



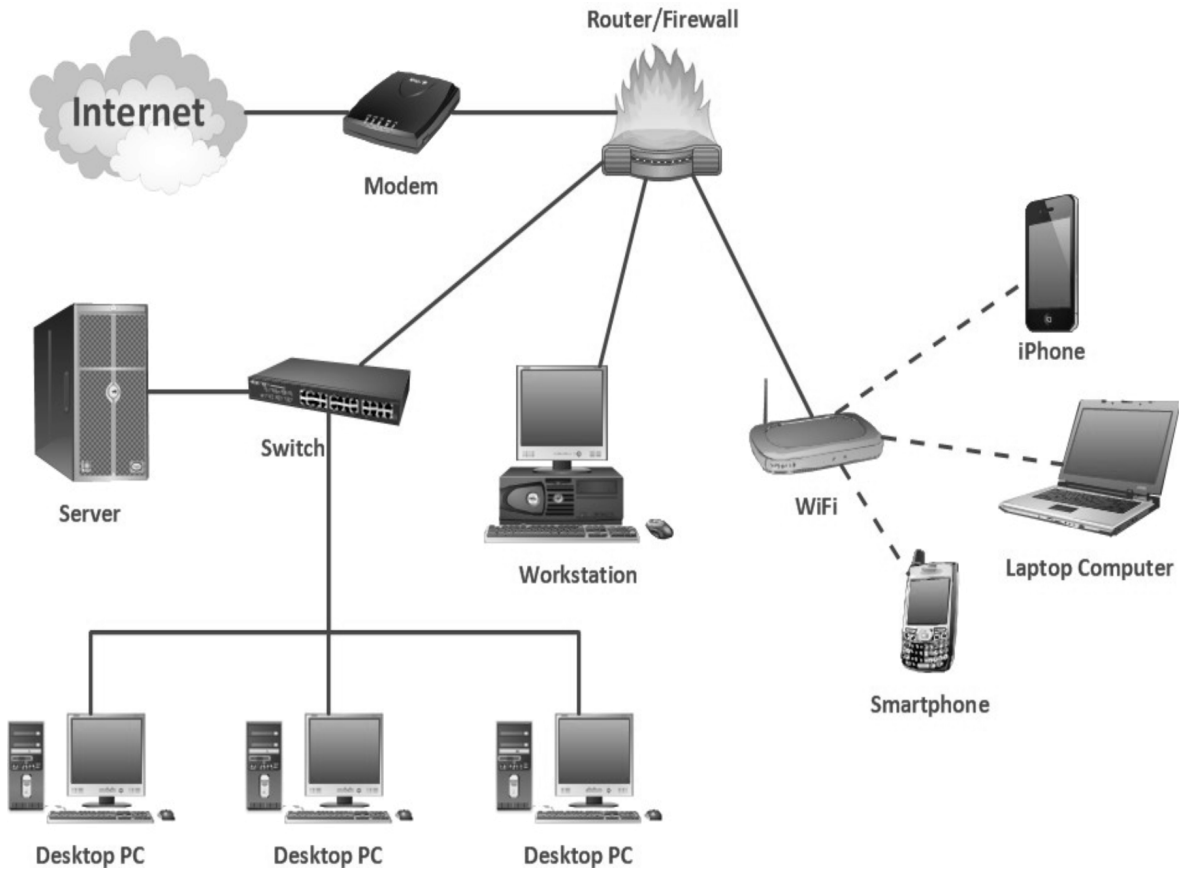
South Sudan



Secondary ICT

Information Communication Technology Teacher's Guide

2



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South Sudan

SECONDARY
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ICT TEACHER'S GUIDE



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UNIT 1: COMPUTER NETWORKS

What the learners are supposed to Learn

The learners should share what they already know about computer networking, intranet and internet, file sharing and network application software such as MS Outlook.

In small groups and individually they should develop an understanding that a network is a set of computers connected together to share data, facilities and other resources.

They should learn individually and in small groups how to manage contacts, set up common events in the calendar (meeting schedules), create task lists and share common folders and files in an intranet environment (e.g. Microsoft Outlook).

As a class they should understand the opportunities that computer networks offer in communications and collaboration, and the risks associated with it. They should understand and contrast internet and intranet, describe how file sharing works in an intranet set up, and explain how network application works.

Key inquiry questions

- Why are computer networks important now and in the future?
- Why do organizations and institutions develop and depend upon intranet?
- How does file sharing work and how can the advantages be developed and risks reduced?

How can a network application be used to ease resource sharing?

Learning outcomes

Knowledge and understanding	Skills	Attitudes
<ul style="list-style-type: none"> • Understand computer networks / intranets and know how to use them to communicate and to share files e.g. Microsoft Outlook 	<ul style="list-style-type: none"> • Carry out resource sharing in a network • Contrast different computer networks • Use network applications (Microsoft Outlook) 	<ul style="list-style-type: none"> • Appreciate the importance of intranet in an organization • Appreciate the benefits of resource sharing • Value undertaking risk assessment

Contribution to the competencies:

Critical thinking: in optimizing resource sharing

Communication: in groups and in the use of networking applications

Co-operation: in group work and in sharing facilities and resources.

Links to other subjects:

All subjects: Communication and resource sharing

Networks are everywhere. One can hardly do anything with data that does not involve a network. Like the human networks that we are all part of, computer networks let us share information and resources.

In introducing this unit, learners should share what they already know about computer networks. After the learners have shared then the teacher can introduce what computer networks are, the uses of computer networks and the standards that a basic computer network should meet

History of computernetworks.

Guide the learners through the various stages that computer networks have undergone through in order to be where they are today. Emphasis on the fact that computer networks are still developing and what we know to be computer networks today is bound to change in a few years due to advancement in technology.

Activity 1

The teacher the learners in finding out in details how computer networks have evolved through various stages in history.

Where available, use computers to research and encourage the learners to share with the rest of the class.

Benefits of computer networks.

This is an important area to highlight to the learners. This will help them understand how applicable the computer networks are in their day to day lives. By learners understanding the benefits of computer networks then learners will find it easier to learn about computer networks.

Activity 2

The teacher to divide the learners in groups and guide them in identifying: a) major advantages of using computer networks.
b) major disadvantages of using computer networks.

Some expected answers from the learners may include:

Disadvantages

a) It lacks independence.

Computer networking involves a process that is operated using computers, so people will be relying more of computer work, instead of exerting an effort for their tasks at hand. Aside from this, they will be dependent on the main file server, which means that, if it breaks down, the system would become useless, making users idle.

b) It poses security difficulties.

Because there would be a huge number of people who would be using a computer network to get and share some of their files and resources, a certain user's security would be always at risk. There might even be illegal activities that would occur, which you need to be careful about and aware of.

c) It lacks robustness.

As previously stated, if a computer network's main server breaks down, the entire system would become useless. Also, if it has a bridging device or a central linking server that fails, the entire network would also come to a standstill. To deal with these problems, huge networks should have a powerful computer to serve as file server to make setting up and maintaining the network easier.

d) It allows for more presence of computer viruses and malware.

There would be instances that stored files are corrupt due to computer viruses. Thus, network administrators should conduct regular check-ups on the system, and the stored files at the same time.

e) **Its light policing usage promotes negative acts.**

It has been observed that providing users with internet connectivity has fostered undesirable behavior among them. Considering that the web is a minefield of distractions – online games, humor sites and even porn sites – workers could be tempted during their work hours. The huge network of machines could also encourage them to engage in illicit practices, such as instant messaging and file sharing, instead of working on work-related matters. While many organizations draw up certain policies on this, they have proven difficult to enforce and even engendered resentment from employees.

f) **It requires an efficient handler.**

For a computer network to work efficiently and optimally, it requires high technical skills and know-how of its operations and administration. A person just having basic skills cannot do this job. Take note that the responsibility to handle such a system is high, as allotting permissions and passwords can be daunting. Similarly, network configuration and connection is very tedious and cannot be done by an average technician who does not have advanced knowledge.

g) **It requires an expensive set-up.**

Though computer networks are said to be an inexpensive system when it is already running, its initial set up cost can still be high depending on the number of computers to be connected. Expensive devices, such as routers, switches, hubs, etc., can add up to the cost. Aside from these, it would also need network interface cards (NICs) for workstations in case they are not built in.

The teacher to accept any other relevant answers presented by the learners.

Advantages

- **Resource sharing**-Networks are capable of sharing one resource, such as a printer, for several computers. This allows many separate computers to access a single network resource. In the long run this saves money and space for the organization.
- **Data sharing** - Computer networks makes it easy to share documents. The type of server that stores files is called a file server. Data can be in the form of text, images, numbers or characters.
- **Cost efficiency** - Computer networking helps one to use software products available in the market by installing them in the server and sharing them among various workstations hence saving cost.
- **Flexibility** - Computer networking is known to be flexible as it gives users the chance to explore vital things like software without affecting their functionality. It also allows people to have the accessibility to all information they need to get and also share.
- **Management of data**- Computer networking helps in centralization of data from all the user systems to one system where it can be managed in an easier and better way.

1.1 Types of computer networks

Personal Area Network (PAN)

Learners should be able to understand why this type of network is called a personal area network. The teacher should guide the learner to identify some of the components that make up the personal area network. The learner should also be able to identify areas where these types of networks are applicable.

Activity 3

The teacher to assist the learners in creating a personal area network in the class using modem with either mobile phones or a computer.

Local Area Network. (LAN)

The teacher to introduce what a LAN is. The teacher to guide the learners to understand where this type of network is applicable and the geographical area it covers. The teacher should also emphasis to the learners how this type of network is created and also state the major differences between a LAN and a WAN.

The teacher should go further to guide the learners in understanding the advantages and disadvantages of this type of network.

Activity 4

The teacher to divide the learners in pairs where they are to find out the similarities and differences of WAN and LAN. Learners to present their findings to the other students.

Wide Area Network. (WAN)

The teacher to introduce what a WAN is, what it is made up of and the geographical area it covers. The teacher should give an example of WAN example the internet. The teacher to further put emphasis on the importance of WAN and also their major shortcomings.

Activity 5

The teacher to divide learners in groups and ensure that they are able to access the internet or any other research material. The learners should then research about why WAN is not suitable for use in the rural areas of south Sudan. Let the learners write down their findings.

Metropolitan Area Network (MAN)

The teacher to introduce what MAN is, what it constitutes and the geographical area that it covers. The teacher to go ahead and emphasis on the advantages and disadvantages of MAN.

Wireless networks.

Wireless networks are computer networks that are not connected by cables of any kind. The use of a wireless network enables enterprises to avoid the costly process of introducing cables into buildings or as a connection between different equipment locations. Wireless networks use radio waves to connect devices such as laptops to the Internet,

The teacher to introduce what wireless networks are. Learners should be able to understand why wireless networks are gaining popularity. The teacher should go ahead to breakdown wireless networks into three i.e. system interconnections, wireless LANs and wireless WANs. The learners should be able to distinguish between the three.

Exercise 1.

1. Router -to provide a connection between the PC and phone line/LAN.

Modem - allows the computer to send and receive data over phone lines.

Network Interface Card - connects to a LAN that provides internet access.

Wireless adaptor or card - connect to Wireless Access Point.

2. a) two or more computers linked together communicating or sharing resources

- A network that is restricted to a single site, building or campus

b) Star -suitable diagram.

- Ring - suitable diagram.

- Bus -suitable diagram.

NB The star ring and bus diagrams are in the learner's book.

c) Router • Firewall • Modem • (Web) browser software • email software • anti-spyware or anti-virus software.

3a) • centralization of services example software installation, backups, printing, security, monitoring etc.

- Servers provide centralized storage (of data).

- Servers provide centralized storage of programs.

- More flexible use of equipment e.g. employees able to use any available computer

- improved communications e.g. internal email provides a record of communications similarly it reduces the need to meet in real time as staff may frequently be out of the office etc.

b) Difference in reach, LAN is restricted to a single site, building, campus while WAN covers more than one site or geographically remote locations.

- Difference in type of connection, LAN can be connected via direct link or physical link while WAN connection is via satellite link

- Difference in speed of transmission of data, LAN has high transmission speed i.e. 10Mb, 100Mb etc. while WAN is generally slower i.e. 1Mb typical broadband.

1.2 Networks topology

A network topology is the pattern in which nodes i.e., computers, printers, routers or other devices are connected to a local area network (LAN) or other network via links e.g., twisted pair copper wire cable or optical fiber cable.

There are four principal topologies used in LANs: bus, ring, star and mesh. The most widely used of these is bus, because it is employed by Ethernet, which is the dominant LAN architecture. In a bus topology all devices are connected to a central cable, called the bus or backbone. This topology is relatively inexpensive and easy to install for small networks.

In a ring topology each device is connected directly to two other devices, one on either side of it, to form a closed loop. This topology is relatively expensive and difficult to install, but it offers high bandwidth and can span large distances. A variation is the token ring, in which signals travel in only one direction around the loop, carried by a token from node to node.

In a star topology all devices are connected directly to a central computer or server. Such networks are relatively easy to install and manage, but bottlenecks can occur because all data must pass through the central device.

The mesh topology can be either a full mesh or a partial mesh. In the former, each computer is connected directly to each of the others. In the latter, some computers are connected to most of the others, and some are connected only to those other nodes with which they exchange the most data.

The several basic network topologies can be combined in various ways to form hybrid topologies, such as a ring-star network or a tree network. The latter consists of two or more star networks connected to a linear bus.

When teaching, introduce what network topology is and what it does. The teacher to go ahead and discuss the various types of network topology, their various features, advantages and also disadvantages. The learners should be able to know the various scenarios where each network topology is used.

Activity 6

Short notes on tree topology.

A **tree topology** is a special type of structure in which many connected elements are arranged like the branches of a tree. For example, tree topologies are frequently used to organize the computers in a corporate network, or the information in a database.

In a tree topology, there can be only one connection between any two connected nodes. Because any two nodes can have only one mutual connection.

In computer networks, a tree topology is also known as a star bus topology. It incorporates elements of both a bus topology and a star topology. Below is an example network diagram of a tree topology, in which the central nodes of two star networks are connected to one another.

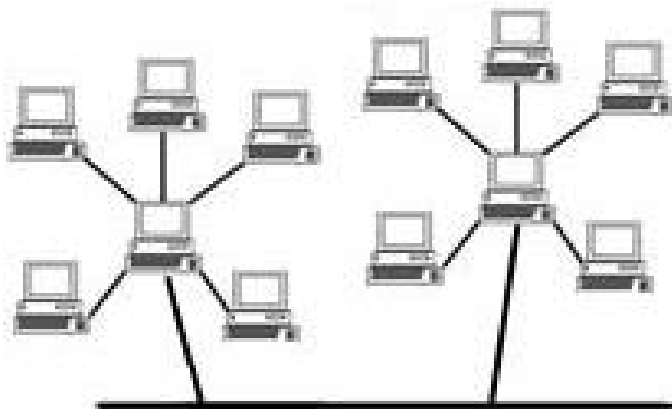


Figure 1. Tree Topology

In the picture above, if the main cable or trunk between each of the two star topology networks were to fail, those networks would be unable to communicate with each other. However, computers on the same star topology would still be able to communicate.

Learners to add more notes on what they have researched about tree topology. They may add the advantages, disadvantages and features of tree topology.

Short notes on hybrid topology.

A hybrid topology is a type of network topology that uses two or more other network topologies, including bus topology, mesh topology, ring topology, star topology, and tree topology.

Learners to add more notes on what they have found out about hybrid topology. They may add the advantages, disadvantages and features of hybrid topology.

Exercise 2.

1. Topology
2. Star
3. Bus.
4. Bus Topology, Ring, Topology, Tree and Hybrid Topology
5. The advantages of star, bus, ring, and mesh topology are outlined in the learner's book.

The teacher to accept any other correct answer from the learners.

A given transmission on a communications channel between two machines can occur in several different ways. The transmission is characterised by:

- the direction of the exchanges
- the transmission mode: the number of bits sent simultaneously
- synchronization between the transmitter and receiver

The teacher to define what is meant by data transmission mode. The student may also give their understanding of the term data transmission modes.

After learners are conversant with what data transmission mode is, the teacher then to go ahead and explain the three forms i.e.

A simplex connection which is a connection in which the data flows in only one direction, from the transmitter to the receiver. This type of connection is useful if the data do not need to flow in both directions.

A half-duplex connection which is also referred to as alternating connection or semi-duplex. It is a connection in which the data flows in one direction, but not both at the same time. With this type of connection, each end of the connection transmits in turn.

A full-duplex connection which can be understood as a connection in which the data flow in both directions at the same time. Each end of the line can therefore transmit and receive data at the same time.

The learners with the help of the teacher should be able to understand which the best mode to use in various situations and also give examples of each transmission mode as used in our day to day lives.

The teacher to introduce by defining what a network is. He or she should also be able to explain that networks are understood depending on the geographical area they cover hence local or global.

1.3 Data transmission Modes in Computer Networks.

A given transmission on a communications channel between two machines can occur in several different ways. The transmission is characterised by:

- the direction of the exchanges
- the transmission mode: the number of bits sent simultaneously
- synchronization between the transmitter and receiver

The teacher to define what is meant by data transmission mode. The student may also give their understanding of the term data transmission modes.

After learners are conversant with what data transmission mode is, the teacher then to go ahead and explain the three forms i.e.

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The learners with the help of the teacher should be able to understand which the best mode to use in various situations and also give examples of each transmission mode as used in our day to day lives.

1.4 Intranet

Comparison between internet and intranet.

Intranet is shared content accessed by members within a single organization while Internet is global communication accessed through the Web.

The teacher to give the description of what internet is and also what an intranet is in details. The teacher to then emphasis on the differences between intranet and internet. Point out the similarities between internet and intranet.

Activity 7

Learners to research on why various organizations depend on intranet in south Sudan. Expected responses should be similar to benefits or advantages of intranet.

File sharing in an intranet set up.

The teacher to define what the term intranet means. Learners also to share what they already know about intranet.

Emphasis on the uses of intranet and its relation to file sharing. The teacher then to outline the steps to be followed when sharing files in an intranet set up as outlined in the learners book.

How file sharing works in a network.

Outline the major ways of sharing files in a network as outlined in the learner's book. ie Peer to peer file sharing and File synchronization.

Peer to peer file sharing.

Introduce what peer to peer file sharing is. Take the learners through how it works or used in sharing files. Introduce some programs that may be used in peer to peer file sharing for example Gnutella program, Bit Torrent, uTorrent and The Pirate Bay among many others.

Risks of Using P2P File Sharing

Define what a risk is .which can be understood as the potential losing something of value especially from ones computer. The teacher to emphasis on the risks that network users may face especially when sharing their file in the internet. Some of the risks are outlined in the learner's book.

Go ahead to offer solutions or ways to counter the risks that users are exposed to when using p2p to share files. This is in order to ensure that learners are more cautious when sharing files.

File synchronization

Briefly introduce what File synchronization is. Which is a utility that has the ability to synchronize multiple pairs of folders or files. It has been designed to be easy to use and quick to do the job. Emphasis on the two ways in which file synchronization is divided into.

Using network application in resource sharing.

The teacher to emphasis on what resource sharing is. The learners may give some benefits of sharing resources in network. The teacher to assist the learners in exhausting all the benefits of resource sharing.

Name some of most frequently used shared network environment objects.

Learners to find out how network application can be used to ease resource sharing among various organizations in south Sudan.

1.5 Microsoft Outlook

Introduce what Microsoft outlook is and what it is used to do. Outlook is an E-mail software program by Microsoft that enables users to send and receive e-mail on their computer. Learners should understand that Microsoft outlook is used to share files. Many corporations utilize Microsoft Outlook in conjunction with Microsoft Exchange Server and Microsoft SharePoint Server for employees to coordinate meetings, calendars and shared mailboxes and folders.

Opening Microsoft outlook.

Guide the learners in opening Microsoft outlook from their computers. The teacher should ensure that each and every student has been able to access Microsoft outlook in the computer.

The procedure for opening outlook has been given in the learner's book.

How to create and manage contacts in Microsoft outlook.

Guide learners on how to create and manage contacts. Follow the procedure in the learner's book.

How to set up common events in the calendar.

Finding your Calendar

After accessing outlook, let the learners follow the steps given in the learner's book to open the calendar.

Creating entries on your calendar

The teacher should introduce how entries will appear on Microsoft outlook.

Meetings

The learners may be allowed to share what they know about meetings. The learners may go ahead to give examples of meetings they have attended. After a light discussion as a class, the teacher to introduce what

a meeting is. The teacher should then divulge further to explain the meaning of a meeting in the context of Microsoft outlook. Microsoft outlook enables one to send a meeting request to one or more people. Outlook trails who accepts the request and blocks out time on your calendar for the meeting. When you create a meeting request, you can add attachments, set a location, and use the Scheduling Assistant to choose the best time for the meeting.

The teacher should then guide them step by step on how to schedule a meeting using Microsoft outlook. The steps are provided for in the learner's book.

Activity 9

After going through how to schedule a meeting using Microsoft outlook, the learners to gather in groups and schedule a meeting of their debate clubs or any other club in the school using Microsoft outlook. The teacher should guide the learners and help those who maybe having challenges.

Event.

Introduce what an event is. Learners to chip in by giving examples of events. Guide the learners step by step on how to create an event using Microsoft outlook.

Activity 10

In groups let the learners follow the steps they have learnt to create an event of their choice. Guide the learner's into creating their events successfully.

Creating task list in MS Outlook.

Begin by introducing what task lists are. Outline some tasks that can be created using outlook. Emphasis on how to create task lists using mms outlook.

Exercise 3.

1. When the device is able to exchange information with another device.
2. It is the computer that generates or terminates the data.
3. Router.
4. A link refers to the connectivity between two devices. It includes the type of cables and protocols used in order for one device to be able to communicate with the other.
5. It refers to a direct connection between two computers on a network. A point to point connection does not need any other network devices other than connecting a cable to the NIC cards of both computers.
6. Network topology dictates what media a company must use to interconnect devices. It also serves as basis on what materials, connector and terminations that is applicable for the setup.
7. There are several ways to do this. Install reliable and updated anti-virus program on all computers. Make sure firewalls are setup and configured properly. User authentication will also help a lot. All of these combined would make a highly secured network.

UNIT 2: SPREADSHEETS

What the learners are supposed to Learn

The learners should develop hands-on skills in the use of Microsoft Excel individually and in small groups by entering data into rows and columns to develop their understanding that a spreadsheet is a program with which data is processed.

They should have opportunities to investigate simple problems through calculations, graphs, and statistical analysis by using actual statistical data (e.g. learners' heights versus weights). This should include simple regression parameters such as regression equation and correlation coefficient.

For example, they might use statistical data from the last population census to understand how to store, organize, and manipulate different data categories (state, gender, education, age, etc.), create charts, sort and filter data.

They should use functions and formulas in data manipulation by organizing and producing e.g. a pay sheet. They should learn how to import and export data.

Key inquiry questions

- How is an Excel worksheet/workbook set up and managed?
- How is data processed in MS Excel?
- How can business accounts be recorded?
- How is data summarized to produce reports?
- How are files and data protected in spreadsheets?
- How can examination results or other data be recorded in a tabulated manner?
- How can spreadsheets be used to evaluate an investment?
- How can an inventory be managed?

Learning outcomes

Knowledge and understanding	Skills	Attitudes
<ul style="list-style-type: none"> • Understand spreadsheets and know how to manage, manipulate and analyze data to produce different reports 	<ul style="list-style-type: none"> • Set up and manage worksheets / workbooks • Analyse and interpret data to generate different reports • Perform file and data protection • Apply creative thinking in solving problems 	<ul style="list-style-type: none"> • Appreciate the value of spreadsheets • Appreciate the value of functions and analysis tools • Appreciate the importance of accurate record keeping

Contribution to the competencies:

Critical thinking: in data manipulation, analysis and use of formulas

Communication: in information presentation

Co-operation: in team work and information sharing

Links to other subjects:

Mathematics: Formulas and functions

All subjects: Statistics

Introduction

Introduce what spreadsheets is and also give some examples of spreadsheet. The teacher to go further and give the uses of spreadsheet. This is in order to intrigue the learners to see the applicability of spreadsheet in the modern day world.

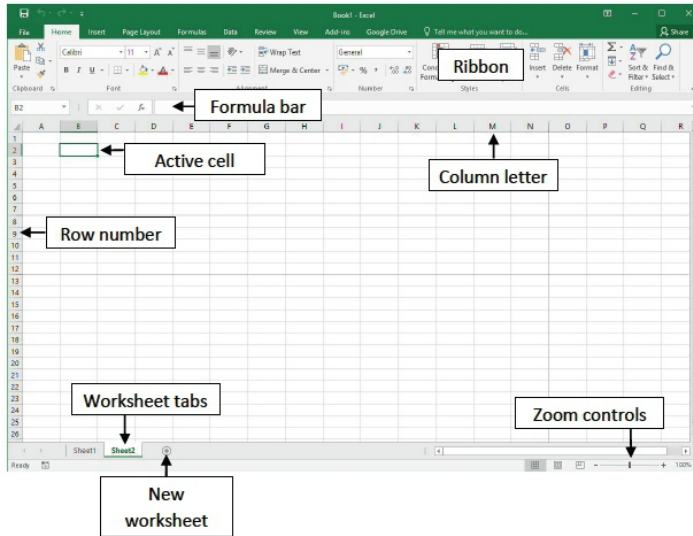
Opening spreadsheet.

Guide the learners into accessing Microsoft Excel in the computer.

1. Click on the Start button on the taskbar at the bottom left corner of the Screen.
2. Click the all programs or apps icon. The program menu will open.
3. Select Microsoft Office from the list of programs.
4. Click on Microsoft Excel.

After opening the Excel page the learners should be able to identify some of the features of the Excel as shown in their book. They should be familiar with each feature and be able to state what role it plays.

Features of Microsoft Excel 2016.



1. **Active cell-** Anything typed enters in the active cell. Formatting or any other manipulation affects only the active cell.
2. **Row number-** Rows are numbered consecutively from 1 going downwards.
3. **Column letter-** Columns are labelled consecutively with letters. On reaching 'Z', they are labelled as AA, AB, AC etc.
4. **Formula bar** -It shows the content of the active cell, and can also be used to edit it.
5. **Worksheet tabs** - A workbook may consist several worksheets, the tabs are used to switch between the workbooks. Right-click or double-click the tab when you want to rename them.
6. **Zoom controls** -Zoom controls allows one to view a larger/smaller area of the worksheet.
7. **Ribbon-** The ribbon includes the tabs and controls for all the essential features of the Excel spreadsheet.

2.1 Setting up and managing excel worksheet

Learners should be able to understand what a worksheet comprises of. Emphasis on some of the necessary changes that one may have to perform on a recently opened worksheet.

Renaming a worksheet.

Take the learners through the process of renaming a worksheet.

Activity 1

The learners to open a blank Excel page and using the skills they have learnt, rename the page from sheet 1 to their names. Supervise and assist those who may be having difficulties.

Navigating in a worksheet.

Show the learners the home cell in an Excel worksheet .Go ahead to guide learners on how to move from one cell to another in an excel worksheet.

Inserting and removing rows and columns.

Start by introducing what a row and a column is in the context of MS excel. After making sure that the learners are familiar with what rows and columns are, go ahead and show the learners on how to insert rows and columns and also how to remove them.

Also to show the learners how to adjust the height and the width of rows and columns. The procedure for inserting, removing and adjusting the height and width of rows and columns is in the learner's book.

Activity 2

Guide the learners to perform the activity, where they have to insert a new row and column, and also remove the row and column they had added.

Saving a workbook.

Take the learners through the process of saving a workbook. Emphasis on the need or the importance of saving a workbook. Learners to save a work book in order to gain the skill practically.

Activity 3

Guide the learners in saving the workbook they had created in the previous activities.

2.2 Importing data and importing data iMSExcel.

Importing data.

Importing data involves getting data from another source and bringing it to MS Excel. Introduce what importing data is. Emphasis to the learners the importance of importing data.

Guide the learners into understanding how to import data using the steps provided for in the learners book.

Exporting data.

Introduce what exporting data is. Learners to share what they know about exporting of data.

Guide the learners on how to export data from access to MS excel. Emphasis on the need to follow the right procedure when exporting data.

Activity 4

Guide the learners in importing and exporting data to and from access to MS excel. Refer to the procedure provided for in the learner's book

2.3 Entering Data in MS eXCEL

Introduce how an active cell appears in an MS Excel. An active cell will appear to have a darker border around it than other .Emphasis on how to navigate on MS Excel this can be done by moving with the mouse. Guide the learners on the important points out when entering data. Emphasis

that data entered in MS Excel may contain text data, numerical data or formula.

Entering numbers with fractions.

MS excel also accepts numbers that are in fraction form, though the procedure involved is different from the one used when entering whole numbers.

Guide the learners to know how to enter a fraction that has a whole number and also how to handle when it is only a fraction involved. The steps involved in entering a fraction is provided for in detail in the learner's book.

Exercise 1.

Divide the learners in sizeable groups and let them follow the procedure provided to enter numbers with fractions.

Entering Numbers as Text

Text may be anything that is not a number or formula. At times one may require to enter a number as a Text. In such scenarios one should start by entering an apostrophe before the number.

Exercise 2.

Guide the learners to enter numbers as text as shown in the learners book. The steps involved are provided in learner's book.

Entering Date and Time Data.

Date are normally stored in the form of whole numbers while Time data is stored as decimal values. Emphasis that both data and time data is displayed using special formatting.

Ensure the learners understand that Excel recognizes only valid date and time data type.

Guide the learners on the steps involved when entering date and time data. Let the learners follow the steps practically in order to gain the skills.

Using AutoFill to enter a series of values

An auto fill feature lets one enter a series of numbers or characters in a specified range. Emphasis on the fact that the software completes the entry that has been typed.

Guide the learners on the steps involved when using Auto fill to enter data in MS Excel.

Exercise 3.

Divide the learners in sizeable groups, let them follow the procedure in the learner's book in order to gain skills on how to use the Auto-Fill Feature.

Formatting Numbers

Excel provides preset number formats to help the user standardize how numbers will appear in the worksheet. Emphasis on the need to customize number formats in order to fit ones needs and also for them to become easier to read.

Introduce the various number formats that exist. ie general format which is standard format. Number format which displays the formatting style of the selected cell. Currency format which basically shows the currency sign before the number. Guide the learners to know how to insert the currency symbol.

Accounting format which changes the formatting to Accounting. Percentage format which changes the formatting to Percentage. Fraction which basically displays a number as a fraction instead of a number with decimal places. Among many other number formats.

Introduce what a formula and a function is. Emphasis that spreadsheet program such as Excel enables the users to create mathematical formulas and execute functions.

2.4 Formula and functions

Formula

Introduce what a formula is and what it is used to do. Emphasis that a formula performs calculations or other actions on the data provided in the work sheet. Introduce what Operator Precedence and Excel Arithmetic Operators are as explained in the learner's book. Emphasis that arithmetic operators specify the type of calculation that one wants to perform on the elements of a formula, like addition, subtraction, multiplication or division while operator precedence is the order or the precedence in which excel follows.

Entering Formulas

Guide the learners to understand how to enter formulas. Point out to the learners that a formula is preceded by an = sign.

Exercise 4.

Guide the learners to perform the exercise 4 in the learner's book.

Common Formula Errors.

If Ms Excel cannot properly calculate a formula that one enters in a cell, the program displays an error value in the cell as soon as you complete the formula entry. Excel uses several error values, all of which begin with the number sign (#).

Take the learners through the common formula errors and when they occur as outlined in the learner's book.

Functions

Functions are predefined formulas and are already available in Ms Excel. Guide the learners to understand how a function can be identified.

Emphasis on the functional categories which is grouping functions in groups depending on the common features among them.

Entering functions.

Guide the learners on how to enter functions in MS excel. Emphasis on the differences between functions and formulas these may include a function is a piece of code designed to calculate specific values and are used inside formulas.

Point out the rules to follow when using a function.

Function Categories

Introduce what functions category are. Emphasis that Excel provides a large number of built-in functions that can be used to perform specific calculations or to return information about spreadsheet data. These functions are grouped into categories in order to help one find the function that they need.

Point out the function category as outlined in the learner's book.

General Mathematical functions

Guide the learners on the various mathematical functions in MS Excel. These include SUM () which add a group of cells, PRODUCT () which multiplies a list of numbers, ROUND () which rounds a number to a specified number of significant figures, POWER () which works out exponents and SQRT () which finds the square root of a number.

Emphasis on the correct format to follow when using the mathematical functions.

Statistical Functions

Introduce what statistical functions are. Guide the learners in understanding the various statistical functions in MS Excel. Emphasis on the role each of the statistical functions performs and also the format in which they should appear.

Exercise 5.

Guide the learners in performing the exercise 5 in order to have practical skills on how to use functions in MS excel.

Text Functions

Introduce what text functions are. Guide the learners in understanding the various text functions in MS Excel. Emphasis on the role of the various text functions i.e. CONCATENATE () function which lets one to join together text and LEN () Function which counts the number of characters in a string of text.

Emphasis on the role that text functions perform and give an example of result that one gets when using the text function.

DATE/TIME Functions.

Introduce date/time functions. Guide the learners to understand the various types of functions under date and time functions. Emphasis on the role that the various date and time functions perform.

Guide the learners further on how to manipulate the date /time functions .for example subtracting two cells which contain different dates to get the number of days between them.

Lookup Functions

Introduce look up functions. Guide learners to know the differences between VLOOKUP () and HLOOKUP ().

Emphasis on the role each of the two performs.

Financial Functions

Introduce financial functions. Outline some of the calculations that financial functions perform. Emphasis to the learners the financial concept behind financial functions by defining the various terms associated with financial functions.

Future Value Function.

Symbolized as $FV()$. It is a function that lets one calculate the future value of an investment, assuming a fixed interest rate.

Emphasis on the format which the function takes. Breakdown the formula for the student to understand what each character represents.

Emphasis to the learners on how to use the formula correctly by ensuring that both the payment and the initial balance are negative numbers or zero values.

Present Value Function

It calculates the initial value of an investment or a loan. It is symbolized as $PV()$. helps in answering hypothetical questions. Emphasis on the correct format of the function. Guide the learners to understand how the function works using the example in the learner's book.

PMT () Function

Calculates the amount of the regular payments you need to make in order to achieve a set target. Emphasis on what one needs to specify so as to get the payments they need to make in each time period.

Guide the learners to understand the format of the function. Take the learners through the example provided to understand how the function works.

Number of payment Periods Function.

Represented as $NPER()$. Used to calculate the amount of time it will take you to pay off a loan or meet an investment target.

Emphasis on the format which the function takes.

2.5 Cell References

Cell references in Excel are very important. A cell reference can be understood to refer to a cell or a range of cells on a worksheet and can be used in a formula so MS Excel finds the values or data that one wants that formula to calculate.

Relative.

Introduce what relative cell reference is. Emphasis that it is the default cell reference mode.

Example 6.

Guide the learners through the example 6 in the learner's book in order for them to understand how relative cell reference works.

Absolute

Introduce what absolute cell reference is. Emphasis that Absolute cell reference always points to the same place, even when the position of any cells is changed.

Example 7.

Guide the learners through the example 7 in order to understand how absolute cell reference works.

Mixed

Introduce what mixed cell reference is. Emphasis that a mixed reference is a reference that refers to a specific row or column.

Example 8.

Guide the learners through the example in order to understand how mixed cell reference works.

2.6 Inventories in MS Excel

Introduce what inventories are. Point out how MS excel is used in managing inventories. Emphasis on how to use excel correctly in order to manage inventories.

Creating inventories.

Guide the learners through the process of creating an inventory from scratch. Point out the importance of having an inventory especially in the business set up. A step to step guide is provided for in the learner's book.

Activity 6

Divide the learners into groups and let them research on how to use preset templates in MS excel for inventory management of a business.

The procedure is:

Step 1

Open Excel, click "File" tab and then click "New."

Select "Inventories" from the list of template types that appear. A list of inventory template options will display

Browse through the list of inventory templates. While browsing, you can see a live preview on the side bar of the window. Select the one that is suitable for your business and purpose.

Click "Download" to open the selected template.

The template comes with formatting already done; however, it is customizable and you can make any alterations to the inventory as you wished to in order to make it more professional and appealing and relevant to your business.

Save the spreadsheet with a filename of your choice.

2.7 Charts

It is also called a graph. It may be understood as a graphical representation of data, in which data is represented by symbols, such as bars in a bar chart, lines in a line chart, or slices in a pie chart. A chart may represent tabular numeric data, functions or some kinds of qualitative structure and provides different information.

Emphasis on the elements of a chart, types of charts and their uses. Point out to the learners on how to choose a chart type and when to use various types of charts.

Creating a chart

Guide the learners through the steps involved in creating a chart. The steps are shown in the learner's book.

Activity 7

Divide the learners in groups, provide them with their form one results and let them generate a bar graph using MS excel from the results.

The procedure to use is:

Enter the data in MS excel as taught earlier.

Highlight the data that you would like to use for the bar chart.

Select the **Insert tab** in the toolbar at the top of the screen. Click on the Bar Chart button in the **Charts group** and then select a chart from the drop down menu. In this case select a bar graph.

The bar chart appear in the spreadsheet with horizontal bars.to represents the information.

Update the title for the bar graph.

Adding chart elements

Introduce what chart elements are. Learners to share what they know about chart elements. Guide the learners through the various elements, how to add or remove the elements.

Activity 8

In the bar graph they created in the previous exercise. Let the learners add and hide a title, legend and gridlines. Guide the student using the procedure in their work book.

2.8 Statistical analysis using Excel

Introduce what statistical analysis is. Point out how excel is useful when performing statistical analysis. Emphasis on the need to have Data Analysis Tool pack installed.

Using Excel for Correlation

Introduce what correlation is. Guide the learners through the steps involved when using excel to perform correlation. Follow the procedure in the learner's book.

Using Excel for Linear Regression

Introduce what linear regression is. Guide the learners through the steps involved when using excel to perform linear regression. Follow the procedure in the learner's book.

Activity 9

Guide the learners in performing the activity. After collecting the data, let them analyze it using MS excel following the procedure on how to use linear regression in MS excel.

2.9 Sorting and Filtering data

Sorting data

Introduce what sorting out data is. Point out the importance of sorting out data. Emphasis in different ways of sorting out data i.e. how to Sort in alphabetical order, how to sort from smallest to largest and how to sort multiple levels.

Filtering data.

Introduce what filtering data is. Point out the importance of filtering data in MS excel. Emphasis on the various ways in which data can be filtered in MS excel as outlined in the learners book.

2.10 What if analysis

What-If Analysis in Excel allows the user to try out different values or scenarios for formulas. Guide the learners to understand how what if analysis generally works. Emphasis on the types of what if analysis

Manual what if analysis

It is based on the idea that you have one or more input cells that affect one or more key formula cells. Let the learners observe what happens when the value in the input cells change. Point out on the example given in the learner's book.

Data tables

Scenario summaries give a table showing data from various scenarios, however, they do not update if the data they are based upon changes. Emphasis to the learners that data tables can be based on either one or two variables. For a single variable, a two column data table is required. The first column should contain the variable, while the second should be left blank for Excel to populate. While in a two variable data table Instead of consisting of two columns, there should be one column containing the values for the first variable, with a row containing the values for the second variable. Guide the learners through the example in the learner's book for them to understand.

Scenario manager

Ensure that learners understand the restrictions of data table. Point out to the learners situations that one may use the scenario manager. Reiterate the importance of using scenario manager. Guide the learners through the example given in the learners book to enable them define a scenario.

Emphasis on how scenarios are created in MS excel. The scenario manager can be found on the Data ribbon, under What -If Analysis. Click the Add button to start creating new scenarios. The next dialog box will ask for a name for the scenario and which cells are to be changed. A scenario can contain up to 32 changing cells, although in reality, most scenarios will use far fewer than this. Once the scenario name and cells to be changed have been selected, click the OK button and fill in the values for each cell to be used in the scenario. From here, click Add to continue adding more scenarios, or OK when finished.

2.11 Reverse What if analysis

Point out to the learners what reverse what if analysis does. MS Excel provides two tools that are relevant to reverse What-If analysis. These are goal seek and solver.

Goal seek

It is found on the Data ribbon, under What-If Analysis. It simply asks for three parameters. The Set cell which refers to the cell that one wants to contain the goal value, to value box which should have the goal and the by changing cell box which should show the cell reference for the cell to be manipulated in order to achieve the goal.

Take the learners through the example provided for in the learner's book for them to understand how the goal seek tool works and also how to navigate on the work sheet when using it. Point out to the learners that at times MS Excel may not find and a solution. Emphasis on how to maneuver when MS excel cannot find a solution which you are sure exists.

Solver

Outline the shortcomings of goal seek feature that may necessitate the use of solver. Emphasis on what solver enables on to do. Reiterate on the problems that one can use solver to tackle

2.12 Workbook protection

Protecting an MS excel document is essential. This can be achieved by setting password for the workbook. Engage the learners in coming up with some advantages or benefits of protecting a workbook.

Setting a password for a workbook

Guide the learners through the steps involved in setting a password in a work book. Follow the steps provided for in the teacher's book.

Revision exercise 4.

1. They include:
 - a. **Active cell**- Anything typed enters in the active cell. Formatting or any other manipulation affects only the active cell.
 - b. **Row number**- Rows are numbered consecutively from 1 going downwards.

- c. **Column letter-** Columns are labelled consecutively with letters. On reaching 'Z', they are labelled as AA, AB, AC etc.
 - d. **Formula bar** -It shows the content of the active cell, and can also be used to edit it.
 - e. **Worksheet tabs** - A workbook may consist several worksheets, the tabs are used to switch between the workbooks. Right-click or double-click the tab when you want to rename them.
 - f. **Zoom controls** -Zoom controls allows one to view a larger/smaller area of the worksheet.
 - g. **Ribbon-** The ribbon includes the tabs and controls for all the essential features of the Excel spreadsheet.
2. The intersection between a row and a column.
 3. The worksheet is a grid of columns designated by letters and rows designated by numbers while a workbook is a completion of many worksheets.
 4. Eleven data formats are available in Microsoft Excel for data Storage. Example:
 - a. Number - Stores data as a number
 - b. Currency - Stores data in the form of currency
 - c. Date - Data is stored as dates
 - d. Percentage - Stores numbers as a percentage
 - e. Text Formats - Stores data as string of texts
 5. It's defined by the term "PEMDAS" or "BEDMAS".
 - a. Parentheses or Brackets
 - b. Exponent
 - c. Multiplication
 - d. Division
 - e. Addition
 - f. Subtraction
 6. Following are the functions available in Excel for manipulating the data:

- a. Math and Financial Functions - SQRT, DEGREE, RAND(), GCD
 - b. Logical Functions - IF, AND, FALSE, TRUE
 - c. Date and Time functions - NOW(), DATEVALUE(), WEEKDAY(NOW())
 - d. Index Match - VLOOKUP
7. Excel provides three ways to protect a workbook:
- a. Password protection for opening a workbook
 - b. Protection for adding, deleting, hiding and unhiding sheets
 - c. Protection from changing size or position of windows.
8. In order to avoid writing the data again and again for calculating purpose, cell reference is used. When you write any formula, for specific function, you need to direct Excel the specific location of that data. This location is referred as, cell reference. So, every time a new value added to the cell, the cell will calculate according to the reference cell formula.
9. WEEKDAY () returns the day of the week for a particular date counting from Sunday.
Example: Let date at A1 be 12/30/2016 WEEKDAY (A1, 1) =>6

UNIT 3: SOCIAL MEDIA

What the learners are supposed to Learn

In small groups the learners should discuss social media, such as Facebook, Twitter, YouTube, Instagram, etc. They should learn about the importance of social media.

They should develop individual expertise by creating personal accounts to join different social media. They should be able to communicate by posting messages, requesting friends, adding friends, posting images, tweeting news, etc.

In small groups learners should create and edit contents of social media such as Wikipedia. They should, for example, do it by writing and posting e.g. local history and geography of South Sudan on Wikipedia.

Learners should discuss and understand the power of social media with examples (e.g. Obama's use of them in his initial election) and also the range of risks in social media and learn about cybercrime, ethics and legal implications.

They should understand social media and their roles, and compare social media types in terms of content. They should be able to describe how to create an account in a social media and explain how to communicate and collaborate in social media.

Key inquiry questions

- What are social media and how could they be classified and differentiated from traditional media?
- How do the virtual communities interact and exchange information?
- How could individuals and institutions benefit from social media?
- What impact has virtual social media on the traditional media institutions and on societies?
- What are the ethical and legal issues and risks relating to social media?

Learning outcomes

Knowledge and understanding	Skills	Attitudes
<ul style="list-style-type: none"> • Understand social media and know how to create and access information, e.g. Facebook, Twitter, YouTube, Instagram, Wikipedia, etc. 	<ul style="list-style-type: none"> • Explore social media • Be able to join social media • Be able to interact via social media • Analyze risks in accessing social media <p style="text-align: center;">Contrast different social media</p>	<ul style="list-style-type: none"> • Appreciate the role of social media • Value the regulations governing data and information access • Respect privacy • Awareness of cybercrime, risks and legal implications • Enjoy innovation

Contribution to the competencies:

Critical thinking: about social media, ethical issues and legal implications

Communication: in social media

Co-operation: in sharing information

Links to other subjects:

Languages: Writing skills

Citizenship: Communication and society

All subjects: Information sharing

3.1 Introduction to social media.

Start by describing what social media is. Engage the learners to find out what they know about social media. Point out the various ways or categories in which social media is classified. Cite examples for each category. Learners may also share which social sites they have used.

Social media and traditional media

Emphasis on the major differences between social media and traditional media also referred to as industrial media. Learners also to participate in pointing out the differences.

Classification of social media.

Introduce the different categories that are used in classifying social media. Learners may also share what they already know about the classification of social media.

Benefits of using social media

Benefits of social media can be in two ways i.e. to individuals and to institutions. Learners to share what benefits they accrue from using

various social media platforms. Point out some benefits of using social media to an institution and also to individuals.

3.2 Common social media sites

First define what is a social media site is. Which social media sites do people prefer most? Let learners identify which of these they have used and which they prefer and why?

Point out the features people normally look for when deciding which social media sites to use.

Facebook.

First start by describing what is Facebook is. Learners may give some reasons why they use it. Take the learners on a brief history about Facebook. Guide the learners through the steps one has to follow in order to open a face book account and what one should have in order to create an account successfully.

Point out that in order to open an account one must be connected to the internet. After creating an account guide them through the steps of setting up a profile in Facebook.

Emphasis on the various ways in which the learners can use Facebook. Point out to the learners the need to remember their passwords so as to be able to login in the accounts later.

Activity 1

Learners to discuss how they can use Facebook to promote peace in south Sudan. They may include points like; creating groups in face book aimed at fostering peace, making friends through sending friend request through Facebooks regardless their tribes in order to end tribalism which is a source conflict.

Twitter.

Introduce what twitter is and how it is used. Give some brief history about twitter. Learners may also share what they know about twitter.

Guide the learners on how create an account. Emphasis on the need to have a valid email address and also enter a strong password. Point out to the learners the need to remember their passwords so as to be able to login in the accounts later.

Guide the learners on how to use to tweeter by showing them how to communicate in tweeter through sending tweets replying to tweets and also retweeting.

Activity 2

Learners to discuss how they can promote environmental sustainability in south Sudan using tweeter.in their discussion they may come with points like: They may tweet about the state of the environment in order to raise awareness, they may also follow organizations like united nations environmental program (UNEP) and other NGO's that focus on environment in order to gain knowledge on how to preserve their environment, They may also create hashtags (#) about the state of environment in south Sudan in tweeter in order to gain the attention of the world among many other ways.

YouTube

Introduce what YouTube is. Learners to share their experiences with YouTube. Give a short history of how YouTube came into being.

Guide learners on how to create an account. Emphasis on the need to give a valid phone number for verification purposes. Outline the benefits that one enjoys by creating an account.

Point out to the learners the need to remember their passwords so as to be able to login in the accounts later.

Guide the learners through the steps involved in uploading a video into the accounts they have created.

Activity 3

Divide learners into sizeable groups and let them create YouTube accounts using the steps they have learnt. The learners to then to record videos of some of the physical features near them like mountains, hills, lakes, rivers among many others and follow the steps shown in their books to upload the videos to their YouTube channels.

Instagram.

First start by describing what is Instagram is. Take the learners on a brief history about Instagram. Guide the learners through the steps one has to follow in order to open an Instagram account and what one should have in order to create an account successfully.

Emphasis on how to open an Instagram account using a phone and also using a computer. Point out to the learners the need to remember their passwords so as to be able to login in the accounts later.

Activity 4

Guide the learners in creating and customizing their Instagram accounts. The teacher to choose what the learners will use i.e. either the mobile phone or the computer

3.3Wikipedia

Introduce what Wikipedia is .Give a brief history about Wikipedia and how it is used. Take the learners through the steps of creating an account with Wikipedia. Point out to the learners the need to remember their passwords so as to be able to login in the accounts later.

How to create and edit content in Wikipedia.

Guide the learners through the process of creating or editing content in Wikipedia.

Activity 5

Let the learners create an account and write about the local history and geography of south Sudan.

3.3 Ethical and legal issues in social media

Introduce what is meant by the term ethics and the term legal. Relate the terms used with a familiar context in social media usage.

Legal issues.

Point out some of the legal issues that revolve around the use of social media. The learners may also contribute in form of discussions. Emphasis on the fact that social media users are not immune to the law hence the need to be responsible when using the social media sites.

Activity 6

Allow the learners to explore as many legal issues as they can come up with. Ask them leading questions like, if you were the minister for Justice, which law would you pass to ensure safety in social media?

Ethical issues.

Guide the learners into understanding some of the Ethical issues that revolve around the use of social media. Reiterate on the need to be keen when using social media platforms.

Activity 7

In pairs, ask the learners to debate what choice each would give to Kiden. Allow them to speak out in turns.

Exercise 1.

In general the learners need to demonstrate the knowledge they have acquired to solve problems in the society.

1. Learners to give both the benefits to the individual and also institutions some of them are given in the learner's book.
2. Some of them may include:
 - a) Accessibility - the means of production for industrial media are mostly owned privately or by government; social media tools are generally available to anyone at little or no cost.
 - b) Usability - industrial media production typically requires specialized skills and training. Most social media does not, or in some cases reinvent skills, so anyone can operate the means of production.
 - c) Recency - the time interval between communications produced by industrial media can be long it can take days, weeks, or even months compared to social media which can be capable of almost prompt replies, only the participants determine any delay in response.
 - d) Permanence - industrial media, once created, cannot be altered i.e. once a magazine article is printed and distributed, changes cannot be made to that same article while social media can be altered almost immediately by comments or editing.

Accept any other answer from the student that may be right.

3. Some of them are outlined in the learner's book.

Accept any other answer from the learners that may be right.



South Sudan

Secondary ICT

Information Communication Technology Teacher's Guide

2

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