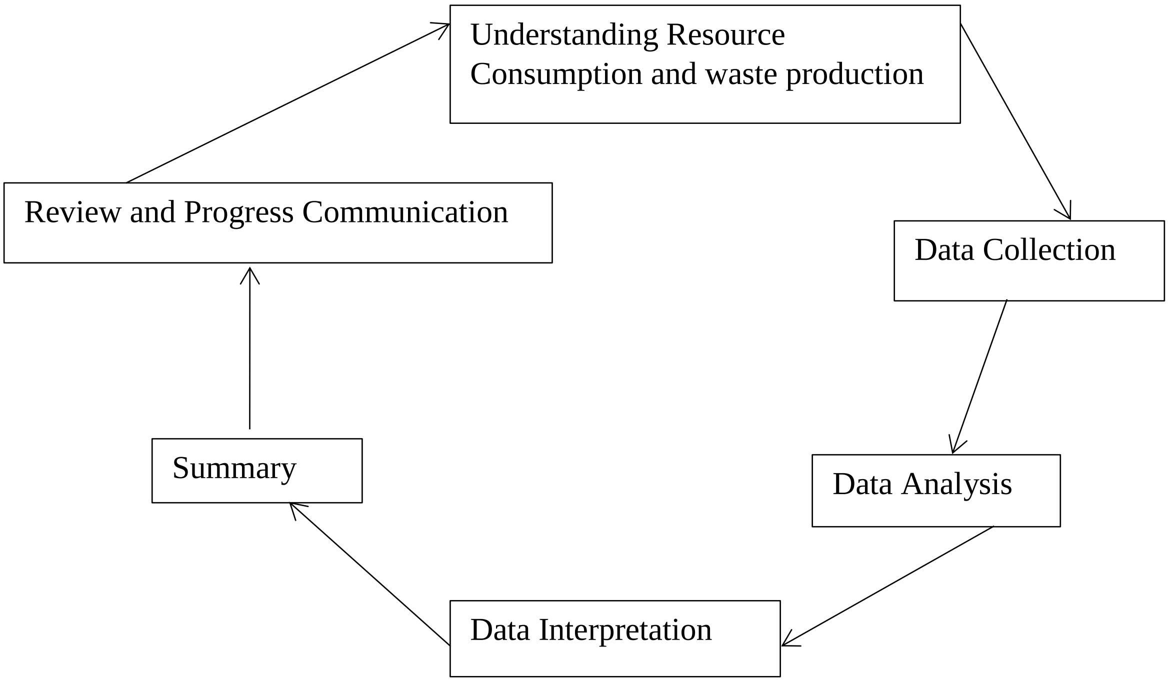

Figure 27. A measuring technique process

The most commonly used measuring technique of current resource usage is Environmental Resources Accounting. It is a subject of accounting proper, its target being to incorporate both environmental and economic information. It is a field that identifies usage of resources, measures and communicates costs of a company's or national economic impact on the environment. Costs include clean up or reclaim of contaminated sites, environmental fines, penalties and taxes, purchase of pollution prevention technologies and cost of waste management.

Conclusion

This learning outcome covered methods for minimizing waste, waste management procedures following the principles of 3Rs (Reduce, Reuse, Recycle) and methods for economizing or reducing resource consumption. The trainee should be able to come up with innovations to enhance all these.

Further Reading

ISO standards

Innovation in waste minimization and reduction of resources consumption methods.

7.3.4.3 Self-Assessment

Written Assessment

1. Which of the following is not a principle of the 3Rs?
    a) Reduce
    b) Replenish
    c) Reuse
    d) Recycle
2. Identify which of the following resource is odd one out.
    a) Air
    b) Fossil fuel
    c) Water
    d) Sun
3. Classification of environmental resources is based of the three of the following apart from?
    a) Based on source of origin
    b) Based on renewability
    c) Based on development stage
    d) Based on region.
4. Which is not a wastage minimization technique?
    a) Resource optimization
    b) 3Rs principles
    c) Quality control improvement
    d) Replenish
5. Benefits of minimizing waste do not include?
    a) Public image
    b) Fun
    c) Environmental responsibility
    d) Economic benefits
6. Explain the principles of 3Rs according to environmental resources giving examples
7. Briefly outline the types of environmental resources.
8. Give three examples of measuring techniques of current resource usage.

Practical Assessment

A report on methods for minimizing wastage used in the school.

7.3.4.4 Tools, Equipment, Supplies and Materials

- Standards operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Environmental Management and Coordination Act 1999
- Machine/equipment manufacturers specifications and instructions
- Personal Protective Equipment (PPE)
- ISO standards
- Company Environmental Management Systems (EMS)
- Montreal protocol
- Kyoto protocol

7.3.4.5 References

Ahmad, Y. (1989*) Environmental Accountability and Sustainable Development:* A UNEP World Bank Symposium. World Bank. Washington D.C.

https://courses.Lumenlearning.com/boundless-economics/chapter/introduction-to-natural-resources-economics/

https://www.conserve-energy-future.com/what-is-the-process-of-minimizing-waste.php.

7.3.5 Learning Outcome No 4: Evaluate current practices in relation to resource usage

7.3.5.1 Learning Activities

Learning Outcome No. 4: Evaluate current practices in relation to resource usage	
Learning Activities	**Special Instructions**
4.1. Collect and provide information on resource efficiency systems and procedures to the work group where appropriate. 4.2. Measure and record of current resource usage by members of the work group. 4.3. Analyze and record of current purchasing strategies according to industry procedures. 4.4. Analyze current work processes to access information and data following enterprise protocol.	Group discussions on resource efficiency systems and procedures.

7.3.5.2 Information Sheet No7/LO4: Evaluate current practices in relation to resource usage

Introduction

This learning outcome covers collection and provision of resource efficiency systems and procedures, measuring and recording of current resource usage, analyzing and recording purchasing strategies, according to industry procedures and analyzing work processes to access information and data.

Definition of key terms

Resources: They are the flows and reservoirs of matter and energy that can sustain or benefit living systems.

Resource efficiency systems: These are procedures that ensure the limited resources are used sustainably while minimizing impact on the environment. The systems allow for creation of more using less and deliverance of greater value output with less input.

Purchasing strategies: These are actions that may be undertaken in order to increase overall saving from buying of goods and services. They are used in order to make cost effective buying decisions from a group of efficient vendors who will deliver quality goods and services on time and at mutually agreeable terms.

Content/Procedures/Methods/Illustrations

4.1 Information on resource efficiency systems and procedures are collected and provided to the work group where appropriate

Environmental Resource Efficiency Systems

Resource efficiency is a sustainable development aspect. Sustainable development is a dynamic process that enables people of present and future generations to realize their potential and improve their quality of life in terms of consequently protecting and enhancing the environment's life support systems. Resource efficiency systems involve gaining the most out of what you have. The systems can be beneficial in ways such as reducing the amount of material used, hence reducing manufacturing costs, waste and compliance to environmental regulations thus reducing impact on the environment.

In the resource efficiency process, it is important to firstly understand the inputs and outputs before analyzing environmental impact. This is usually done using a life cycle analysis.

When developing an environmental resource efficiency system, the following procedure is followed:

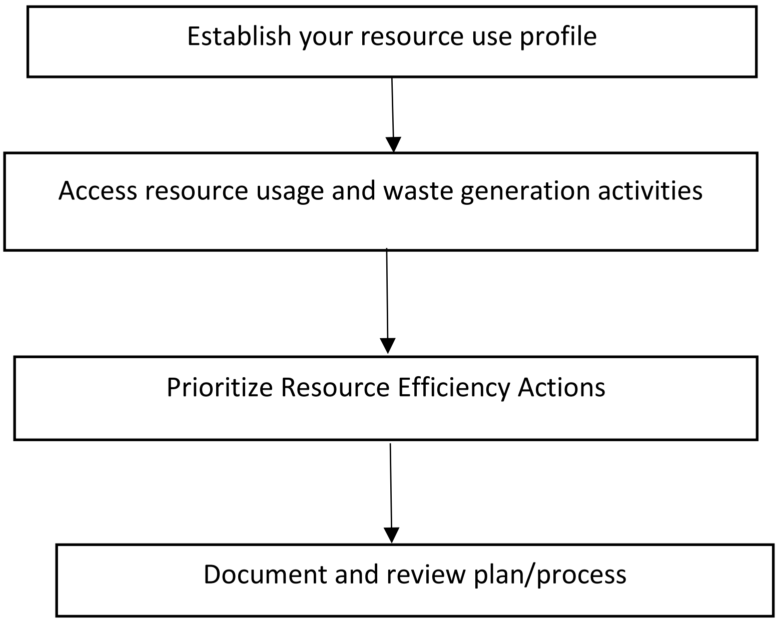

Figure 28. Developing an environmental resource efficiency system procedure

Establish resource use profile

It entails collecting, analyzing and determining baseline data for current resource use and waste generation and monitoring the efficient strategy gains. Baseline date includes:

- Energy use by fuel type
- Water use by source of water
- Waste generation by type of waste

Potential sources of these data include:

- Bills
- On-site metering information
- Existing internal resource management and tracking databases

Access resource consumptions

Offers an opportunity to consider the key processes for their potential to reduce resource usage and optimize saving. This steps also involves the development of resource efficiency indicators.

Prioritize resource efficiency actions

It involves integrating known opportunities, evaluating the costs and benefits of each activity and prioritizing ideal activities in the resource efficiency strategy.

These actions may include: Most effective technology available, most ideal product design that minimizes wastage.

Document and review the plan/strategy

This is the monitoring and evaluation stage of the cycle. It seeks to ascertain the resource efficiency strategy that is best suited for the resource.

4.2 Current resource usage is measured and recorded by members of the work group

Resource usage

Resource can be distinguished into at least three different definitions of resource:

- The economist's view (any means that enters into the production of goods and services)
- The Physical's view (energy, material and information)
- The ecologist's view (naturally occurring components of the environment that can sustain or benefit organisms, populations or communities within an ecosystem)

Resources can be termed as the flows and reservoirs of matter and energy that can sustain or benefit living systems.

Measures for resource use

a) **Energy Analysis**

It is the analysis of the available energy that is lost in the course of material and energy transformation.

b) **Product-oriented Methods**

Life cycle assessment – it is based on analyzing output in relation to input. It involves calculation of environmental impacts.

Material input per unit of service (MIPS) – deals with flows into and out of the techno sphere but pay little attention to the way these flows are dealt with within the techno sphere.

c) **Entropy-based Measure**

Evaluation occurs without reference to transformations of energy or materials. It takes into account all resource consumption in the form of lost energy.

d) **Muller-Wenk and operationalized in the Eco-indicator 99 Method**

It is not based on the questions of how long resources last and how much they are decreased by current practices, but instead evaluates the effects on future generations by examining the future additional investment (in terms of energy) due to the extraction of resources in the present time.

4.3 Current purchasing strategies are analyzed and recorded according to industry procedures

Purchasing strategies

These are the activities taken in order to increase overall savings from buying. It requires input from all functional areas and departments of an organization. For a successful purchasing strategy, the following steps can be used:

- Conduct an internal needs analysis
- Conduct an assessment of the supplier's market
- Collect supplier's information
- Develop a sourcing/outsourcing strategy
- Implement the sourcing strategy
- Negotiate with the suppliers and select the winning bid
- Implement a transition plan or contractual supply chain improvements

i. Conduct an internal needs analysis

You will need to benchmark current performance and then identify needs and targets in this stage before developing a procurement strategy. It involves collection of different types of data. Initial data collection is to benchmark current performance, used resources, cost for all functions in the organization and current growth projections.

ii. Conduct an assessment of the supplier's market

Potential suppliers that are feasible sources of the required goods and services are identified. Specific requirements by the organization limits number of suppliers that are suitable, such as technological requirements, quality.

iii. Collect supplier's information

The business reputation and performance of the supplier must be evaluated. A supplier's ability to meet selection criteria may result in significant profits or losses. Use of agents who are experts with the market and stakeholders can be beneficial. A competitive environment may be created by selecting more than one supplier in order to avoid potential supply disruptions.

iv. Develop a sourcing/outsourcing strategy

Examples of sourcing/outsourcing strategies include: direct purchase, acquisition, and strategic partnership. Determination of the right strategy is dependent on the competitiveness of the supplier's market and the organization's risk tolerance, business strategy and outsourcing/sourcing motivation.

v. Implement the sourcing strategy

Sourcing strategies involve partnerships that are strategic and/or acquisition. Suppliers may possess the following characteristics:

- Activities involvement core to the buyer such as correct technological requirements, raw material for product
- A limited number of suppliers with the specific skilled labor

- Part of the broader business strategy of the organization.

The organization may develop a competitive bidding process in case of a direct purchase.

vi. **Negotiate with the suppliers and select the winning bid**

The team must evaluate suppliers' response and apply its evaluation criteria. Suppliers may request additional information in order to make the most realistic bid. Evaluation of received bids is done and the selection criteria used and the bidders shortlisted. After the evaluation process, contract negotiations begin.

vii. **Implement a transition plan or contractual supply chain improvements**

Suppliers who won the bid should be invited to participate in implementing improvements. A communication plan must be developed and a system for evaluating and measuring performance will need to be developed using key performance indicators. Transition plans are very important when switching suppliers.

4.1 Current work processes to access information and data is analyzed following enterprise protocol

Data Analysis of Current Work Processes

An analysis of current work processes to access information and data is important as it helps to increase the effectiveness and efficiency of a process. It offers an assessment of how well the process attains its end goal, by examining every part of the structure. It can therefore help identify potential improvements making it easier to carry out a re-engineering initiative later on in the process. Data analysis is the process of collecting, transforming, cleaning and modelling data with the goal of discovering the required information. Results obtained are communicated, suggesting conclusions and supporting decision making. Data analysis process consists of the following phases that are interactive in nature:

- Data Requirement Specification
- Data collection
- Data processing
- Data cleaning
- Data analysis
- Communication

Data Requirement Specifications

Required data for analysis is based on a question or experiment or project. Data necessary as inputs such as population is identified. Specific variables regarding this population such as age may be specified and obtained. Data can be numerical or categorical. Clear measurement priorities must be set according to:

- What to measure?
- How to measure it?

Data collection

It is the process of gathering information on targeted variables identified as data requirements. Data collection ethics are paramount in regards to accurate and honest data. It provides a target to improve and a baseline to measure.

Data processing

It involves organizing data for analysis. It includes structuring the data as required for the relevant analysis tools. Creation of a data model might be necessary.

Data cleaning

Processed and organized data may be incomplete, contain duplicates or errors. Data cleaning is the process involving correcting the errors. It is dependent on the type of data.

Data analysis

Processed, organized and analyzed data is now ready for analysis. Various data analysis techniques work to understand, interpret and derive conclusions based on the requirements. Data visualization may also be used to examine the data in graphical format in order to obtain insight on the messages within the data.

Statistical data models such as correlation, regression analysis may be used to identify the relations among the variables. They are descriptive and help in analysis simplification and results communication.

Communication

Results are to be interpreted in a format as required by the users to support their decision making. Feedback from the users might result in additional analysis.

Visualization techniques such as tables, charts and graphs are used by data analysts to aid in communicating messages clearly and efficiently to the users.

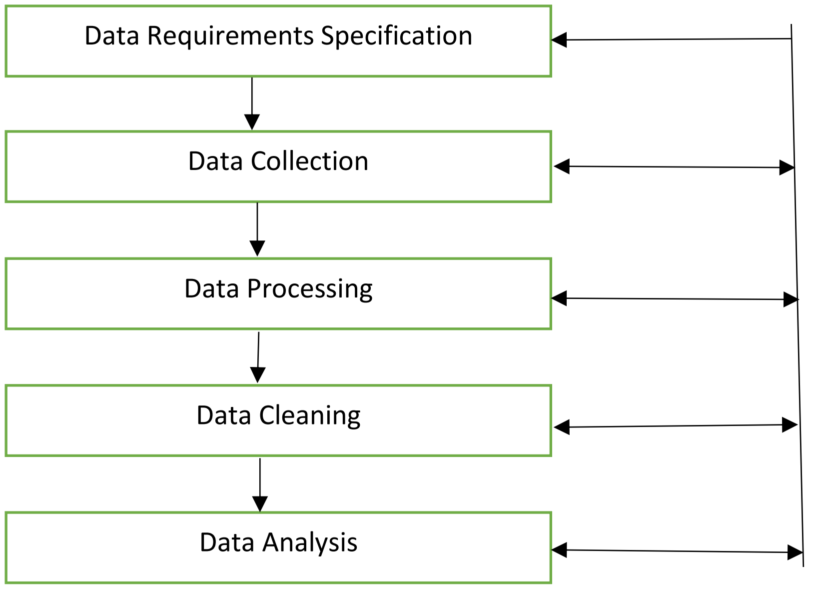

Figure 29. Data analysis process

Conclusion

At the end of this learning outcome, the trainee should be able to properly develop an effective resource efficiency system, quantify current resource usage, implement efficient purchasing strategies and analyze data and access information on current work processes.

Further Reading

Mugenda, O. M. & Mugenda, A. G. (2008). *Research methods: Quantitative and Qualitative Approaches.* Nairobi: African Centre for Technological Studies

7.3.5.3 Self-Assessment

Written Assessment

1. Which is not a benefit of using resource efficiency systems?
    a) Sustainable Development
    b) Cast reduction
    c) Environmentally friendly
    d) Less value output
2. Data analysis on current work processes involves certain phases apart from which one?
    a) Data processing
    b) Data guessing
    c) Data collection
    d) Data cleaning
3. Which is the odd one out in relation to resource usage?
    a) Resource exploitation
    b) Resource efficiency systems
    c) Purchasing strategies
    d) Data analysis on work processes
4. Baseline data in establishing resource use profile does not include?
    a) Water use
    b) Waste generation
    c) Premises
    d) Energy use
5. Which of the following is not included in the life cycle analysis?
    a) Establishing resource use profile
    b) Documenting and reviewing plan
    c) Data collection
    d) Prioritizing resource efficiency actions
6. Describe development procedures of a resource efficiency system.
7. Outline steps taken in developing purchasing strategies.

8. Define data analysis and explain the phases it involves.

Project

Do a project. An assessment of the work process involved in an organization

7.3.5.4 Tools, Equipment, Supplies and Materials

- Standards operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Environmental Management and Coordination Act 1999
- Machine/equipment manufacturers specifications and instructions
- Personal Protective Equipment (PPE)
- ISO standards
- Company Environmental Management Systems (EMS)
- Montreal protocol
- Kyoto protocol

7.3.5.5 References

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7.3.6 Learning Outcome No. 5: Identify environmental legislations/conventions for environmental concerns

7.3.6.1 Learning Activities

Learning Outcome No. 5: Identify environmental legislations/conventions for environmental concerns	
Learning Activities 	**Special Instructions**
5.1. Identify environmental legislations/conventions and local ordinances according to different environmental aspects/impact 5.2. Describe industrial standard/environmental practices according to the different environmental concerns	Use the Kenyan Constitution Group Discussions

7.3.6.2 Information Sheet No7/LO5: Identify environmental legislations/conventions for environmental concerns

Introduction

This learning outcome covers identification of environmental legislations/ conventions and local ordinances according to different environmental aspects as well as description of industrial standards/environmental practices according to the different environmental concerns.

Definition of key terms

Environmental legislations/conventions: Also known as multilateral environmental agreements. Are agreements between states that guide global, regional and national action on environmental issues and are therefore key elements of environment, legal and governance regimes?

Industrial standards: Industry standards are a set of requirements to be followed by a member of that industry in relation to the standard functioning and carrying out of operations.

Local ordinances: These are laws for an area smaller than a nation e.g. local government or county and should be consistent with the constitution and public policies.
Environmental concerns: These are harmful effects on the biosphere brought about by anthropogenic activities (human influence) or natural internal processes. These issues include global warming, climate change, waste disposal, water pollution and deforestation.

Content/Procedures/Methods/Illustrations

5.1 Environmental legislation/conventions and local ordinances are identified according to the different environmental aspects/impact

Environmental policy and legislation

Environmental legislation is the collection of laws and regulations aimed at protecting natural resources and the environment from harm or misuse. The laws are implemented in different jurisdictions depending on the structure of government or local authorities. Environmental policy: This is a course or a system of principles adopted by an organization or country to guide decision making and achieve beneficial outcomes. Protection and conservation of natural resources happens on different levels of jurisdiction such as the international level, regional level and national level. At the international level, the global environmental authority, known as the United Nations Environment Program (UNEP) was established in June 1972 as a result of the Stockholm conference on the human environment. UN Environment is the recent abbreviation used and is located in Nairobi, Kenya. At the regional level Kenya is part of the African Union and the economic block East African Community. The African Union was officially launched in 2002 as a successor to the Organization of African Unity (1963 – 1999). The African Union policy on the environment in Africa is under the department of Environment, Climate change, Water, Land and Natural Resources. The DREA guides Africa on issues such as climate change, project on environmental restoration and rehabilitation and capacity building of environmental institutions in Africa. At the national level, we have the National Environment Management Authority (NEMA), established under the Environmental management and coordination act no. 8 of 1999 (EMCA) as the principle instrument of government for the implementation of all policies relating to environment. The authority has been in operation since 1st July 2002. Environmental policy at the county level is run by the county governments and they control the use of resources but have no jurisdiction over resources share by more than one county, because such resources are considered National resources and are under the national government.

Multilateral environmental agreements/international environmental protocols

Multilateral environmental agreements are agreements between states that guide global, regional and national action on environmental, legal and governance regimes. Timeline of major environmental conference and protocols.

- Conference on Human Environment, in Stockholm in June 1972.
- Montreal Protocol on Substances that Deplete the Ozone Layer in Montreal (1987).
- United Nation Conference on Environment and Development, in Rio de Janeiro (1992)
- Kyoto Protocol, in Kyoto (1997).
- World Summit on Sustainable Development, Johannesburg (2002).
- UN conference on Sustainable Development, Rio de Janeiro (2012).
- UN Sustainable Development Summit, in New York (2015).

- Conference of the parties of the UNFCCC in Paris (2015).

Protocols

This is the original draft of a multilateral environmental agreement, specifying the terms of a treaty agreed to in a conference and signed by the parties.

Kyoto Protocol

Kyoto Protocol is an international treaty that was agreed upon in 1997. It commits state parties to reduce greenhouse gas emissions, adopted in Kyoto, Japan on 11th December, 1997 and entered into force on 16th Feb 2005. The protocol mirrors the convention in recognizing the specific needs and concerns of developing countries, especially the most vulnerable among them. Annex 1 parties must thus provide information on how they are striving to meet their emission targets, while minimizing adverse impacts on developing countries. The target for the first commitment period of the protocol cover emission of the following greenhouse gases; carbon dioxide, methane, nitrous oxide, hydroflouro carbons (HFCs), perfluoro carbons (PFCs) and sulfur hexafluoride. An adaptation fund was established to finance concrete adaptation projects and programs in developing countries that parties to the Kyoto protocol. The fund financed with the share of proceeds from clean development mechanism (CDM) project activities and other sources.

Montreal Protocol

The Montreal Protocol on Substance that Depletes the Ozone layer, is a Global agreement to protect the stratospheric ozone layer by phasing out the production and consumption of ozone-depleting substances. It was agreed on 26th August 1987, and entered into force in 1989.

It has gone through nine revisions, in 1990 (London), 1991(Nairobi), 1992(Copenhagen), 1993 (Bangkok), 1995 (Vienna), 1997 (Montreal), 1998 (Australia), 1999 (Beijing) and 2016 (Kigali). Montreal protocol has been innovative and successful and is the first treaty to achieve universal ratification by all countries in the world. The Montreal protocol's Scientific Assessment Panel estimates that it will even greater benefits worldwide. The latest amendment to the protocol was on October 15, 2016 in Kigali, Rwanda. The amendment seeks to phase down production and consumption of hydroflouro carbons (HFCs) worldwide. This amendment creates market certainly and opens international market to improved technology that are better for the environment.

Environment law and policy in Kenya

Environmental Management and Coordination Act (1999)

This act is the framework law on environmental management and conservation. It guides the country on all areas concerning the environment and all the institutions responsible for enforcement. The following institutions have been established through this principle act; National Environment Management Authority, Public Complaints Committee, National Environment Tribunal, National Environment Action Plan Committees and County Environment Committees. Section 9 (1) of EMCA mandates the National Environment Management Authority (NEMA) to exercise general supervision and coordination over all matters relating to the environment and to be the principle guide to the government of Kenya in the implementation of all policies relating to the environment. The authority has been in operation since 1st July 2002. NEMA is also responsible for ensuring Kenya's compliance with Multilateral Environmental Agreements. The Act provides for environmental protection through; environmental impact assessment, environmental audit and monitoring and environmental restoration orders, conservation orders and easements. The latest amendment to the act was in 2015 to align to the constitution, 2010. The changes in the amendment include; functions of the cabinet secretary, national environmental complaints committee and access to information.

Industrial standards

Industrial standards are a set of requirements to be followed by a member of that industry in relation to the standards functioning and carrying out of operations. In the environmental sector, the Environmental Management and Coordination Act is the principal instrument guiding professional practices. There are regulations that guide specific sectors in the environment. An example is the Air Quality Regulations (2014). The Air Quality Regulations (2014) specifies air quality limits, air quality management plan, emission standards, vehicular emission reduction measures, guidelines on air pollution monitoring parameters from stationary sources among others.

Features of an environmental strategy

An environmental strategy is a set of initiatives that can be implemented to reduce the impacts and effects on the natural environment through products, processes and policies. An example is the National Climate Change Action Plan (NCCAP) 2018 – 2022. Features of an environmental strategy include:

Introduction

The introduction gives a background of what has been there before and what the strategy seeks to change or achieve. In this section goals and objectives are clearly explained.

Enabling policy and legal framework

In this section, international, regional and national policy and legal framework that supports and guide the strategy are clearly outlined and explained.

Priority areas the strategy seeks to change

In this section, the actions to be carried out are spelled out. The institution for implementation of the action is clearly stated and their mandate made clear. The sectors to be involved in the activities are also found in this section of the strategy or plan.

Delivering the strategy

In this section, all of the activities, resources and stakeholders needed for the delivery of the strategy are outlined and how they all come together and how they are connected. It also has information on technology, finance and resource mobilization, delivery and coordination mechanisms and institutional roles and responsibilities.

Conclusion

A clear end to the strategy or action plan detailing the important content and expected outcomes in the period specified for achieving the plans. Environmental management system is a framework of process and practices that enable an organization reduce its environmental impact and increase efficiency by training personnel, monitoring and generating reports.

Basic elements of an EMS include the following:

- Reviewing the organizations environmental goals.
- Analyzing its environmental impacts and legal requirements.
- Setting environmental impacts and legal requirements.
- Establishing programs to meet these objectives and targets.
- Monitoring and measuring progress in achieving the objectives.
- Ensuring employees environmental awareness and competence.
- Reviewing programs of the EMS and making improvements.

ISO 14001 Environmental Management Systems

This standard now emphasizes life cycle analysis in the new 2015 version. It also encourages risk analysis along the supply chain. It allows more sustainable management of companies and is an important tool in controlling the impacts of the organization. Approaches in this family of standards include audits, communication, labeling and life cycle analysis as well as environmental challenges such as climate change. ISO 14001:2015 specifies the requirements for an environmental management system that an organization can use to enhance its environmental performance. It is intended to be used by an organization seeking to manage its environmental responsibilities in a systematic manner that contributes to the environmental pillars of sustainability. It helps an organization achieve its intended outcomes of its environmental management system, which provide value for the environment, the organization, government policy, and the intended outcomes is produced and returned back into the environment. Main types of pollutants include; noise pollution, light pollution, solid waste, air and water pollution.

5.2 Industrial standard/environmental practices are described according to the different environmental concerns

Environmental Concerns

Environmental concerns are harmful effects on the biosphere brought about by anthropogenic activities (human influence) or natural internal processes. These issues include global warming, climate change, waste disposal, water pollution and deforestation. They include:

a) **Climate change**

The relationship between climate and weather is quite close. Climate is the averaging of atmospheric weather conditions over long periods over at least 30 years. Climate change refers to a change in the climate system that is caused by significant changes in the concentration of greenhouse gases due to human activities and which is addition to natural climate change that has been observed during a considerable period.

Causes of climate change

- Green-house gases: They are gases that absorb and emit radiant energy within the thermal infrared range. The main GHGs are carbon dioxide, methane, nitrous oxide, etc. they increase the temperature of the atmosphere therefore affecting climate over a period of time.
- Volcanic eruptions: Volcanic gases like sulphur dioxide can cause global cooling, while volcanic carbon dioxide, a green-house gas has the potential to promote global warming.
- Air pollution: Processes such as fossil fuel burning in industry, motor vehicles and buildings emit substances that cause local and regional pollution. They release greenhouse gases, mainly C02, methane and nitrous oxide, which are linked to global climate change.

Factors that increase climate change

- Urbanization.
- Industrialization.
- Technological development/advancement.
- Land use and land cover change.

Effects of climate change

- Flooding.
- Drought.
- Crop failure.
- Loss of bio-diversity.
- Human health.

b) Global warming

Refers to the observed/projected gradual increase in global surface temperature. It is one of the consequences of climate change. Energy from the sun reaches the earth in the form of ultraviolet (UV), visible and infrared (IR) radiation. Most of this thermal radiation is absorbed by the atmosphere, thereby warming it. Greenhouse gases cause the greenhouse effect. It is useful because trapping some energy keeps the temperatures on our planet mild and suitable for living things. However, too much CHG can cause the temperature to increase out of control.

Effects of global warming

- Sea level rise: The Polar Regions are particularly vulnerable to rising temperatures. This rise in temperature is causing the ice sheet to melt. The increase in sea levels affects people and infrastructure along the coast, wildlife and plants.
- Shrinking ice sheets: Greenland and Antarctic ice sheets have decreased in mass. This affects the wildlife such as polar bears and whales that breed near the ice sheets. The glaciers act as a cooling system for the earth and when they melt this is greatly compromised.
- Decrease in biodiversity: As land and sea undergo rapid change, the living organisms that inhabit them are affected and their population decreases. Plants and

animals survive at optimum conditions and when these conditions are compromised by increase in temperature, plants and animals are more susceptible to diseases.

- Severe weather: Higher temperatures are worsening weather events such as storms, floods, heat waves and droughts. A warmer climate creates an atmosphere that can collect, retain and drop more water, changing weather patterns in such a way that wet areas become wetter and dry areas drier.
- Death: Intense weather events, increase in diseases has all contributed to increase in death rates.

c) Pollution

This is the addition of a substance either liquid, solid or gas or any form of energy, such as heat, light sound at a higher rate than it can be recycled, decomposed, diluted or stored and affects normal environmental processes. Types of pollution includes:

- Solid waste. Solid waste is any discarded material that is abandoned by being disposed of, burned, recycled and can be solid, liquid or semi-solid form. Examples of solid waste include; domestic waste, waste tyres, construction and demolition waste, asbestos, industrial waste, biomedical waste, E-waste, pesticide waste, used oil and sludge and sewage waste.
- Noise pollution. This is the transmission of high intensity sound that causes discomfort to living beings. The intensity is measured in decibels. Types include industrial noise, neighborhood noise etc.
- Air pollution**.** Air pollution may result either from a quantitative change, by raising the concentration in air of some of its normal constituents (e.g. co2, nitrogen peroxide) or a qualitative change due to introduction of external compounds such as radio-nuclides and synthetic organic substances.
- Water pollution. This is the introduction of chemical, biological compounds into water ecosystems at a rate higher that it can be recycled, decomposed or diluted. This affects life in these ecosystems leading to diseases and in some cases deaths. One of the most common is the problem of solid waste finding its way into oceans through rivers and this has affected breeding of some aquatic life and suffocation of both plants and animals.

d) Land use and land cover change

Humans have been modifying land to obtain food and other essentials for thousands of years but current rates are far greater than ever in history, and are driving unprecedented changes in ecosystems and environmental processes at local region and global scales. Land cover refers to the physical and biological cover over the surface of land, including water, vegetation, bare soil and/or artificial structures. Land use can be defined in terms of human activities such as agriculture, forestry and building construction that alter land surface processes including hydrology, biogeochemistry, and biodiversity.

Effects of land use and land cover change

- Biodiversity loss
- Climate change
- Pollution

Conclusion

The unit covered environmental legislations/conventions and local ordinances as well as industrial/environmental practices according to different environmental aspects/impacts/concerns.

Further Reading

ISO 14001, Environmental Management Systems
National Climate Change Action Plan

7.3.6.3 Self-Assessment

Written Assessment

1. Which year was the Montreal protocol agreed?
   a) 1999
   b) 2001
   c) 1987
   d) 2000
2. Which of the following is not a greenhouse gas?
   a) Carbon dioxide
   b) Hydrogen
   c) Methane
   d) Nitrous oxide
3. Which of the following is the principal guiding Act in environmental matters in Kenya?
   a) Environmental Management and Coordination Act (EMCA)
   b) Water Act
   c) National Climate Change Action Plan (NCCAP)
   d) Air Quality Regulations (2014)
4. Which one of the following is an effect of climate change?
   a) Urbanization
   b) Flooding
   c) Seal level decrease
   d) Reduction in diseases
5. Which year did National Environment Management Authority become operational?
   a) 1999
   b) 1995
   c) 2001

d) 2002

6. Identify environmental legislations for environmental concerns
7. List five effects of global warming

Practical Assessment

Identify an environmental issue in your home area and come up with an environmental strategy to solve it.

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7.3.6.4 Tools, Equipment, Supplies and Materials

- Standards operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Environmental Management and Coordination Act 1999
- Machine/equipment manufacturers specifications and instructions
- Personal Protective Equipment (PPE)
- ISO standards
- Company Environmental Management Systems (EMS)
- Montreal protocol
- Kyoto protocol
- Air Quality Regulations (2014).
- National Climate Change Action Plan

7.3.6.5 References

Africa Forest Forum, (2019). *Basic science of climate change, a compendium for technical training in African Forestry*, p 120 – 123.

Africa Forest Forum, (2019). *International Dialogues*, Processes and Mechanisms on climate change, a compendium for professional and Technical Training in African Forestry, p 11.

Government of Kenya, (1999). *Environmental Management and Coordination Act, Government Press.*

7.3.7 Learning Outcome No. 6: Implement specific environmental programs

7.3.7.1 Learning Activities

Learning Outcome No. 6: Implement specific environmental programs	
Learning Activities 	**Special Instructions**
6.1. Identify Programs and Activities according to organization's policy and guidelines. 6.2. Determine and perform individual roles/responsibilities based on the activities identified. 6.3. Resolve problems/constraints encountered in accordance with organization's policies and guidelines. 6.4. Consult stakeholders based on company guidelines.	Trainees to discuss in groups on environmental programs implementations.

7.3.7.2 Information Sheet No7/LO6 Implement specific environmental programs

Introduction

This learning outcome covers identification of programs/activities guidelines, determining individual roles/responsibilities based on the identified programs, resolving problems encountered and consulting stakeholders according to organization's policies and guidelines

Definition of key terms

Environmental programs: These are a set of measures and interventions aimed at ensuring compliance with national, county and institutional environmental regulations and the overall goal of reducing negative environmental impacts.

Stakeholders: A stakeholder is either an individual, group or organization who has interest or concern in a certain area or who is impacted by the outcome of a project. They can be within or outside the organization that is sponsoring or funding the project.

Roles: These are the positions team members assume or the parts that they play in a particular operation or process.

Responsibilities: These are the specific tasks or duties that members are expected to complete as a function of their roles.

Problem solving: It is the art of defining a problem, determining the cause of the problem, identifying prioritizing, and selecting alternatives for a solution; and implementing solutions.

Content/procedures/methods/illustrations

6.1 Programs/Activities are identified according to organization's policies and guidelines

Environment Programs

These are a set of measures and interventions aimed at ensuring compliance with national, county and institutional environmental regulations and the overall goal of reducing negative environmental impacts. Environmental programs can be initiated at the national level by the government of Kenya, or international environmental organizations such as the United Nations Environment Programme (UNEP) or at the county level by county governments. The nature of a project and the shareholders involved or affected by a project depend on the type of project and what it seeks to achieve. One important step before initiating a project, is understanding the needs and expectations of the community affected by the project.

Community Needs and Expectations

These are the things or services required by a certain group of people because they are essential for survival and for a life of dignity. Needs can be identified through assessing the strengths and resources available in the community to meet the needs of children, youth, women and families. The assessment also focuses on the capabilities of the community including its citizens, agencies and organizations. In the environment sector, sustainable development is key where needs of the current generation are met without compromising the needs of the future generations. Sustainable development has three pillars namely; social, economic and environmental. Problems that usually face communities include:

- Health
- Food security
- Lack of employment
- War and conflict
- Poverty

Identification of programs

The following process can be used in identifying programs and activities;

- Developing a plan for assessing local needs and resources
- Understanding and describing the community and stakeholders
- Conducting stakeholder meetings and forums
- Collecting information about the problem(s)
- Analyzing community problems
- Identifying community assets and resources
- Developing baseline measures
- Collecting feedback from the community
- Developing and using criteria and processes to set priorities
- Producing a final report on program interventions

Developing a plan for assessing local needs and resources
Developing a plan helps gain a deeper understanding of the community. A community assessment helps to uncover not only needs and resources, but also the underlying culture and social structure that will help you understand how to address the community's need and utilize its resources.

Understanding and describing the community and stakeholders
This entails understanding physical aspects, infrastructure, patterns of settlement, commerce and industry, demographics, history, community, leaders, culture and existing institutions. This will give a general idea of the community's strengths and the challenges it faces.

Conducting stakeholder meetings and forums
Stakeholder meetings and forums are a valuable resource in upholding open lines of communication with the public. Community participation can help identify and solve problems.

Collecting information about the problem(s)
Quantitative information is crucial to building awareness and gathering support for community issues. Analysis of data provides concrete approach for assessing, planning and implementing community projects.

Analyzing community problems
This is a way of thinking carefully about a problem or issue before acting on a solution. It first involves identifying reasons a problem exists, and then identifying possible solutions and a plan for improvement.

Identifying community assets and resources
A community asset or resource is anything that can be used to improve the quality of community life. It can be a person, physical structure, community service or business.
Developing baseline measures
One of the first activities needed to be done is figuring out how much the different factors and trends to be examined are happening in the first place.
To have an effective program, you have to know how much of an effect your efforts are having and this can be achieved the baseline measures.

Collecting feedback from the community
It's important to collect input from members of the community when working on plans to address environmental problems and concerns. Actively soliciting the involvement of community members in the process as it begins and continuing to approach them for their input will help them become more interested and actively involved.
Developing priorities
This is meant to bring to light issues of the community that need to be addressed. Criteria are standards for making a judgment and provide guidelines for making decisions. In this

step, the order of important things in relation to others is determined. A set of criteria priorities may change in people's concern or knowledge.

Producing a final report on program interventions
After all these steps have been followed and there's a clear understanding of what needs to be done to remedy the environmental issue, a final report is made. This report is important because it will guide the implementation of the program and will clearly state the issues experienced so as to improve in subsequent projects.

6.2 Individual roles/responsibilities are determined and performed based on the activities identified

Setting of individual roles/responsibilities
A lack of clarity regarding roles, responsibilities and expectations of the various agencies or individuals can impede success of teams. It is therefore important for team members to understand their roles and responsibilities and to share their expectations about the roles and responsibilities of others.
Roles – These are the positions team members assume or the parts that they play in a particular operation or process.

Responsibilities –These are the specific tasks or duties that members are expected to complete as a function of their roles. These activities or obligations are specific to a person who is accountable for a role on a project that has been assigned to them.

Importance of assigning roles and responsibilities

- **Efficiency**

Having a clear understanding of project roles allows the leader to develop a timeline. This gives a clear idea of which task and when the specific portion is expected to be completed. Assigning roles enables team members to get a better idea of which members have closely related tasks. Coordination in the workplace is easier and efficient.

- **Productivity**

When the responsibility is assigned closely to the strength of an individual, productivity is enhanced. It increases only when all members agree on the responsibilities assigned to them. If they agree and own their roles and responsibilities, they will easily understand how to achieve success.

- **Enthusiasm**

Issuing responsibilities to team members gives each person a sense of ownership. They become invested in the project's outcome, thereby increasing their efforts to create a quality product. If roles and responsibilities are not defined, team members lack morale, get disinterested and detached. Leaders should ensure work is evenly distributed to avoid conflict and creating stress for some workers.

6.3 Problems/constraints encountered are resolved in accordance with organization's policies and guidelines

Resolving problems and issues

Problem solving is the act of defining a problem; determining the cause of the problem; identifying prioritizing; selecting alternatives for a solution and implementing solutions. Problem solving gives us an opportunity to improve the system and relationships.

Steps in problem solving process

a) **Define the problem**

This involves differentiating facts from opinions, being specific with the underlying causes, identifying what standard or expectation has not been met and what can be improved, and determine in which process the problem lies.

b) **Generate alternative solutions**

In this stage there's room for creativity and ideas can be shared through brainstorming.
All parties affected should be involved in generating alternatives. The alternatives should be consistent with the goals of everyone involved in the process.

c) **Evaluate and select alternatives**

There is a need to go deeper after generating alternatives so that realistic and appropriate options can be prioritized. The evaluation should be relative to a target standard and the selection should not be biased or favor a particular individual or a group.

d) **Implementation and follow up**

Implementation of the chosen alternatives is the final step. It is important to gather feedback from the stakeholders as implementation is taking place. This can be part of an ongoing monitoring and evaluation. Long-term results should be evaluated so as to learn on areas that can be improved in future initiatives.

6.4 Stakeholders are consulted based on company guidelines

Stakeholder Consultation

A stakeholder is either an individual, group or organization who has interest or concern in a certain area or who is impacted by the outcome of a project. They can be within or outside the organization that sponsoring or funding the project. It's important to get output from members of the community when working on plans to address environmental problems and issues. This will help them become more interested and more actively involved.

Public participation is one of the fundamental principles of democracy. Democracy is premised on the idea that all citizens are equally entitled to have a say in decisions affecting their lives. Citizens' participation in government decision making and projects is fundamental to the functioning of a democratic system of governance as stated in chapter one of the constitution of Kenya, 2010. Stakeholder consultation or public participation is not only important in government initiatives but also in any project so that community members can be fully involved and own the project.

Importance of stakeholder consultation

- It increases the likelihood of stakeholders getting actively involved and staying involved throughout the implementation process.
- It increases understanding of the priorities of the community members and what problems and issues are the major concern. This information may not be known by professionals.
- It is a reliable, systematic and easy way to acquire information from the beneficiaries of a project.
- It provides a useful source of data, information and direction for donors, government and participants.
- It keeps the government's agenda and organization objectives to reflect the interests of the community by getting their perspective.

5 S of Good Housekeeping

This method contains five steps and is essential for being organized and working efficiently. Henry Ford originally developed what we know now as the 5s methodology in 1972. It was however popularized by Hiroyuki Hirano in Japanese in 1980. 5s of good housekeeping is a management technique that is aimed at optimizing the workplace and improving the efficiency of work performance. These five steps include:

i. Seiri – Sort

First you should identify what is necessary and what is unnecessary. Items can be physical, such as broken equipment, or non-physical such as outdated files in a network and information that is no longer needed. Enlist a team to identify which items are needed and classify them by frequency of use. This should extend to software. Sorting out software needs will reduce costs, increase available storage space and make organization more effective.

ii. Seiton - Straighten

After sorting resources and removing what is unwanted, you can put them in order. Resources should be clearly labelled and stored in an appropriate place where they can be found easily.

Physical resources used often should be kept close by, while items that are used less often stored further away. For computers, files should be saved appropriately, in distinguishable folders with appropriate names using dates where applicable.

iii. Seiso – Shine

After the workplace is in order, it should be cleaned. This should be a regular event, making it easy to monitor the condition of machinery and tools. This will make it easy to do regular maintenance. Clean files regularly to ensure that only the latest versions are left, and ensure that the computer is regularly updated to the latest version.

iv. Seiketsu – Standardize

Creating a standardized procedure to ensure the good work practices are maintained is the next step. Having a standard in place will serve as best practice and will remove uncertainty amongst your team. It should be communicated in written form, and checklists be created to help team members perform all of the steps correctly.

v. Shitsuke – Sustain

Finally, the new processes and standards need to be sustained. This can be attained by building the whole process into performance evaluation. The process can evolve over time, and so 5s should be modified appropriately, and changes communicated to team members. Assessment of adherence to standards and success of the process can be done through project review or meetings.

Conclusion

This learning outcome covered implementation of specific environmental programs through identification of programs/activities, individual roles/responsibilities, resolving of problems/constraints and consulting stakeholders based on organization policies and guidelines.

Further Reading

EMCA 1999
ISO Standards

7.3.7.3 Self-Assessment

Written Assessment

1. Which of the following is a problem faced by communities in Kenya?
    a) Budget surplus
    b) Wealth
    c) Conflict
    d) Democracy
2. Which of the following choices describes a stakeholder?
    a) Infrastructure
    b) History
    c) Donor agency
    d) culture

3. Which of the following is a step-in good housekeeping?
    a) Re-use
    b) Sustain
    c) Recycling
    d) Repurpose
4. At which level does the central government initiate projects?
    a) Regional level
    b) National level

    c) County level
    d) International level
5. Which of the following is the leading environmental organizations at United Nations?
    a) World Meteorological Organization
    b) United Nations Environment Program (UNEP)
    c) Intergovernmental Panel on Climate Change (IPCC)
    d) United Nations Framework Convention on Climate Change (UNFCC)
6. List down the 5s of good housekeeping
7. List 5 importance of stakeholder consultation.
8. Discuss three importance of assigning roles and responsibilities.

Practical Assessment

Observe the activities in the administration block of your learning institution and make observations if the activities conform to the 5s of good housekeeping. Identify a stakeholder meeting near your learning institution or in your home area and make observation on how the meeting is conducted and how the community members are engaged.

Project

Determine the weaknesses of stakeholder consultation in the Kenyan context.

7.3.7.4 Tools, Equipment, Supplies and Materials

- Standards operating and/or other workplace procedures manuals
- Specific job procedures manuals
- ISO standards
- Company Environmental Management Systems (EMS)

7.3.7.5 References

Africa Forest Forum (2019), *international dialogues, processes and mechanisms to climate change:* A compendium for professional and technical training in African forestry, Technical working paper pg. -99

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International Organization for Standardization, (2017) ISO 14001

7.3.8 Learning Outcome No. 7: Monitor activities on environmental protection/programs

7.3.8.1 Learning Activities

Learning Outcome No. 7: Monitor activities on environmental protection/programs	
Learning Activities 	**Special Instructions**
7.1. Monitor and evaluate activities periodically according to the objectives of the environmental program. 7.2. Gather and consider feedback from stakeholders in proposing enhancements to the program based on consultations. 7.3. Analyze gathered data based on evaluation requirements 7.4. Submit recommendation based on the findings. 7.5. Set and establish management support systems to sustain and enhance the program. 7.6. Monitor and report environmental incidents to concerned/proper authorities.	Personal protective equipment should be used at all times. Trainees to gather and analyze data in groups.

7.3.8.2 Information Sheet No7/LO7

Introduction

This learning outcome covers monitoring and evaluating activities, gathering and considering feedback from stakeholders based on consultations, analyzing it based on evaluation requirements and submitting recommendations based on findings. The unit also deals with establishing management support systems as well as monitoring and reporting environmental incidents to concerned authorities. This learning outcome will provide essential skills and knowledge for monitoring and evaluating activities, gathering and considering feedback from stakeholders based on consultations, analyzing it based on evaluation requirements and submitting recommendations based on findings.

Definition of key terms

Environmental protection: It is any practice to maintain or restore the quality of natural environment by individuals, organizations and government based on policies and procedures.

Monitoring: This is the ongoing assessment of project progress towards achieving set targets and goals.

Evaluation Periodic: It is analysis of the efficiency, impacts and significance of either a project’s completed actions (or ongoing activities).

Management support systems: They are used to provide input to the implementation of ongoing activities, to inform decision making processes.

Stakeholders: These are people who are directly or indirectly affected by the development of a project/ program.

Content/procedures/methods/illustrations

7.1 Activities are periodically monitored and evaluated according to the objectives of the environmental program

Monitoring and Evaluation

Monitoring and evaluation involves collection and analysis of data of a program while it is ongoing(monitoring), and periodic assessment of program that might be conducted internally or by external evaluators (evaluation).monitoring ensures figuring out new strategies and actions needed to be taken to ensure progress towards the most important results.it also involves watching the progress of a program against time, resources and performance schedulers while the program is ongoing so as to identify the lagging areas requiring timely attention and action. Evaluation helps to understand the worth, quality, significance, amount, degree or condition of any intervention desired to tackle a social problem. Monitoring and evaluation are therefore important to assess program results, improve project management and planning to understand different stakeholder's perspective and ensure accountability. Hence it is important first to determine the programs that need to be assessed, over what time period and whether it is an ongoing activity which requires monitoring or a completed activity that requires evaluation.

7.2 Feedback from stakeholders are gathered and considered in proposing enhancements to program based on consultations

Stakeholders Involvement

To ensure that monitoring and evaluation is relevant and efficient to the stakeholders, it is essential that their information needs are considered. Key internal and external stakeholders need to be identified. There should be careful decisions on how to involve them in the design, implementation, analysis and/or communication of findings. Various stakeholders include public/communities, private/public organizations, the government, donor agencies among others. These are individuals who will directly or indirectly be affected by the program. Clarity on aims, objectives, activities and pathways to change key issues and questions need to be identified from both internal and external sources. Some of these issues include; needed resources (human, financial, technical), management (roles and responsibilities), clarity about aims and goals, cost effectiveness and to identify; relevance/acceptability of the project to the community, the effectiveness of the project; i.e. Are you achieving for your objectives? The impact of the program on people's lives and to the contributions made to the outcomes and impacts.

In order to assess progress, the aims, objectives and pathways to change need to be clarified what you are trying to achieve and how. The aims are the final impacts of people's lives or the environment, that you wish to achieve. The desired outcomes are the objectives which are the changes needed to be made to achieve the aims. The pathway to change desires how the project activities will contribute to the desired outcomes (objectives); which will in turn contribute to final impacts (aims).

7.3 Data gathered are analyzed based on evaluation requirements

The information to be collected may include:

- Quantitative data expressed in numerical terms (numbers, ratios). This information will allow answering of what, how many, questions.
- Qualitative data is expressed through descriptive prose and can address questions about 'why' and 'how' as well as perspectives, attitude and beliefs.

Information is collected through indicators need to be SMART (specific, measurable, achievable, relevant and time-bound). Qualitative information is analyzed by identifying categories, themes and data, interpreting findings in relation to research questions and watching out for the unintended results and data that does not fit the expectations. Quantitative data is analyzed by calculating simple totals, averages, percentages and statistical tests. Effective monitoring generates a solid data base for evaluations. Data, reports, analysis and decisions based on monitoring evidence should be retained with a view to making them easily accessible to evaluations.

7.4 Recommendations are submitted based on the findings

Recommendations on how the project should be effectively implemented should be recorded and documented for submission. These recommendations are based on the findings of the analyzed data. The following issues are often included in the recommendations;

- Operation mechanics and responsibilities; proper delegation of responsibilities to permit smooth operations and holding liaison meetings periodically
- Identifying and meeting staff and training needs
- Initiation of extension activities with regular resources
- Development of a work schedule to progress logistics and to streamline program

7.5 Management support systems are set/established to sustain and enhance the program

Management support systems are established to sustain and enhance the programs. Environmental management system is a powerful sustainable tool developed as part of an organizations strategy to implement environmental policies and address governmental regulations. The purpose of management system is to specify general requirements and guidelines that, when followed, should provide reasonable assurance that the outputs from the system will have minimal negative environmental impact and improved environmental performance. Management support system processes include document control, record and internal auditing. These are beneficial for ensuring a holistic approach to environmental impacts and focusing on only critical aspects and processes.

7.6 Environmental incidents are monitored and reported to concerned/proper authorities

Environmental incidents are then monitored and reported to concerned authorities such as National Environment Management Authority which is responsible for carrying out environmental and rationally utilization of environmental resources and enhance environmental protection. These concerned authorities will ensure follow-up.

Conclusion

The learning outcome dealt with monitoring activities on environmental protection/programs by periodic monitoring of activities/programs, considering stakeholders' feedback, submitting recommendations based on findings, setting management support systems as well as monitoring and recording environmental incidents. Upon completion of this learning outcome, the trainee should be able to monitor activities on environmental protection /programs, evaluate environmental incidents and set management support systems.

Further Reading

Environment regulations on monitoring and evolutions.
ISO Standards

7.3.8.3 Self-Assessment

Written Assessment

1. Which of the following is not considered monitoring?
    a) Counting the number of people trained
    b) Tracking the number of brochures disseminated
    c) Attributing changes in health outcomes to an intervention
    d) Collecting monthly data on clients served in a clinic
2. At what stage of a program should monitoring take place?
    a) At the beginning of the program
    b) At the midpoint of the program
    c) At the end of the program
    d) Throughout the life of the program
3. A good monitoring system helps answer which of the following questions?
    a) Is the project progress according to schedule
    b) Have periodic benchmarks been met?
    c) Is the project under or over achieving output targets?
    d) All of the above
4. Which of the statements is true?
    a) A gender audit is not a type of assessment
    b) Monitoring is conducted while the program is finished
    c) Evaluation is conducted while the program is ongoing
5. Define the terms
    a) Monitoring

b) Evaluation

6. What is the significance of monitoring and evaluation on a program?
7. State the importance of stakeholder involvement in monitoring and evaluation.
8. How is data analyzed in monitoring and evaluation?
9. State the relevance of authorities such as NEMA in environmental protection in regard to monitoring and evaluation.

Oral Assessment

Distinguish between monitoring and evaluation

Practical Assessment

NEMA is undertaking a clean-up on the Nairobi River. Develop a monitoring and evaluation plan for the project.

7.3.8.4 Tools, Equipment, Supplies and Materials

- Standards operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Environmental Management and Coordination Act 1999
- Machine/equipment manufacturers specifications and instructions
- Personal Protective Equipment (PPE)
- ISO standards

7.3.8.5 References

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Peoples-Shep, M.D, Rogers, M.M. & Finerty, E.J. (1990). *Monitoring Progress towards Achievement of Objectives.* Chapel Hill, NC: University of North Carolina at Chapel Hill

United Nations Development Programme Evaluation Office-Handbook on Monitoring and Evaluating for results

7.3.9 Learning Outcome No. 8: Analyze resource use

7.3.9.1 Learning Activities

Learning Outcome No. 8: Analyze resource use	
Learning Activities 	**Special Instructions**
8.1. Identify all resource consuming processes. 8.2. Determine quantity and nature of resource consumed. 8.3. Analyze resource flow through different parts of the process. 8.4. Submit recommendation based on the findings. 8.5. Classify wastes for possible source of resources.	Group discussion on resource consumption and flow

7.3.9.2 Information Sheet No7/LO8 Analyze resource use

Introduction

This learning outcome covers identification of resource consuming processes, determination of quality and nature of resource flow through different parts of the process and classification of wastes for possible source of resources.

Definition of key terms

Resource use: This is the consumption or utilization of raw materials such as water, soil, air, biodiversity and land to satisfy our needs such as recreation, energy, food and manufacture products.

Resource: A resource is a source of supply mostly comprised of a part of earth that is valued by humans and from which a benefit is derived.

Biotic resources: These are resources that come from living things or organic materials. Examples, include plants and animals.

Abiotic resources: These are resources that come from non-living and inorganic materials, examples include air, water and sunlight.

Environmental Management System (EMS): This is a framework of processes and practices that enable an organization reduce its environmental impacts and increase efficiency by training personnel, monitoring and generating inputs.

Content/procedures/methods/illustrations

1.1 All resource consuming processes are identified

A resource is a source or supply mostly comprised of a part of earth that is valued by humans and from which a benefit is derived. All-natural resources fall under two main categories namely; renewable and non-renewable resources.

Renewable resources

These are resources that are available consistently and can be reasonably replaced or recovered. Examples include; water, air and vegetation. Replacing these resources is possible but the time taken to replenish them might be very long. Sustainable use of these resources is encouraged because they might be depleted and degraded beyond levels that replacing them will be difficult. The renewable raw materials that come from living things namely animals and trees are termed as biotic renewable resources while those that come from non-living things such as sun, water and wind are termed as abiotic renewable resources.

Non-renewable resources

These are resources that cannot simply substituted or recovered once they have been consumed or utilized. Examples of such natural resources include fossil fuels and minerals. These resources exist in food quantities and their regeneration rate is lower than their exploitation rate. The non-renewable materials that come from living things such as fossil fuels are known as biotic non-renewable resources while those that come from non-living things such as rocks and soil are known as abiotic non-renewable resources.

Resources consumption

Resource use is the consumption or utilization of raw materials such as soil, air, biodiversity and land to satisfy our needs such as recreation, energy, food and manufacture of products.

8.2 Quantity and nature of resource consumed is determined

Standards that determine resource use

Environmental Management System: This is a framework of processes and practices that enable an organization reduce its environmental impacts and increase efficiency by training personnel, monitoring and generating inputs. Basic components of an EMS include the following;

- Reviewing the organization’s environmental goals
- Analyzing its environmental impacts and legal requirements
- Setting environmental impacts and legal requirements
- Establishing programs to meet these objectives and targets
- Monitoring and measuring progress in achieving the objectives
- Ensuring employees’ environmental awareness and competence
- Reviewing progress of the EMS and making improvements

ISO 14001 - Environmental Management Systems

This standard now emphasizes life cycle analysis in the new 2015 version. It also encourages risk analysis along the supply chain. It allows more sustainable management of companies and is an important tool in controlling the impacts of the organizations. Approaches in this family of standards include, audits, communication, labelling and life cycle analysis as well as environmental challenges such as climate change. ISO 14001:2015 specifies the requirements for an environmental management system that an organization can use to enhance its environmental performance. It is intended for use by an organization seeking to manage its environmental responsibilities in a systematic manner that contributes to the environmental pillar of sustainability. It helps an organization achieve the intended outcomes at its environmental management system, which provide value for the environment, the organization itself and interested parties. Consistent with the organization's environmental policy, the intended outcomes of an environmental management system include;

- Enhancement of environmental performance
- Fulfilment of compliance obligations
- Achievement of environmental objectives

Other standards that are critical to resource use include ISO 20400 and ISO 50001

ISO 20400 – Sustainable Environment

Although not a requirement standard, this standard establishes very useful guidelines for the definition of purchasing management procedures that stimulate the circular economy. It is precisely in the purchase s management that the decision-making process is concentered on which way to going the acquisition of natural resources and raw materials with less impact in the life cycle. By implementing ISO 20400, an organization will contribute positively to society and the economy through making sustainable purchasing decisions and encouraging suppliers and other stakeholders to do the same. The standard will help address the following issues;

- Reduce impact on the environment
- Tackle human rights
- Manage supplier relations
- Harmonize long-term global costs
- Improving purchasing performance of an organization
- Giving an organization a competitive edge

Factors to consider before using ISO 20400

- Examining buying culture
- Know your supply chain
- Thin strategically
- Get buy-in from top management

ISO 50001 – Energy Management Systems

Defines management requirements for one of the most significant environmental aspects today; energy consumption. These requirements support the management of companies in the definition of strategies that allow not only to reduce the impact of energy bills, but also to reduce consumption (acquisition of new and more efficient technologies? or to choose the origin of energy (renewable or non-renewable). It is based on the management system model of continual improvement. This makes it easier for organizations to integrate energy management into their overall efforts to improve quality and environmental management. It provides a framework of requirements for organizations to;

- Develop a policy for more efficient use of energy
- Fix targets and objectives to meet the policy
- Use data to better understand and make decisions about energy use
- Measure the results
- Review how well the policy works
- Continually improve energy management

8.3 Resource flow is analyzed through different parts of the process

Circular economy

The components of the circular economy involve re-use, sharing, repair, refurbishment and recycling to create a closed system that minimizes waste production and the use of resource input. This system replaces the end-of-life concept therefore eliminating use of toxic chemicals, waste that impair reuse and return to the biosphere. The circular economy is an efficient and environmentally friendly system for resource consumption. It achieves this by designing out waste and pollution, keeping products and materials in use are regenerating natural systems. This system aims to keep products, equipment and infrastructure in use, thus improving productivity of resources. All the waste that has been produced should become an input or byproduct or recovered resource for another industrial process for example, rice husks can be reused in the wine making process. When the rice husks are added to a basket press for making wine the piece the skin of grapes to release more tannins and provide a path for pressed juice to flow. This is an example of using a waste product from one process and reusing it in another process. The circular economy is supported by the ISO standards namely ISO 20400 sustainable procurement, ISO 14001 Environmental Management Systems and ISO 50001 Energy Management Systems.

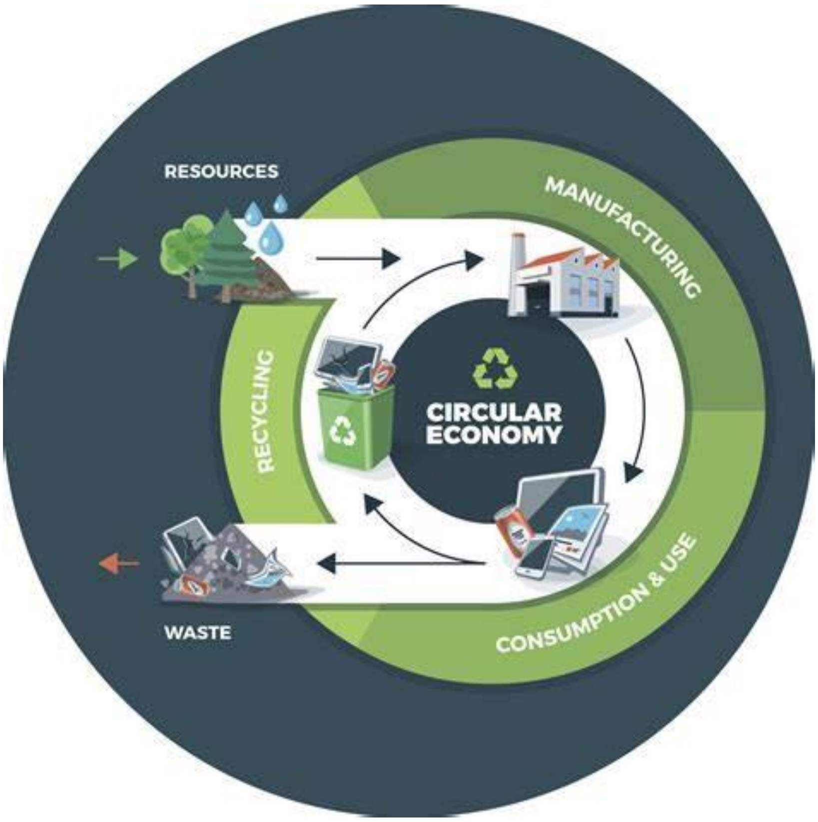

Figure 30. Circular economy cycle. Source: www.ies.be

Importance of circular economy

- It reduces waste production and prevent waste from entering the natural environment
- It saves money for companies that use by-products to manufacture other products
- It reduces the emission of greenhouse gases which are the major causes of global warming and climate change
- It reduces the pressure on the environment and its resources.
- It improves the supply of raw materials by reducing and eliminating wastage.
- The system stimulates innovation on resource use and new manufacturing processes to reuse and repurpose waste and by-products
- The new manufacturing processes provide employment and creates more jobs
- Consumers are provided with more durable and innovative products that will increase the quality of life and save money in the long-term

Linear economy

The linear economy relies on using finite resources such as metals, minerals and fossil fuels. It also relies on water and land which when depleted or degraded will be hard to restore. In this system resources are extracted, consumed and eventually waste is produced and returned back into the environment. This waste and pollution are destroying the living systems that are dependent on for resources and healthy living for plants and animals. When products are discarded, resources, energy, labor and knowledge that was invested to produce the products is wasted. This is why the linear economy has to be replaced by the circular economy. The linear system involves endless resource extraction, cannot satisfy human needs sustainably and involves endless waste dumping.

Disadvantages of the linear economy

- Production of goods is at the expense of the productivity of our ecosystems. Excessive pressure on the environment compromises the provision of essential ecosystem services such as water, air and soil
- Rate of exploitation is higher than the rate of replenishing of the resources therefore some resources will be exhausted. This will compromise the survival of the future generations
- Health and wellbeing of animals and plants is affected due to introduction of waste in the natural ecosystems. This affects food security and quality of life.
- Fluctuating of raw material prices make investment expensive and may lead to job losses. This system is not flexible in sourcing of raw material and if the supply of one raw material is compromised the whole system is affected.
- Waste produced has increased to levels that are affecting various ecosystems and the cost of rehabilitation is beyond what most countries can afford or are willing to use for restoration and rehabilitation efforts.

8.4 Wastes are classified for possible source of resources

Recycling

Recycling is the process of converting waste materials into new, reusable objects or products. Waste recycling involves the collection of waste materials and the separation and clean-up of those materials. Recycling waste means that fewer new products and consumables need to be produced, saving raw materials and reducing energy consumption. Waste can be in different forms, either solid, liquid or gas. Examples of solid waste include; domestic waste, waste tires, construction and demolition waste, biomedical waste, E-waste and sewage sludge. Recycling prevents wastage of potentially useful materials, reduces the consumption of fresh raw materials and energy usage in addition to reducing pollution.

Methods used in recycling and treating waste

Thermal treatment of waste

Thermal treatment is the combustion of waste at specific temperature with or with no air-supply as part of the process and includes waste incineration, gasification and pyrolysis. This is an environmentally sound technology that reduces the volume of waste and inerts any hazardous components. Energy can be recovered as an end product.

a) Waste incineration

Waste incineration is controlled burning of solids, liquids and gaseous waste. The technology is applicable in the management of both hazardous waste streams as well as municipal solid waste. Facilities that undertake incineration should meet the requirements in the Third Schedule of the Environmental Management Coordination (waste management) Regulations of 2006

b) Gasification

This is a process of reacting waste at high temperatures greater than (>700^0C) without combustion, with a controlled amount of oxygen and or/stream to generate useful products such as electricity, chemicals, fertilizers and natural gas. This could be an important option in landfills. Pyrolysis is a form of treatment that chemically decomposes organic materials by heat in the absence of oxygen. Pyrolysis typically occurs under pressure and at operating temperatures above 400-500 degrees Celsius. It can either be anaerobic or aerobic.

c) Water treatment

Drinking water sources are subject to contamination and require appropriate treatment. The following are steps to water treatment;

i. **Cocigulating and flocculation:** This step involves adding chemicals with a positive charge. The positive charge neutralizes the negative charge of dirt and other dissolved particles.
ii. **Sedimentation:** Solid particles settle at the bottom, due to weight. This settling process is known as sedimentation.
iii. **Filtration:** Once the solid particles have settled at the bottom of the water supply, clear water is allowed to pass through filters in order to dissolve particles in the water.
iv. **Disinfection:** After water has been filtered, a disinfectant, for example chlorine can be added to kill remaining bacteria and parasites.

Recycling of plastics

Plastic waste is recycled through pyrolysis and hydrolysis. There are three types of plastic recycling namely; primary recycling, secondary recycling and tertiary recycling.

i. **Primary recycling:** This is a physical method. It involves processing of a waste/scrap into a product with characteristics similar to those of original product. Remolding is an example of this process
ii. **Secondary recycling:** It involves processing of waste/scrap plastics into materials that have characteristics different from those of original plastics product. This process needs segregation of plastic waste so as to be successful.
iii. **Tertiary recycling:** This is a chemical method of recycling plastic waste. Tertiary recycling involves the production of basic chemicals and fuels from plastics waste using pyrolysis as a process. Pyrolysis is a form of treatment that chemically decomposes organic materials by heat in the absence of oxygen. Pyrolysis typically occurs under pressure and operating temperatures above 400-500 degrees Celsius. In anaerobic treatment, waste is broken down in the process of micro-organisms and in the absence of air while in the aerobic treatment, biological degradation of organic waste take place in the presence of oxygen.

Conclusion

This learning outcome covers, natural resources, types of natural resources, resource consuming processes, quality and nature of resources used, resource flow through different parts of the process and classification of wastes.

Further Reading

ISO Standards

1.3.9.3 Self-Assessment

Written Assessment

1. Which of the following ISO standard defines Energy Management Systems?
   a) ISO 20400
   b) ISO 14001
   c) ISO 50001
   d) ISO 17743
2. Which of the following is NOT a physical method of recycling plastic waste?
   a) Primary recycling
   b) Tertiary recycling
   c) Secondary recycling
   d) Remodeling
3. Which of the following is NOT a renewable resource?
   a) Water
   b) Fossil fuels
   c) Air
   d) Vegetation
4. Which of the following is the ISO standard for Environmental Management System?
   a) ISO 20400
   b) ISO 14001
   c) ISO 50001ISO 17743
5. Which of the following is a non-renewable resource?
   a) Minerals
   b) Sunlight
   c) Air
   d) Water
6. State four benefits of the ISO 14001 (Environmental Management Systems) to an organization?
7. Highlight five importance of circular economy?
8. Give four advantages of linear economy?

Practical Assessment

1. Observe the water purification process and write a report on the observations made.
2. In groups, come up with an idea of a company and explain how you would use the ISO 14001 (Environmental Management Systems) to comply with environmental statutory obligations.

Project

Water purification and treatment methods, latest technology and challenges in Kenya

7.3.9.4 Tools, Equipment, Supplies and Materials

- ISO 14001
- ISO 50001
- ISO 20400
- The National Solid Waste Management Strategy

7.3.9.5 References

Africa Forest Forum, (2019), *International dialogues, processes and mechanisms to climate change:* A compendium for professional and technical training in African Forestry, Technical Working Paper, p.94

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International Organization for Standardization, (2017), ISO 20400, *Sustainable Procurement*, ISO central secretariat

International Organization for Standardization, (2015), ISO 14001, *Environmental Management Systems*, ISO central secretariat

International Organization for Standardization, (2015), ISO 50001, *Energy Management Systems*, ISO central secretariat

7.3.10 Learning Outcome No. 9: Develop resource conservation plans

7.3.10.1 Learning Activities

Learning Outcome No. 9: Develop resource conservation plans	
Learning Activities 	**Special Instructions**
9.1. Determine efficiency use/conversion of resources following industry protocol 9.2. Determine causes of low efficiency of use of resources based on industry protocol 9.3. Develop plans for increasing the efficiency of resource use based on findings	Group discussion on resource efficiency

7.3.10.2 Information Sheet No7/LO9: Develop resource conservation plans

Introduction

This learning outcome offers the knowledge and skills for determining efficient/of use/conversion of resources and developing plans for increasing the efficiency of resources use based on findings.

Definition of key terms

Resource conservation: It is the protection, maintenance and restoration of natural resources such as water, soil, minerals, forests and wildlife.

Industry protocol: It is the official system of rules or procedures governing affairs of an industry.

Content/procedures/methods/illustrations

9.1 Efficiency of use/conversion of resources is determined following industry protocol

Resource conversation includes protection of natural resources because they are limited. These resources should therefore be maintained and processed. Various resources are conserved in the following ways;

Soil

- Reforestation: Planting trees helps in reducing soil erosion
- Terracing: Terraces control fast flow of water which takes away soil as it flows, usually in hilly areas
- Soil fertility: Maintenance of soil fertility is obtained by adding manure or fertilizers or crop rotation

Water

- Rain water harvesting: Process of storing rain water
- Treatment of industrial wastes before being released into water bodies
- Dams and reservoirs that store water & supply when needed. Also help in producing energy
- Glowing flora: Helps prevent flow of water & makes it sink into the soil increasing groundwater levels.

Energy sources such as coal, biomass, and natural gas

- Promoting green technology like solar panels & other renewable sources of energy
- Minimize the over-exploitation of non-renewable resources
- Creating awareness about the need for conservation

Biodiversity

- In-situ conservation: Protecting plants and animals within their natural habitats e.g. national parks, wildlife sanctuaries
- Ex-situ conservation: Protecting outside e.g. seed banks, zoo, botanical gardens

9.2 Causes of low efficiency of use of resources are determined based on industry protocol

Causes of resource depletion

Resources depletion is the consumption of a resource faster than it can be replenished. Natural resources are commonly divided between renewable resources and non-renewable resources. Major causes of resource depletion are;

a) Population growth

With the increase in population, natural resources are stretched out to meet the people's needs.

Man, overexploits natural resources to meet his needs thus ultimately leading to the scarcity of these resources in the near future.

b) Over consumption

For example, the number of motor vehicles is increasing day by day which needs a huge amount of petroleum.

Overconsumption reduces the earth's carrying capacity. Excessive unsustainable consumption will exceed the long-term carrying capacity of its environment and subsequent resource depletion, environmental degradation and reduced ecosystem health.

c) Deforestation

Due to increased population there is high consumption of products obtained from trees. This hence leads to the cutting down of trees for provision such products as firewood. Deforestation results in decline in biodiversity causing extinction of many species. The water cycle will also be affected by cutting down of trees and there will be increased soil erosion.

d) Natural calamities

These include flood and drought that adversely affect biodiversity. Earthquakes and volcanic eruptions can alter the earth's topography

e) Pollution

The effect which pollution has on natural resources is substantial. Water bodies are the most affected by pollution from toxic discharge from industries

f) Climate change

With increasing global warming, ecosystems and species are likely to be affected by the extreme weather conditions. Some regions will experience more extreme heat while others slightly cool. Flooding, drought and intense heat could result

9.3 Plans for increasing the efficiency of resource use are developed based on findings

Having a clear plan or roadmap, helps focus limited resources on priority activities. That is, the ones most likely to bring about the desired change. With the growing population and increased consumption of natural resources. It is critical to ensure conservation of the scarce resources. This is by promoting use of natural resources sparingly in order to meet the needs of the current generation without compromising the ability of the future generation to meet their own needs.

Conservation planning is a natural resource problem-solving and management process. The process integrates ecological, economic and social considerations to meet people's needs. This approach, improves natural resource management, minimizes conflict and address problems and opportunities. A conservation plan entails two things; first, it is a written record of management decisions and natural resources. Second, it contains the recommended conservation practices chosen to implement and maintain natural resources. The purpose of conservation planning is the sound use of and management of soil, water, air, plant and animal resources to prevent their degradation and ensure their sustained use and productivity while also considering related human social and economic needs.

Benefits of developing a resource conservation plan include;

- Protection of soil productivity
- Protection of water quality
- Improvement of soil fertility through crop rotation
- Management of soil moisture
- Promoting green technology such as renewable sources of energy
- Enhances open space and wildlife habitat

Steps required in development of an efficient resource conservation plan include;

- Preparing a conservation plan
- Providing technical assistance
- Providing information about possible financial assistance
- Monitoring progress and providing documentation
- Evaluating monitoring and providing re-planning technical assistance if necessary

The above requirements are based on industry protocol. Therefore, the efficiency use/conversion of resources and causes of low efficiency of use of resources are determined based on industry protocol. Plans to increase efficiency of resources can be developed based on the findings of monitoring and evaluation carried out. Recommendations provided from the monitoring and evaluation process, will help in providing better conservation and management practices on the natural resources

Conclusion

Upon completion of this learning outcome, the trainee should be able to determine the efficiency of conservation of resources and develop plans for increasing the efficiency of resources.

Further Reading

Conservation practices carried out in Kenya
Kenyan policies governing resource conservation

7.3.10.3 Self-Assessment

Written Assessment

1. The three R's to save the environment are;
    a) Reserve, Reduce, Recycle
    b) Reuse, Reserve, Reduce
    c) Reserve, Reuse, Reduce
    d) Reduce, Recycle, Reuse
2. The concept of sustainable development encourages
    a) Form of growth that meets basic needs
    b) Preservation of the resources for the need of future generation
    c) A change in all aspects of life
    d) Growth to meet current needs, preservation for the needs of future and change in all aspects of life
3. The management of natural resources should take into;
    a) A long-term perspective
    b) Environmental pollution
    c) Their equitable distribution
    d) a, b, c, and safe disposal of water
4. What is the significance of resource conservation?
5. State way to improve efficiency use of;
    a) Soil
    b) Water
    c) Wildlife

Oral Assessment

1. Define resource conservation plan
2. What are some of the human activities that affect resource conservation?

Practical Assessment

Discuss in groups how you would develop a resource conservation plan for a National Park near you

7.3.10.4 Tools, Equipment, Supplies and Materials

- Standards operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Environmental Management and Coordination Act 1999
- Machine/equipment manufacturers specifications and instructions
- Personal Protective Equipment (PPE)
- ISO standards
- Company Environmental Management Systems (EMS)

7.3.10.5 References

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CHAPTER 8: OCCUPATIONAL SAFETY AND HEALTH PRACTICES/ DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES

8.1 Introduction

Occupational safety and health practices is a unit of competency offered in TVET level 6 qualification for basic competencies. This learning outcome describes the competencies required to comply with regulatory and organizational requirements for occupational safety and health. The significance of occupational safety and health practices to TVET level 6 curriculum is to equip trainee with knowledge, skills and attitude required to identify hazards in the workplace and/or the indicators of their presence, evaluation and/or work environment measurements of OSH hazards/risk existing in the workplace, gathering of OSH issues and/or concerns, prevention and control measures such as use of PPE and contingency measures for a safe working environment.

The critical aspects of competency to be covered include; identification of hazards/risks in the workplace and/or its indicators, requests for evaluation and/or work environment measurements of OSH hazards/risk in the workplace, gathering of OSH issues and/or concerns raised by workers, identification and implementation prevention and control measures, including use of PPE (personal protective equipment) for specific hazards, recommending appropriate risk controls based on result of OSH hazard evaluation and OSH issues gathered in accordance with organization procedures. The unit of competency covers three learning outcomes. Each of the learning outcome presents; learning activities that cover performance criteria statements, thus creating opportunity for the trainees to demonstrate knowledge and skills in the occupational standards and content in the curriculum. Information sheet provides; definition of key terms, content and illustration to guide in training. The competency may be assessed through written tests, demonstration, practical assignment, interview/oral questinong and case study. Self assesssement is provided at the end of each learning outcome. Holistic assessment with other units relevant to the industry sector workplace and job role is recommended.

8.2 Performance Standard

Identify workplace hazards and risk, identify and implement appropriate control measures to hazards and risks, implement OSH programs, procedures and policies/guidelines in accordance with organization procedures.

8.3 Learning Outcomes

8.3.1 List of learning outcomes

a) Identify workplace hazards and risk
b) Identify and implement appropriate control measures to hazards and risks
c) Implement OSH programs, procedures and policies/guidelines

8.3.2 Learning Outcome No. 1: Identify workplace hazards and risk

8.3.2.1 Learning Activities

Learning Outcome No. 1: Identify workplace hazards and risk	
Learning Activities 	**Special Instructions**
1.1. Identify hazards (physical, biological, chemical, ergonomics, safety and unsafe) in the workplace and/or its indicators (increased of incidents of accidents, injuries, increased occurrence of sickness or health complaints/symptoms, common complaints of workers related to OSH, high absenteeism for work-related reasons) of its presence 1.2. Conduct evaluation and/or work environment (health audit, safety audit, work safety and health evaluation, work environment measurements of physical and chemical hazards) measurements of OSH hazards/risk existing in the workplace by authorized personnel or agency 1.3. Gather OSH issues and/or concerns (workers' experience/observance on presence of work hazards, unsafe/unhealthy administrative arrangements (prolonged work hours, no break time, constant overtime, scheduling of tasks), reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/guidelines) raised by workers	PPEs should be provided at all times

8.3.2.2 Information Sheet No8/LO1: Identify workplace hazards and risk

Introduction

This learning outcome addresses hazards as well as their indicators at work place, evaluation and work environmental measures and gathering of OSH issues and concerns at the work place as per the workplace procedures.

Definition of key terms

Hazards: It is anything (e.g. condition, situation practice or behavior) that has potential to cause harm, including injury, disease, death, environmental, property and equipment damage. It can be a thing or a situation.

Hazard identification: It is the process of examining each work area and working task for the purpose of identifying hazardous inherent in the job.

Risk: The likelihood or possibility that a risk will occur e.g. injury, illness, death, damage, may occur from exposure to hazard.

Risk control: It is taking actions to eliminate health and safety risks as far as is reasonably practicable.

Monitoring and review: These involve ongoing monitoring the hazard identified, risks assessed, risk control processes and reviewing them to make sure that they are working.

Content/procedures/methods/illustrations

1.1 Hazards identification in the workplace and/or its indicators of its presence

The workplace hazards may include the following:

- Safety hazards at workplace: this includes unsafe work place conditions that may result from confined space, excavations falling objects, gas leak, electrical fault, waste spillage, debris, poor storage of tools and materials.
- Unsafe workers behavior: This include smoking in prohibited areas, substance and alcohol use at work.
- Physical hazards: This may include radioactive vibration extreme temperatures, pressure noise illumination and temperature.
- Agronomical hazards: This includes psychological factors like excessive pressure, fatigue and varying metabolic cycles.
- Chemical hazards: They may include dust, smoke, fumes, gases and vapors.
- Biological hazards: These are hazards resulting from bacteria viruses, plants, parasites, mites mold fungi and insect.

The hazards and risk indicators may include the following;

- A high rate of increased incidents of accidents and injuries
- Increase in occurrence of sickness or health complaints and symptoms
- Common complaints of workers as aspects related to the occupation safety and health
- Cases of high absent seem for work related reasons that may affect the normal working trend

1.2 Evaluation and/or work environment measurements of OSH hazards/risk existing in the workplace is conducted by Authorized personnel or agency

The evaluation and work environmental measurement may include the following:

Health audit: This is a process by health professionals to assess, evaluate and improve care of workers in a systematic way. It measures current practice against defined standard. It forms part of health governance which aims to safeguard high quality care of workers.

Safety audit: It is used to describe an activity where a facility gets information about one or more aspects of the workplace in order to evaluate the risks levels for health and safety issues. It is a structured process where information is collected relating to the efficiency, effectiveness and reliability of a company's total health and safety management system.

Work safety: This describes procedures in place to ensure safety and health of the employee. It involves hazard identification and action according to the government standards and ongoing safety training and education for employees. The occupational safety and health issues can be gathered from workers by a number of methods. These methods include:

- Questionnaires
- Oral interviews
- By use of suggestion box

The data collected using these methods is analyzed to get the required information to facilitate site taking of the corrective actions. The concerns may concern the following aspects:

- Environmental safety
- Workplace safety
- Machine safety
- Workers welfare issues
- Compensation issues in case of injury or loss of life
- Operational hours and maximum exposure limit

1.3 OSH issues and/or concerns raised by workers are gathered.

When workplace hazards have been identified and controls introduced, top management, supervisors, safety and health personnel, employees, and employee representatives should be provided with training that describes these control measures. Standards developed by the Occupational Safety and Health Administration require the employer to train employees in the safety and health aspects of their jobs initially upon assignment, and/or annually. Many of these OSHA standards make it the employer's responsibility to limit certain job assignments to employees who are "certified," "competent," or "qualified" meaning that they have had special previous training, in or out of the workplace. The term "designated" personnel means selected or assigned by the employer or the employer's representative as being qualified to perform specific duties. Training records provide evidence of the employer's good faith and compliance with OSHA standards. Documentation can also supply an answer to one of the first questions an accident investigator will ask: "Was the injured employee trained to do the job?" Many researchers and studies conclude that those who are new on the job have a higher rate of accidents and injuries than more experienced workers. To help employers, safety and health professionals, training directors, and consultants can help fulfill OSHA training related requirements.

Conclusion

In summary, this learning outcome covered aspects concerning hazards in the work place as well as their indication, evaluation of the work environment and the OSH issues or observed by the workers and how they can be addressed.

Further Reading

Occupational Safety and Health Act (OSHA) 2007

Factory Act 2002

8.3.2.3 Self-Assessment

Written Assessment

1. Which of the following is not a chemical hazard?
   a) Vapor
   b) Fumes
   c) Gases
   d) Illumination
2. Identify which is not a psychological hazard.
   a) Fatigue
   b) Memory
   c) Workout cycle
   d) Personal relationship
3. Which of the following is a physical hazard?
   a) Vibration
   b) Electrical fault
   c) Alcohol abuse
   d) Gas leaks
4. Define the following terms
   a) Hazard
   b) Risk
5. Describe briefly the following terms as used in OSH
   a) Hazard identification
   b) Health auditing
   c) Safety audit
6. Differentiate between physical and chemical hazards at the work place.
7. Describe briefly the ergonomic factors that can cause hazards.

Oral Assessment

1. Mention any three unsafe worker behavior.
2. Mention any five safety hazards at the work place.
3. Mention any three indicators of hazards
4. Mention any two ways of evaluating the work place environment

Practical Assessment

1. Trainees to identify any health hazards in the workshops as well as in the compound
2. Trainees to gather information on any precautionary measure that can be used to address the above hazards.

8.3.2.4 Tools, Equipment, Supplies and Materials

- Standard operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Machine/equipment manufacturer's specifications and instructions
- Personal Protective Equipment (PPE)

1.3.2.5 References

Government of Kenya (2007). *Occupational Safety and Health Act.* Government Press. Nairobi. Kenya

https://www.osha.gov/shpguidelines/hazard-Identification.html

8.3.3 Learning Outcome No. 2: Identify and implement appropriate control measures to hazards and risks

8.3.3.1 Learning Activities

Learning Outcome No. 2: Identify and implement appropriate control measures to hazards and risks	
Learning Activities 	**Special Instructions**
2.1. Identify and implement prevention and control measures (isolate the hazard, substitute the hazard with a safer alternative, use administrative controls to reduce the risk, use engineering controls to reduce the risk, use personal protective equipment, safety, health and work environment evaluation, periodic and/or special medical examinations of workers), including use of safety gears / PPE (personal protective equipment) for specific hazards. 2.2. Recommend appropriate risk controls (isolate the hazard from anyone who could be harmed, substitute the hazard with a safer alternative, use administrative controls to reduce the risk, use engineering controls to reduce the risk, use personal protective equipment) based on result of OSH hazard evaluation. 2.3. Recognize and establish contingency measures (evacuation, isolation, decontamination, emergency personnel) including emergency procedures (fire drill, earthquake drill, basic life support/CPR, first aid, spillage control, decontamination of chemical and toxic, disaster preparedness/management, set of fire-extinguisher) during workplace incidents and emergencies are in accordance with organization procedures.	PPEs should be provided at all times

8.3.3.2 Information Sheet No8/LO2: Identify and implement appropriate control measures to hazards and risks

Introduction

This learning outcome focuses on addressing prevention and control measures to hazards including the use of PPEs, taking appropriate risk controls as well as contingency measures recognized and re-established in accordance to the workplace procedures.

Definition of key terms

Hazard prevention and control: These are efforts geared towards protecting workers from the work place hazards i.e. help avoid injuries, illness, and incidents, minimize or eliminate safety and health risk and help provide workers with safe and healthful working conditions.

Personal protective equipment: It is one of the importance means to protect the wearer from hazards in the work place. It is the last frontier of the wearer from worksite hazards and should be selected based on the job scope and intended protection.

Content/Procedures/Methods/Illustrations

2.1 Prevention and control measures for specific hazards identified and implemented

There are six major control measures to hazards. They include:

- Use of personal protective equipment
- Elimination
- Substitution
- Isolation
- Engineering controls
- Administrative controls

Elimination

It is often cheaper and more practical to eliminate hazards at the design or planning stage of a product, process or place used for work. In these early phases, there is greater scope to design out hazards or incorporate risk control measures that are compatible with the original design and functional requirements. For example, remove trip hazards on the floor or dispose of unwanted chemicals. This involves getting rid of dangerous machine, tool and equipment away from the work environment.

Substitution

If it is not reasonably practical to eliminate the hazards and associated risks, you should minimize the risk. For example, today the dangers associated with asbestos are well known and there are numerous alternatives to asbestos products currently on the market including cellulose fiber, thermoset plastic flour or polyethane foams. Replacing solvent- based paints with water-based ones is also a better alternative. In this case, the faulty machine is/tool/equipment is replaced by safe ones.

Isolate the hazard from people

This involves physically separating the source of harm from people by distance or using barriers. For example, introducing a strict work area, using guard rails around exposed edges and holes in the floors, using remote control systems to operate machinery, enclosing a noisy process from a person and storing chemicals in a fume cabinet.

Engineering control

An engineering control is a control measure that is physical in nature, including a mechanical device or process. For example, this can be done through the use of machine guards, effective ventilation systems and setting work rates on a roster to reduce fatigue. Involves incorporating engineering design to reduce accidents and hazards e.g. having guards.

Administrative control

Administrative controls are work methods or procedures that are designed to minimize exposure to a hazard. Establish appropriate procedures and safe work practices such as; limit exposure time to a hazardous task so that fewer employees are exposed, routine maintenance and housekeeping procedures, training on hazards and correct work methods and use signs to warn people of a hazard. This involves training and proper sensitization on how to use equipment safely, OSH related topics. Issue warming signs and ensure work operation shift.

Use Personal Protective Equipment (PPE)

Provide suitable and properly maintained PPE and ensure employees are trained in its proper use. Examples include gloves, earplugs, face masks, hard hats, gloves, aprons and protective eyewear. PPE limits exposure to harmful effects of a hazard but only if workers wear and use the PPE correctly.

2.2 Appropriate risk controls based on result of OSH hazard evaluation is recommended.

Risk control is the set of methods by which firms evaluate potential losses and take action to reduce or eliminate such threats. It is a technique that utilizes findings from risk assessments, which involve identifying potential risk factors in a company's operations, such as technical and non-technical aspects of the business, financial policies and other issues that may affect the well-being of the firm. It also implements proactive changes to reduce risk in these areas. Risk control thus helps companies limit lost assets and income. The following aspects can be considered in risk control:

- Isolate the hazard from anyone who could be harmed i.e. keep the machine in a closed room and operate it remotely.
- Use design control to eliminate the risk.
- Use personal protective equipment to control the risk.

Prevention and control measures outlined previously are the methods used in risk control.

1.3.1 Contingency measures during workplace incidents and emergencies are recognized and established in accordance with organization procedures

Contingency measures

In relation to occupational health and safety, contingency measures refer to plans involving suitable immediate action for responding to accidental hazards and emergencies. It refers to security measure put forward for emergence response to reduce the effects of system disruption and increase system efficiency. The contingency measures include:

i. **Evacuation**: This involves removal of operatives from the scene of hazard/accident to prevent the situation worsening. It also involves further medical attention i.e. evacuation to a medical facility.
ii. **Isolation**: The affected victims can be isolated to give a secrecy and more attention to prevent spread.

iii. **Decontamination**: In the event of exposure to chemical hazards, where the level of contamination can be controlled then it can be done.

iv. **Engage emergence personnel**: This involves getting an expert where possible to address situation.

Emergence procedures

The following procedures can be used to address hazards:

- Fire drill
- First aid
- Use of fire extinguishers
- Basic life support
- Earth quakes drill where applicable
- Disaster management/preparedness

Incidences and emergencies

The following incidents and emergencies should be addressed and identified where applicable:

- Fire
- Leaks
- Equipment/machine accidents
- Explosion
- Injury of personnel
- Structural support
- Toxic emission

Conclusion

In summary, this learning outcome addressed hazards, prevention and control measures, appropriate risk controls, contingency measures, emergency procedures as well as incidents in the work place in accordance with the workplace procedures.

Further Reading

Occupational safety and health safety guidelines

OSHA 2007

8.3.3.3 Self-Assessment

Written assessment

1. Which of the following is not a hazard control measure?
    a) First aid
    b) Evacuation
    c) Substitution
2. Which one of the following is not a contingency measure in controlling hazards?
    a) Engage personnel
    b) Decontamination
    c) Explosions

d) Isolation

3. Identify which one is not a risk or incidence
    a) Toxic emissions
    b) Leaks
    c) Design control
    d) Structural collapse
4. Describe the term hazard prevention citing relevant example as used in OSH
5. Describe briefly the following hazard control measures
    a) Engineering controls
    b) Elimination
    c) Substitution
6. Explain citing relevant examples the contingency measure to address hazards
7. Outline any five incidents and emergencies that can arise in a work place
8. Describe briefly any five emerging measures to address safety standards.

Oral Assessment

1. Mention any four personal safety equipment
2. Mention any five hazards in a work environment
3. Mention any two contingency measures to be taken into consideration to be able to prevent and control hazards

8.3.3.4 Tools, Equipment, Supplies and Materials

- Standard operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Machine/equipment manufacturer's specifications and instructions
- Personal Protective Equipment (PPE)

1.3.3.5 References

Government of Kenya (2007). *Occupational Safety and Health Act.* Government Press. Nairobi. Kenya

https://www.investopedia.com/terms/r/risk-control.asp

http://phnews.org.au/six-steps-to-control-workplace-hazards/

8.3.4 Learning Outcome No.3: Implement OSH programs, procedures and policies/guidelines

8.3.4.1 Learning Activities

Learning Outcome No. 3: Implement OSH programs, procedures and policies/guidelines	
Learning Activities 	**Special Instructions**
3.1. Provide Information to work team about company OSH program procedures and policies/guidelines 3.2. Participate in implementation of OSH procedures and policies/guidelines 3.3. Train and advise team members on OSH standards and procedures 3.4. Implement procedures for maintaining OSH-related records (medical/health records, incident/accident reports, sickness notifications/sick leave application, OSH-related trainings obtained)	PPEs should be provided at all times Group discussions on OSH standards and procedures

8.3.4.2 Information Sheet No8/LO3: Implement OSH programs, procedures and policies/guidelines

Introduction

This learning outcome address the implementation of OSH programs, procedures, policy and guidelines as well as the OSH related records as per the workplace procedures.

Definition of key terms

OSH procedures and policies: They are guidelines used to direct all employees to work safely and prevent injury, to themselves and others.

OSH standards: OSH standards are rules that describe the methods that employers must use to protect their employees from hazards. These standards limit the number of hazards workers can be exposed to, require the use of certain safe practices and equipment, and require employers to monitor hazards and keep records of workplace injuries and illnesses.

OSH-related records: They are documentations that keep track on various OSH processes.

Content/Procedures/Methods/Illustrations

1.1 Information to work team about company OSH program, procedures and policies/guidelines are provided

The purpose of the Health and Safety policies and procedures is to guide and direct all employees to work safely and prevent injury, to themselves and others. All employees are encouraged to participate in developing, implementing, and enforcing Health and Safety policies and procedures. The following OSH programs can be considered:

a) **Medical surveillance**: This is a planned plan of periodic examination which may include the following:
   - Biological effect monitoring
   - Clinical examination

b) **Periodic occupational health surveillance**: This consists of examination conducted periodically to identify vulnerable groups among the staff which could be of immense value to prevention

c) **Management of occupational exposure**: This means amount of work place agent that has reached and individual worker.

3.2 Implementation of OSH procedures and policies/guidelines are participated

The occupation health and safety address the following priorities:

i. Conducting workplace audits and risk assessment at facility level.
ii. Oversee compliance of facility design and building codes for new construction
iii. Support the procurement systems for quality and adequate PPEs and other OSH supply within the facility
iv. Review causes of/for rehabilitation and compensation of injured health sector employees
v. The management of incidents and emergencies arising within the health facility.
vi. Ensuring new staff go through the induction and orientation on OSH issues.
vii. Publicizing, promoting and enforcing the guidelines and procedures among the staff they supervise.
viii. To coordinate capacity building of the facility level staff and disseminate policy guidelines at the facility level

3.3 Team members are trained and advised on OSH standards and procedures

Effective training and education can be provided outside a formal classroom setting. Peer-to-peer training, on-the-job training, and worksite demonstrations can be effective in conveying safety concepts, ensuring understanding of hazards and their controls, and promoting good work practices.

Duties of Workers

One of your most important responsibilities is to protect your Health and Safety as well as that of your co-workers.

What the law requires

Workplaces under the jurisdiction are governed by your provincial legislation. The legislation places duties on owners, employers, workers, suppliers, the self-employed and contractors, to establish and maintain safe and healthy working conditions.

The legislation is administered by your provincial legislation. Your officials are responsible for monitoring compliance.

Duties of your Employer

Your employer is responsible for providing you with safe and healthy working conditions. This includes a duty to protect you from violence, discrimination and harassment. You must cooperate with your employer in making your workplace safe and healthy. Your Responsibilities You must also comply with the legislation. You have responsibilities to:

- Protect your own Health and Safety and that of your co-workers
- Not initiate or participate in the harassment of another worker
- Co-operate with your supervisor and anyone else with duties under the legislation

Your Rights

The legislation gives your three rights:

- The right to know the hazards at work and how to control them
- The right to participate in Occupational Health and Safety
- The right to refuse work which you believe to be unusually dangerous.

You may not be punished for using these rights. An employer can be required to legally justify any action taken against a worker who is active in Health and Safety.

Your Right to Know

The standards require your employer to provide you with all the information you need to control the hazards you face at work. For example, chemicals at the workplace must be listed. You are entitled to review this list. Your employer must train you to safely handle the chemicals you will work with. If you are inexperienced, you must receive an orientation.

Your Right to Participate

You have the right to become involved in occupational Health and Safety. The legislation encourages employers and workers to work together to maintain a healthy and safe workplace. Employers at workplaces with (ten or more – consult your provincial act) workers must set up an occupational health committee of employer and worker representatives.

Your Right to Refuse

You have the right to refuse to do work which you believe is unusually dangerous. The unusual danger may be to you or to anyone else.

3.4 Procedures for maintaining OSH-related records are implemented

The OSH documentations may include

a) **Accident reporting**: This includes investigation and analyzing incidents, underlying deficiency and renew the incident reports.
b) **Dangerous occurrences**: The OSH committee shall maintain register for such occurrences in the format give in the OSH regulations.
c) **Incident/Near miss**: The workers shall report any accident and near miss within the work area. The Osh committee shall maintain a register and the occurrence should be investigated.

d) **Notifiable diseases**: The OSH committee shall maintain a register of occupational disease that has been reported.

Conclusion

In summary, this learning outcome addressed aspects to do with OSH programs, policies, standards and related OSH records as applicable to the workplace.

Further Reading

OSHA 2007
Occupational safety and health safety guidelines
ISO standards

8.3.4.3 Self-Assessment

Written Assessment

1. What does OSHS not deal with?
    a) Provision of PPE
    b) Employability
    c) First Aid training
    d) Workplace safety
2. Which of the following is not an OSH related record?
    a) Accident report
    b) Hazard report
    c) Work permit
    d) Incident register
3. The occupation health and safety address the following priorities except
    a) Workplace audits
    b) Risk assessment
    c) first aid training
    d) Employees attendance
4. Differentiate between OSHS and OSHA.
5. Describe briefly the following OSH terms giving relevant examples
    a) Medical surveillance
    b) Periodical occupational health surveillance
    c) Management of occupational exposure
6. Highlight four OSH policies and standards in relation in to the workplace procedures
7. Describe briefly any three OSH related records.

Project

Do an assessment of the OSHS been implemented in a neighboring industry

8.3.4.4 Tools, Equipment, Supplies and Materials

- Standard operating and/or other workplace procedures manuals
- Specific job procedures manuals
- Machine/equipment manufacturer's specifications and instructions
- Personal Protective Equipment (PPE)

1.3.4.4 References

Government of Kenya (2007). *Occupational Safety and Health Act.* Government Press. Nairobi. Kenya

https://www.osha.gov/shpguidelines/education-training.html

https://www.wrla.org/sites/wrla_01/files/health_and_safety_manual_sample.pdf