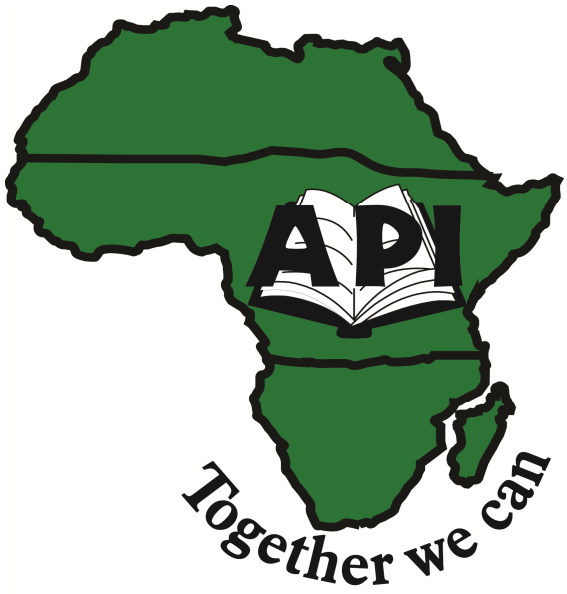
AFRICA POPULATION INSTITUTE (API)



POPULATION STUDIES
TERM ONE STUDENT'S MODULES
(DPS)
Contents

Website: www.africapopulation.net
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Course Name : Introduction to Population Science
Course Code : APDPS 101
Course level : level 1
Course Credit : 4 CU
Contact Hours : 60 Hrs

Course Description

The Course focuses on defining the clear history of population. It introduces the basic aspects of public health in particular the definitions of population, its characteristics, origin & background of the population studies, early intervention of the subject matter, relevant examples of population programs, critical issues involved in demographic conditions vital to health interventions, community health as a branch of population studies and in-depth understanding of economic growth and development.

Population studies is a multi-disciplinary field overlapping with other disciplines such as anthropology, economics, geography, history, medicine, human biology and sociology making it such an interesting subject. This course unit ntroduces the general concepts in the field of population studies and their relationship to issues in research, planning and policy formulation. The course aims to provide students with an understanding of the main concepts in the field of population studies and a perspective on contemporary demographic realities and their implications so that you are able to apply your knowledge of population to broader social concerns.

This course is suitable as an elective for students doing a major/minor in economics, sociology, history and politics, management and administration and biology. In addition the course is a prerequisite for the more advanced courses in population studies and demography, Introduction to analytical demography, Pacific population and urban issues and Applied demography.

Course Objectives

· To help students interact with and learn the major focus of population and demographic studies.
· To ensure that students grasp the relevant population programs/intervention responsible for achieving good economic standards in a given community.
· To help practitioners of population to acquire knowledge on how to implement programs to bring positive social change.

· To introduce students to the basic information about population dynamics and how they instrumental in the economic growth and development.
· To equip students with skills of improving the community's social functioning through integration of indigenous knowledge and modern knowledge.
· To strengthen the students' capacity to suggest better approaches for improving a well and sustainable conduit through which services can reach the needy/vulnerable groups of population.

Course Content

Introduction

· Definition of Population
· Characteristics of Population and Demography
· Objectives of Population studies
· Origin of Population studies
· Early and modern Public Health Interventions

Public Health Programs

· Examples of Population Programs
· Interventions of Population Programs
· Applications in Health care and service delivery

Issues and opportunities of Population studies

· Population dynamics
· Population transition
· Population Pyramids
· Mortality vs morbidity

Demographic factors and Health outcomes

· Disease burden
· Maternal and child Health
· Malaria and HIV/AIDs
· Housing and finance
· Nutrition and micronutrient deficiency

Population Interventions

· Population Distribution, Time and Space
· Levels of Universal, selective and indicative interventions
· Transport and Trade

Community Health

· Definition of Community Health
· Broad categories of Community Health
· Health Promotion
· Forms of Health Promotion
· Arguments which see publicly-funded healthcare as improving the quality of health care

· Arguments which see publicly-funded health care as worsening the quality of health care

Health Economics
· Meaning of Health Economics
· Scope of Health Economics
· Health care demand
· Cost Determination
· Market equilibrium

Population concepts
· Reproductive health issues
· Quantitative methods
· Econometric theories
· Population pressure

Mode of delivery: Face to face lectures, Personal Study and correspondence

Assessment
Course work 40%
Exams 60%
Total Mark 100%

Overview

This by far is the most fundamental unit of the course. By understanding this course unit effectively you will be in position to understand public health through a broad intensity and depth

Aims and objectives

Throughout this course, students are introduced to a variety of subjects that provide the knowledge base and skills for understanding the social, economic, biological, and environmental dimensions of health and health improvement. Typical courses in the programme offer students a range of options to examine, including health promotion and public health; management; finance; gender; globalisation; clinical governance; data management, quality assurance, leadership, and epidemiology. The aim of this BSc programme is to provide students with a broad knowledge of the theories and methods of public health as well as skills in working with the health problems of the communities in which they work.

Outcomes

Increasingly it is recognised that to tackle these public health problems, health care workers require relevant public health skills and knowledge. This undergraduate diploma programme will train professionals with the skills and competencies to tackle public health issues in Uganda today. Through following this programme, students will be assisted to:

Evaluate and analyse the challenges confronting public health and the provision of health services today; engage in policy debates about global and international health; and respond to the challenge of the widening health inequalities that exist within and between communities and indeed countries.

One definition of public health is to prolong life and promote health through the organised efforts of society. Chief concerns are to monitor the health of a community by identifying health needs, implementing policies that promote health, evaluating health services and eliminating health disparities. As such, the scope of public health is huge. And as standards of living, income and access to public health services become more disparate, it is also one of the most crucial issues in the world today. Health protection functions include disease control such as tuberculosis, HIV, communicable disease epidemiology and immunisation, ensuring that air is safe to breathe and water and food are safe to consume.

They also include preventing behaviours that lead to disease, averting injuries, managing chronic health conditions and advocating access to quality health care for all. This includes forming partnerships with service providers and directly providing individual health services where there is a need. Public health has become increasingly important on the political agenda, due to concerns about increasing levels of disease that take lives unnecessarily.

In addition to increasing lifestyle-related poor health (including obesity, heart diseases, diabetes, and high blood pressure), Sub-Saharan Africa suffers from

diseases and illnesses that are closely related to poverty and lack of access to preventative health care. Poverty, HIV/AIDS, malnutrition, pollution-related conditions, preventable diseases, and conflict-related illnesses are problems that we see all around the region today. This only emphasises the need for health care workers to have the relevant public health skills and knowledge in order to tackle public health problems. The Bachelor of Public Health is for those already working within the health sector who wish to specialise in public health - and equally for those who wish to enter this emerging, challenging and crucial field.

This module is their for to clearly bring out the main picture of public health and thus to you to understand public health broadly

Population

A **population** is all the organisms of the same group or species, which live in a particular geographical area, and have the capability of interbreeding

The area that is used to define a sexual population is defined as the area where inter-breeding is potentially possible between any pair within the area, and where the probability of interbreeding is greater than the probability of cross-breeding with individuals from other areas.

In sociology, population refers to a collection of humans. Demography is a social science which entails the statistical study of human populations. This article refers mainly to the human population.

Population genetics (ecology)

In population genetics a sexual population is a set of organisms in which any pair of members can breed together. This means that they can regularly exchange gametes to produce normally-fertile offspring, and such a breeding group is also known therefore as a *Gamo deme*. This also implies that all members belong to the same species.[4] If the Gamo deme is very large (theoretically, approaching infinity), and all gene alleles are uniformly distributed by the gametes within it, the Gamo deme is said to be panmictic. Under this state, allele (gamete) frequencies can be converted to genotype (zygote) frequencies by expanding an appropriate quadratic equation, as shown by Sir Ronald Fisher in his establishment of quantitative genetics.[5]

This seldom occurs in nature: localization of gamete exchange – through dispersal limitations, preferential mating, cataclysm, or other cause – may lead to small actual Gamo demes which exchange gametes reasonably uniformly within themselves but are virtually separated from their neighboring Gamo demes. However, there may be

low frequencies of exchange with these neighbors. This may be viewed as the breaking up of a large sexual population (panmictic) into smaller overlapping sexual populations. This failure of panmixia leads to two important changes in overall population structure: (1) the component Gamo demos vary (through gamete sampling) in their allele frequencies when compared with each other and with the theoretical panmictic original (this is known as dispersion, and its details can be estimated using expansion of an appropriate binomial equation); and (2) the level of homozygosity rises in the entire collection of Gamo demes. The overall rise in homozygosity is quantified by the inbreeding coefficient (f or φ). Note that all homozygotes are increased in frequency – both the deleterious and the desirable. The mean phenotype of the Gamo demes collection is lower than that of the panmictic original – which is known as inbreeding depression. It is most important to note, however, that some dispersion lines will be superior to the panmictic original, while some will be about the same, and some will be inferior. The probabilities of each can be estimated from those binomial equations. In plant and animal breeding, procedures have been developed which deliberately utilize the effects of dispersion (such as line breeding, pure-line breeding, backcrossing). It can be shown that dispersion-assisted selection leads to the greatest genetic advance (ΔG=change in the phenotypic mean), and is much more powerful than selection acting without attendant dispersion. This is so for both allogamous (random fertilization) and autogamous (self-fertilization) Gamo demes.

In ecology, the population of a certain species in a certain area can be estimated using the Lincoln Index.

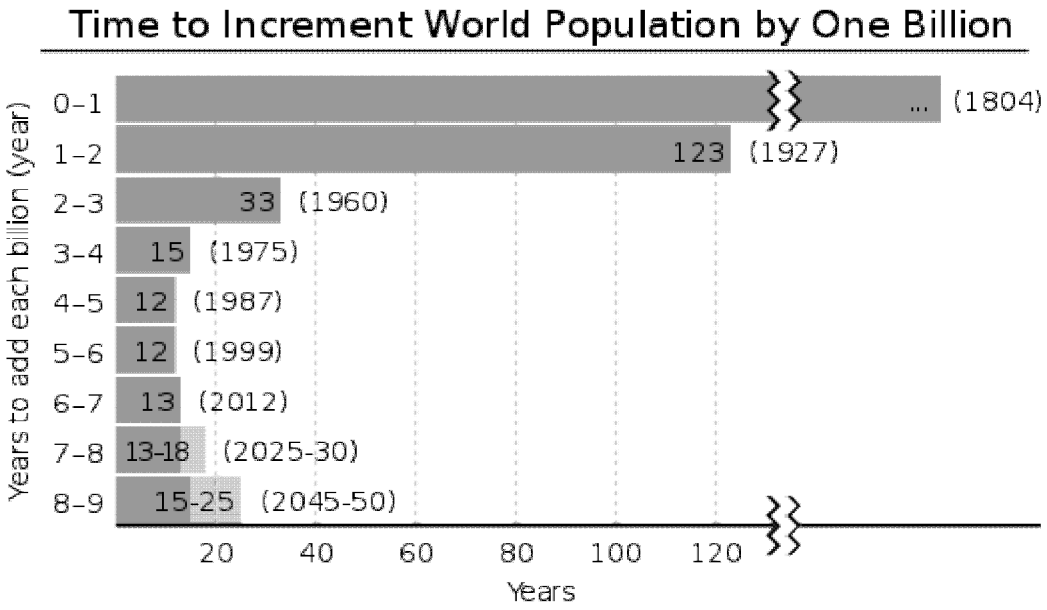
World human population

As of today's date, the world's population is estimated by the United States Census Bureau to be 7.527 billion.[8] The US Census Bureau estimates the 7 billion number was surpassed on 12 March 2012. According to a separate estimate by the United Nations, Earth’s population exceeded seven billion in October 2011, a milestone that offers unprecedented challenges and opportunities to all of humanity, according to UNFPA, the United Nations Population Fund.

According to papers published by the United States Census Bureau, the world population hit 6.5 billion on 24 February 2006. The United Nations Population Fund designated 12 October 1999 as the approximate day on which world population reached 6 billion. This was about 12 years after world population reached 5 billion in 1987, and 6 years after world population reached 5.5 billion in 1993. The population of countries such as Nigeria, is not even known to the nearest million so there is a considerable margin of error in such estimates.

Researcher Carl Haub calculated that a total of over 100 billion people have probably been born in the last 2000 years.

Predicted growth and decline



The years taken for every billion people to be added to the world's population, and the years that population was reached (with future estimates).

Main article: Population growth

Population growth increased significantly as the Industrial Revolution gathered pace from 1700 onwards.[13] The last 50 years have seen a yet more rapid increase in the rate of population growth[13] due to medical advances and substantial increases in agricultural productivity, particularly beginning in the 1960s,[14] made by the Green Revolution.[15] In 2007 the United Nations Population Division projected that the world's population will likely surpass 10 billion in 2055.[16]

In the future, the world's population is expected to peak, after which it will decline due to economic reasons, health concerns, land exhaustion and environmental hazards. According to one report, it is very likely that the world's population will stop growing before the end of the 21st century. Further, there is some likelihood that population will actually decline before 2100. Population has already declined in the last decade or two in Eastern Europe, the Baltics and in the Commonwealth of Independent States.

The population pattern of less-developed regions of the world in recent years has been marked by gradually declining birth rates. These followed an earlier sharp

reduction in death rates. This transition from high birth and death rates to low birth and death rates is often referred to as the demographic transition.

Control

Main article: Human population control

Human population control is the practice of altering the rate of growth of a human population. Historically, human population control has been implemented with the goal of increasing the rate of population growth. In the period from the 1950s to the 1980s, concerns about global population growth and its effects on poverty, environmental degradation, and political stability led to efforts to reduce population growth rates. While population control can involve measures that improve people's lives by giving them greater control of their reproduction, a few programs, most notably the Chinese government's one-child per family policy, have resorted to coercive measures.

In the 1970s, tension grew between population control advocates and women's health activists who advanced women's reproductive rights as part of a human rights-based approach.[22] Growing opposition to the narrow population control focus led to a significant change in population control policies in the early 1980s.[23]

Personal Study

- Community (ecology)
- List of countries by population

Public health is "the science and art of preventing disease, prolonging life and promoting health through the organised efforts and informed choices of society, organizations, public and private, communities and individuals" (1920, C.E.A. Winslow). It is concerned with threats to health based on population health analysis. The population in question can be as small as a handful of people or as large as all the inhabitants of several continents (for instance, in the case of a pandemic). The dimensions of health can encompass "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity", as defined by the United Nations' World Health Organization. Public health incorporates the interdisciplinary approaches of epidemiology, biostatistics and health services. Environmental health, community health, behavioural health, health economics, public policy and occupational health are other important subfields.

There are 2 distinct characteristics of public health:

1. It deals with preventive rather than curative aspects of health
2. It deals with population-level, rather than individual-level health issues

The focus of public health intervention is to improve health and quality of life through the prevention and treatment of disease and other physical and mental health conditions, through surveillance of cases and the promotion of healthy behaviours. Promotion of hand washing and breastfeeding, delivery of vaccinations, and distribution of condoms to control the spread of sexually transmitted diseases are examples of common public health measures.

Modern public health practice requires multidisciplinary teams of professionals including physicians specialising in public health/community medicine/infectious disease, epidemiologists, biostatisticians, public health nurses, medical microbiologists, environmental health officers, dental hygienists, dieticians and nutritionists, health inspectors, veterinarians, public health engineers, public health lawyers, sociologists, community development workers, communications officers, and others

Objectives

The focus of a public health intervention is to prevent and manage diseases, injuries and other health conditions through surveillance of cases and the promotion of healthy behaviours, communities and environments. Many diseases are preventable through simple, non-medical methods. For example, research has shown that the simple act of hand washing with soap can prevent many contagious diseases In other cases, treating a disease or controlling a pathogen can be vital to preventing its spread to others, such as during an outbreak of infectious disease, or contamination of food or water supplies. Public health communications programs, vaccination programs, and distribution of condoms are examples of common public health measures.

Public health plays an important role in disease prevention efforts in both the developing world and in developed countries, through local health systems and non-governmental organizations. The World Health Organisation (WHO) is the international agency that coordinates and acts on global public health issues. Most countries have their own government public health agencies, sometimes known as ministries of health, to respond to domestic health issues. For example in the United States, the front line of public health initiatives are state and local health departments. The United States Public Health Service (PHS), led by the Surgeon General of the United States, and the Centres for Disease Control and Prevention, headquartered in Atlanta, are involved with several international health activities, in addition to their national duties. In Canada, the Public Health Agency of Canada is the national agency responsible for public health, emergency preparedness and response, and infectious and chronic disease control and prevention. The Public health system in India is managed by the Ministry of Health & Family Welfare of the government of India with state owned health care facilities.

There is a vast discrepancy in access to health care and public health initiatives between developed nations and developing nations. In the developing world, public health infrastructures are still forming. There may not be enough trained health workers or monetary resources to provide even a basic level of medical care and disease prevention. As a result, a large majority of disease and mortality in the developing world results from and contributes to extreme poverty. For example, many African governments spend less than US$10 per person per year on health care, while, in the United States, the federal government spent approximately US$4,500 per capita in 2000.

Origin

In some ways, public health is a modern concept of human development in science, although it has roots in antiquity. From the beginnings of human civilisation, it was recognized that polluted water and lack of proper waste disposal spread communicable diseases (theory of miasma). Early religions attempted to regulate behaviour that specifically related to health, from types of food eaten, to regulating certain indulgent behaviors, such as drinking alcohol or sexual relations. The establishment of governments placed responsibility on leaders to develop public health policies and programs in order to gain some understanding of the causes of disease and thus ensure social stability prosperity, and maintain order.

The term "healthy city" used by today's public health advocates reflects this ongoing challenge to collective physical well-being that results from crowded conditions and urbanisation.

Early public health interventions

By Roman times, it was well understood that proper diversion of human waste was a necessary tenet of public health in urban areas. The Chinese developed the practice of variolation following a smallpox epidemic around 1000 BC. An individual without the disease could gain some measure of immunity against it by inhaling the dried crusts that formed around lesions of infected individuals. Also, children were protected by inoculating a scratch on their forearms with the pus from a lesion. This practice was not documented in the West until the early-18th century, and was used on a very limited basis. The practice of vaccination did not become prevalent until the 1820s, following the work of Edward Jenner to treat smallpox.

During the 14th century Black Death in Europe, it was believed that removing bodies of the dead would further prevent the spread of the bacterial infection. This did little to stem the plague, however, which was most likely spread by rodent-borne fleas. Burning parts of cities resulted in much greater benefit, since it destroyed the rodent infestations[*citation needed*]. The development of quarantine in the medieval period helped

mitigate the effects of other infectious diseases. However, according to Michel Foucault, the plague model of govern mentality was later controverter by the cholera model. A Cholera pandemic devastated Europe between 1829 and 1851, and was first fought by the use of what Foucault called "social medicine", which focused on flux, circulation of air, location of cemeteries, etc. All those concerns, born of the miasma theory of disease, were mixed with urbanistic concerns for the management of populations, which Foucault designated as the concept of "bio power". The German conceptualized this in the *Polizeiwissenschaft* ("Police science").

The science of epidemiology was founded by John Snow's identification of a polluted public water well as the source of an 1854 cholera outbreak in London. Dr. Snow believed in the germ theory of disease as opposed to the prevailing miasma theory. Although miasma theory correctly teaches that disease is a result of poor sanitation, it was based upon the prevailing theory of spontaneous generation. Germ theory developed slowly: despite Anton van Leeuwenhoek's observations of Microorganisms, (which are now known to cause many of the most common infectious diseases) in the year 1680, the modern era of public health did not begin until the 1880s, with Louis Pasteur's germ theory and production of artificial vaccines.

Other public health interventions include latrinisation, the building of sewers, the regular collection of garbage followed by incineration or disposal in a landfill, providing clean water and draining standing water to prevent the breeding of mosquitoes. This contribution was made by Edwin Chadwick in 1843 who published a report on the sanitation of the working class population in Great Britain at the time. So began the inception of the modern public health. The industrial revolution had initially caused the spread of disease through large conurbations around workhouses and factories. These settlements were cramped and primitive and there was no organised sanitation. Disease was inevitable and its incubation in these areas was encouraged by the poor lifestyle of the inhabitants.

Modern public health

With the onset of the epidemiological transition and as the prevalence of infectious diseases decreased through the 20th century, public health began to put more focus on chronic diseases such as cancer and heart disease. Previous efforts in many developed countries had already led to dramatic reductions in the infant mortality rate using preventative methods. For instance in the United States, public health worker Dr. Sara Josephine Baker established many programs to help the poor in New York City keep their infants healthy, leading teams of nurses into the crowded neighbourhoods of Hell's Kitchen and teaching mothers how to dress, feed, and bathe their babies.

During the 20th century and early in the next, the dramatic increase in average life span is widely credited to public health achievements, such as vaccination programs and control of many infectious diseases including polio, diphtheria, yellow fever and smallpox; effective health and safety policies such as road traffic safety and occupational safety; improved family planning; tobacco control measures; and programs designed to decrease non-communicable diseases by acting on known risk factors such as a person's background, lifestyle and environment. One of the major sources of the increase in average life span in the early 20th century was the decline in the "urban penalty" brought on by improvements in sanitation. These improvements included chlorination of drinking water, filtration and sewage treatment which led to the decline in deaths caused by infectious waterborne diseases such as cholera and intestinal diseases. In Cutler and Miller's, "The Role of Public Health Improvements in Health Advances", they display evidence of the decline in typhoid fever deaths in Chicago, Baltimore, Cincinnati, and Cleveland after these American cities adopted chlorination, filtration, or a sewage improvement

Meanwhile, large parts of the developing world remained plagued by largely preventable/treatable infectious diseases and poor maternal and child health outcomes, exacerbated by malnutrition and poverty. The WHO reports that a lack of exclusive breastfeeding during the first six months of life contributes to over a million avoidable child deaths each year Intermittent aimed at treating and preventing malaria episodes among pregnant women and young children is one public health measure in endemic countries.

Front-page headlines continue to present society with public health issues on a daily basis: emerging infectious diseases such as SARS, rapidly making its way from China (see Public health in China) to Canada, the United States and other geographically distant countries; reducing inequities in health care access through publicly funded health insurance programs; the HIV/AIDS pandemic and its spread from certain high-risk groups to the general population in many countries, such as in South Africa; the increase of childhood obesity and the concomitant increase in type II diabetes among children; the social, economic and health impacts of adolescent pregnancy; and the ongoing public health challenges related to natural disasters such as the 2004 Indian Ocean tsunami, 2005's Hurricane Katrina in the United States and the 2010 Haiti earthquake.

Since the 1980s, the growing field of population health has broadened the focus of public health from individual behaviours and risk factors to population-level issues such as inequality, poverty, and education. Modern public health is often concerned with addressing determinants of health across a population. There is a recognition that our health is affected by many factors including where we live, genetics, our income, our educational status and our social relationships - these are known as

"social determinants of health." A social gradient in health runs through society, with those that are poorest generally suffering the worst health. However even those in the *middle classes* will generally have worse health outcomes than those of a higher social stratum. The *new* public health seeks to address these health inequalities by advocating for population-based policies that improve health in an equitable manner.

Public Health 2.0

Public Health 2.0 is the term given to a movement within public health that aims to make the field more accessible to the general public and more user-driven. There are three senses in which the term "Public Health 2.0" is used. In the first sense, "Public Health 2.0" is similar to the term "Health 2.0" and is used to describe the ways in which traditional public health practitioners and institutions are reaching out (or could reach out) to the public through social media. In the second sense, "Public Health 2.0" is used to describe public health research that uses data gathered from social networking sites, search engine queries, cell phones, or other technologies. In the third sense, "Public Health 2.0" is used to describe public health activities that are completely user-driven. An example this type of Public Health 2.0 is the collection and sharing of information about environmental radiation levels following the March 2011 tsunami in Japan. In all cases, Public Health 2.0 draws on ideas from Web 2.0, such as crowd sourcing, information sharing, and user-centred design.[

Education and training

Education and training of public health professionals is available throughout the world in Medical Schools, Veterinary Schools, Schools of Nursing, Schools of Public Health, and Schools of Public Affairs. The training typically requires a university degree with a focus on core disciplines of biostatistics, epidemiology, health services administration, health policy, health education, behavioral science and environmental health.

Schools of public health

In the United States, the Welch-Rose Report of 1915 has been viewed as the basis for the critical movement in the history of the institutional schism between public health and medicine because it led to the establishment of schools of public health supported by the Rockefeller Foundation. The report was authored by William Welch, founding dean of the Johns Hopkins Bloomberg School of Public Health, and Wycliffe Rose of the Rockefeller Foundation. The report focused more on research than practical education. Some have blamed the Rockefeller Foundation's 1916 decision to support the establishment of schools of public health for creating the schism between

public health and medicine and legitimizing the rift between medicine's laboratory investigation of the mechanisms of disease and public health's nonclinical concern with environmental and social influences on health and wellness.

Even though schools of public health had already been established in Canada, Europe and North Africa, the US had still maintained the traditional system of housing faculties of public health within their medical institutions. A $25,000 donation from businessman Samuel Zemurray, instituted the country's first School of Hygiene and Tropical Medicine in 1912, laying the groundwork for today's School of Public Health and Tropical Medicine at Tulane University. A year following the Welch-Rose report, and four years following Samuel Zemurray's donation to Tulane, the Johns Hopkins School of Hygiene and Public Health was founded in 1916. By 1922, schools of public health were established in Columbia, Harvard and Yale universities. By 1999 there were twenty nine schools of public health in the US, enrolling around fifteen thousand students.

Over the years, the types of students and training provided have also changed. In the beginning, students who enrolled in public health schools typically had already obtained a medical degree; public health school training was largely a second degree for medical professionals. However, in 1978, 69% of American students enrolled in public health schools had only a bachelor's degree

Degrees in public health

Schools of public health offer a variety of degrees which generally fall into two categories: professional or academic The two major postgraduate professional degrees are the Master of Public Health (MPH) or the Master of Science in Public Health (MSPH). Doctoral studies in this field include Doctor of Public Health (DrPH) and Doctor of Philosophy (PhD) in a subspeciality of greater Public Health disciplines. DrPH is regarded as a professional leadership degree and PhD is more an academic degree.

Professional degrees are oriented towards practice in public health settings. The Master of Public Health, Doctor of Public Health, Doctor of Health Science (DHSc) and the Master of Health Care Administration are examples of degrees which are geared towards people who want careers as practitioners of public health in health departments, managed care and community-based organisations, hospitals and consulting firms among others. Master of Public Health degrees broadly fall into two categories, those that put more emphasis on an understanding of epidemiology and statistics as the scientific basis of public health practice and those that include a more eclectic range of methodologies. A Master of Science of Public Health is similar to an MPH but is considered an academic degree (as opposed to a professional degree) and places more emphasis on quantitative methods and research. The same

distinction can be made between the DrPH and the DHSc. The DrPH is considered a professional degree and the DHSc is an academic degree.

Academic degrees are more oriented towards those with interests in the scientific basis of public health and preventive medicine who wish to pursue careers in research, university teaching in graduate programs, policy analysis and development, and other high-level public health positions. Examples of academic degrees are the Master of Science, Doctor of Philosophy, Doctor of Science (ScD), and Doctor of Health Science (DHSc). The doctoral programs are distinct from the MPH and other professional programs by the addition of advanced coursework and the nature and scope of a dissertation research project.

In the United States, the Association of Schools of Public Health represents Council on Education for Public Health (CEPH) accredited schools of public health Delta Omega is the honorary society for graduate studies in public health. The society was founded in 1924 at the Johns Hopkins School of Hygiene and Public Health. Currently, there are approximately 68 chapters throughout the United States and Puerto Rico.

Qualification in Uganda

Like most countries Uganda does recognise Public health making it a relevant course in it's school system. Though many institutions do teach public health but it's studied from Diploma, Bachelors degree to Doctoral level.

A diploma is two years and a bachelor's degree is three year Graduates will gain:

- The ability to evaluate and analyse the challenges confronting public health and the provision of health services today.
- The knowledge to engage in policy debates about global and international health, and respond to the challenge of the widening health disparities that exist within communities and between countries.
- An understanding of the role public health practitioners play as advocates for change in public health, and of the strengths and weaknesses of differing approaches to health care systems.
- The ability to evaluate the quality and performance of health care systems and understand the various multi-agency approaches, along with their advantages and disadvantages.

Public health programs

Today, most governments recognise the importance of public health programs in reducing the incidence disease, disability, and the effects of aging and other physical and mental health conditions, although public health generally receives significantly

less government funding compared with medicine. In recent years, public health programs providing vaccinations have made incredible strides in promoting health, including the eradication of smallpox, a disease that plagued humanity for thousands of years.

The World Health Organisation (WHO) identifies core functions of public health programs including:

- providing leadership on matters critical to health and engaging in partnerships where joint action is needed;
- shaping a research agenda and stimulating the generation, translation and dissemination of valuable knowledge;
- setting norms and standards and promoting and monitoring their implementation;
- articulating ethical and evidence-based policy options;
- monitoring the health situation and assessing health trends.

In particular, public health surveillance programs can:

- serve as an early warning system for impending public health emergencies;
- document the impact of an intervention, or track progress towards specified goals; and
- monitor and clarify the epidemiology of health problems, allow priorities to be set, and inform health policy and strategies.
- diagnose, investigate, and monitor health problems and health hazards of the community

Public health surveillance has led to the identification and prioritization of many public health issues facing the world today, including HIV/AIDS, diabetes, waterborne diseases, zoonotic diseases, and antibiotic resistance leading to the reemergence of infectious diseases such as tuberculosis. Antibiotic resistance, also known as drug resistance, was the theme of World Health Day 2011.

For example, the WHO reports that at least 220 million people worldwide suffer from diabetes. Its incidence is increasing rapidly, and it is projected that the number of diabetes deaths will double by the year 2030. In a June 2010 editorial in the medical journal *The Lancet*, the authors opined that "The fact that type 2 diabetes, a largely preventable disorder, has reached epidemic proportion is a public health humiliation." The risk of type 2 diabetes is closely linked with the growing problem of obesity. The WHO's latest estimates highlighted that globally approximately 1.5 billion adults were overweight in 2008, and nearly 43 million children under the age of five were overweight in 2010. The United States is the leading country with 30.6% of its population being obese. Mexico follows behind with 24.2% and the United Kingdom with 23%. Once considered a problem in high-income countries, it is now on the rise in low-income countries, especially in urban settings. Many public health

programs are increasingly dedicating attention and resources to the issue of obesity, with objectives to address the underlying causes including healthy diet and physical exercise.

Some programs and policies associated with public health promotion and prevention can be controversial. One such example is programs focusing on the prevention of HIV transmission through safe sex campaigns and needle-exchange programmes. Another is the control of tobacco smoking. Changing smoking behaviour requires long term strategies, unlike the fight against communicable diseases which usually takes a shorter period for effects to be observed. Many nations have implemented major initiatives to cut smoking, such as increased taxation and bans on smoking in some or all public places. Proponents argue by presenting evidence that smoking is one of the major killers, and that therefore governments have a duty to reduce the death rate, both through limiting passive (second-hand) smoking and by providing fewer opportunities for people to smoke. Opponents say that this undermines individual freedom and personal responsibility, and worry that the state may be emboldened to remove more and more choice in the name of better population health overall.

Simultaneously, while communicable diseases have historically ranged uppermost as a global health priority, non-communicable diseases and the underlying behaviour-related risk factors have been at the bottom. This is changing however, as illustrated by the United Nations hosting its first General Assembly Special Summit on the issue of non-communicable diseases in September 2011.

Applications in healthcare

As well as seeking to improve population health through the implementation of specific population-level interventions, public health contributes to medical care by identifying and assessing population needs for health care services, including:

- Assessing current services and evaluating whether they are meeting the objectives of the health care system
- Ascertaining requirements as expressed by health professionals, the public and other stakeholders
- Identifying the most appropriate interventions
- Considering the effect on resources for proposed interventions and assessing their cost-effectiveness
- Supporting decision making in health care and planning health services including any necessary changes
- Informing, educating, and empowering people about health issues

Behavioural medicine is an interdisciplinary field of medicine concerned with the development and integration of knowledge in the biological, behavioural,

psychological, and social sciences relevant to health and illness. The term is often used interchangeably, and incorrectly, with health psychology, whereas the practice of behavioural medicine also includes applied psycho physiological therapies such as biofeedback, hypnosis, and bio behavioural therapy of physical disorders, aspects of occupational therapy, rehabilitation medicine, and physiatry, as well as preventive medicine. One of its academic forebears is the field of psychosomatic medicine. Practitioners of behavioural medicine include appropriately qualified nurses, psychologists, and physicians.

- More recently, it has expanded its area of practice to interventions with providers of medical services, in recognition of the fact that the behaviour of providers can have a determinative effect on patients' outcomes. For example, there exists a large interest in communication behaviours between clinician and patient within the field. Other areas include correcting perceptual bias in diagnostic behaviour; remediating clinicians' attitudes that impinge negatively upon patient-treatment; and addressing clinicians' behaviours that promote disease-development and illness-maintenance in patients, whether within a malpractice framework or not.

ISSUES OF PUBLIC HEALTH

Breast feeding Entity

In Uganda, campaigns to promote breastfeeding have been conducted in the mass media, including public service announcements via radio, television, posters, newspapers and magazines, leading to improved knowledge of the benefits of breastfeeding for infants and mothers among individuals and communities. This has made this a compulsory factor in the health care system of Uganda thus a mother is bound to breast feed unless their is a proper defined cause for not breast feeding

Global Mental Health

The World Health Organisation (WHO) defines mental health as a 'state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community'.

The term **Global Mental Health** refers to the international perspective on different aspects of mental health. It has been defined as 'the area of study, research and practice that places a priority on improving mental health and achieving equity in mental health for all people worldwide' Taking into account cultural differences and country-specific conditions, it deals with the epidemiology of mental disorders in different countries, their treatment options, mental health education, political and financial aspects, the structure of mental health care systems, human resources in mental health, and human rights issues among others.

The overall aim of the field of Global Mental Health is to strengthen mental health all over the world by providing information about the mental health situation in all countries, and identifying mental health care needs in order to develop cost-effective interventions to meet those specific

Global health

Global health is the health of populations in a global context and transcends the perspectives and concerns of individual nations. Health problems that transcend national borders or have a global political and economic impact are often emphasized. It has been defined as 'the area of study, research and practice that places a priority on improving health and achieving equity in health for all people worldwide' Thus, global health is about worldwide improvement of health, reduction of disparities, and protection against global threats that disregard national borders. The application of these principles to the domain of mental health is called Global Mental Health. The major international agency for health is the World Health Organization (WHO). Other important agencies with impact on global health activities include UNICEF, World Food Programme (WFP), United Nations University - International Institute for Global Health and the World Bank. A major initiative for improved global health is the United Nations Millennium Declaration and the globally endorsed Millennium Development Goals. .

Measurement

Analysis of global health hinges on how to measure health burden. Several measures exist: DALY, QALY and mortality measurements. The choice of measures can be controversial and includes practical and ethical considerations.

Life expectancy

Life expectancy is a statistical measure of the average life span (average length of survival) of a specified population. It most often refers to the expected age to be reached before death for a given human population (by nation, by current age, or by other demographic variables). Life expectancy may also refer to the expected time remaining to live, and that too can be calculated for any age or for any group.

Disability adjusted life years

The disability-adjusted life year (DALY) is a summary measure that combines the impact of illness, disability and mortality on population health. The DALY combines in one measure the time lived with disability and the time lost due to premature mortality. One DALY can be thought of as one lost year of ‘healthy’ life and the burden of disease as a measurement of the gap between current health status and an ideal situation where everyone lives into old age free of disease and disability. For example, DALYs for a disease are the sum of the years of life lost due to premature mortality (YLL) in the population and the years lost due to disability (YLD) for incident cases of the health condition. One DALY represents the loss of one year of equivalent full health.

Quality adjusted life years

Quality-adjusted life years, or QALYs, is a way of measuring disease burden, including both the quality and the quantity of life lived, as a means of quantifying in benefit of a medical intervention. The QALY model requires utility independent, risk neutral, and constant proportional tradeoffs behaviour. QALYs attempt to combine expected survival with expected quality of life into a single number: if an additional year of healthy life expectancy is worth a value of one (year), then a year of less healthy life expectancy is worth less than one (year). QALY calculations are based on measurements of the value that individuals place on expected years of survival. Measurements can be made in several ways: by techniques that simulate gambles about preferences for alternative states of health, with surveys or analyses that infer willingness to pay for alternative states of health, or through instruments that are based on trading off some or all likely survival time that a medical intervention might provide in order to gain less survival time of higher quality. QALYs are useful for utilitarian analysis, but does not in itself incorporate equity considerations.

Infant and child mortality

Life expectancy and DALYs/QALYs represent the average disease burden well. However, infant mortality and under-five child mortality are more specific in representing the health in the poorest sections of a population. Therefore, changes in these classic measures are especially useful when focusing on health equity. These measures are also important for advocates of children's rights. Approximately 56 million people died in 2001. Of these, 10.6 million were children under 5 years of age, 99% of these children were living in low-and middle-income countries. That translates to roughly 30,000 children dying every day.

Morbidity

Morbidity measures include incidence rate, prevalence and cumulative incidence. Incidence rate is the risk of developing some new condition within a specified period of time. Although sometimes loosely expressed simply as the number of new cases during some time period, it is better expressed as a proportion or a rate with a denominator.

HEALTH CONDITIONS

The main diseases and health conditions prioritized by global health initiatives are sometimes grouped under the terms "diseases of poverty" versus "diseases of affluence", although the impacts of globalization are increasingly blurring any such distinction.

Respiratory diseases and measles

Infections of the respiratory tract and middle ear are major causes of infant and child mortality. In adults, tuberculosis is highly prevalent and causes significant morbidity and mortality. Mortality in tuberculosis has increased due to the spread of HIV. The spread of respiratory infections is increased in crowded conditions. Current vaccination programmes against pertussis prevent 600 000 deaths each year. Measles is caused by the morbillivirus and spread via the airways. It is highly contagious and characterized by flulike symptoms including fever, cough, and rhinitis and after a few days development of a generalized rash. It can effectively be prevented by vaccination. In spite of this, almost 200,000 people, mostly children under 5 years of age, died from measles in 2007. Pneumococci and Haemophilus influensae cause approximately 50 % of child deaths in pneumonia, and also cause bacterial meningitis and sepsis. Novel vaccines against pneumococci and Haemophilus influenza are clearly cost-effective in low-income countries. Universal use of these two vaccines are estimated to prevent at least 1 000 000 child deaths annually. For maximal long-term effect, vaccination of children should be integrated with primary health care measures.

Diarrhoeal diseases

Diarrhoeal infections are responsible for 17 per cent of deaths among children under the age of five worldwide, making them the second most common cause of child deaths globally. Poor sanitation can lead to increased transmission through water, food, utensils, hands and flies. Rotavirus is highly contagious and a major cause of severe diarrhoea and death (ca 20%) in children. According to the WHO, hygienic measures alone are insufficient for the prevention of rotavirus diarrhoea. Rotavirus vaccines are highly protective, safe and potentially cost-effective. Dehydration due to diarrhoea can be effectively treated through oral rehydration therapy (ORT), with dramatic reductions in mortality By mixing water, sugar and salt or baking soda and administering it to the affected child, dehydration can be effectively treated. Important nutritional measures are promotion of breastfeeding and zinc supplementation.

Maternal health

In many developing countries, complications of pregnancy and childbirth are the leading causes of death among women of reproductive age. A woman dies from complications from childbirth approximately every minute. According to the World Health Organisation, in its *World Health Report 2005*, poor maternal conditions account for the fourth leading cause of death for women worldwide, after HIV/AIDS, malaria, and tuberculosis. Most maternal deaths and injuries are caused by biological processes, not from disease, which can be prevented and have been largely eradicated in the developed world - such as postpartum haemorrhaging, which causes 34% of maternal deaths in the developing world but only 13% of maternal deaths in developed countries.

HIV/AIDS

Human immunodeficiency virus (HIV) is a retrovirus that first appeared in humans in the early 1980s. HIV progresses to a point where the infected person has AIDS or Acquired Immunodeficiency Syndrome. HIV becomes AIDS because the virus had depleted CD4+ T-cells that are necessary for a healthy immune system. Antiretroviral drugs prolong life and delay the onset of AIDS by minimizing the amount of HIV in the body.

HIV is transmitted through bodily fluids. Unprotected sex, intravenous drug use, blood transfusions, and unclean needles spread HIV through blood and other fluids. Once thought to be a disease that only affected drug users and homosexuals, it can affect anyone. Globally, the primary method of spreading HIV is through heterosexual intercourse. It can also be passed from a pregnant woman to her unborn child during pregnancy, or after pregnancy through breast milk. While it is a global disease that can affect anyone, there are disproportionately high infection rates in certain regions of the world.

In June 2001, the United Nations held a Special General Assembly to intensify international action to fight the HIV/AIDS epidemic and to mobilize the resources needed towards this aim, labelling the situation a "global crisis".

Malaria

Malaria is an infectious disease caused by protozoan Plasmodium parasites. The infection is transmitted via mosquito bites. Early symptoms may include fever, headaches, chills and nausea. Each year approximately 500 million cases of malaria occur worldwide, most commonly among children and pregnant women in underdeveloped countries. Malaria can hinder economic development of a country. Economic effects of malaria include decreased work productivity, treatment cost, and time spent for getting treatment.

Deaths in malaria can be sharply and cost-effectively reduced by use of insecticide-treated bed nets, prompt Artemisia-based combination therapy, and supported by intermittent preventive therapy in pregnancy. However, only 23% of children and 27% of pregnant women in Africa were estimated to sleep under insecticide-treated bed nets.

Nutrition and micronutrient deficiency

Greater than two billion people in the world are at risk of micronutrient deficiencies (including lack of vitamin A, iron, iodine and zinc). Among children under the age of five in the developing world, malnutrition contributes to 53% of deaths associated with infectious diseases. Malnutrition impairs the immune system, thereby increasing the frequency, severity, and duration of childhood illnesses (including

measles, pneumonia and diarrhoea). Micronutrient deficiencies also compromise intellectual potential, growth, development and adult productivity.

However, infection is also an important cause and contributor to malnutrition. For example, gastrointestinal infections causes diarrhoea, and HIV, tuberculosis, intestinal parasites and chronic infection increase wasting and anaemia

Fifty million children under the age of five are affected by vitamin A deficiency. Such deficiency has been linked with night blindness. Severe vitamin A deficiency is associated with xerophtalmia and ulceration of the cornea, a condition that can lead to total blindness. Vitamin A is also involved in the function of the immune system and in maintaining epithelial surfaces. For this reason, vitamin A deficiency leads to increased susceptibility to infection and disease. In fact, vitamin A supplementation was shown to reduce child mortality rates by 23% in areas with significant levels of vitamin A deficiency.

Iron deficiency affects approximately one-third of the world's women and children. Iron deficiency contributes to anaemia along with other nutritional deficiencies and infections and is associated with maternal mortality, prenatal mortality and mental retardation globally. In anaemic children, iron supplementation combined with other micronutrients improves health and haemoglobin levels In children, iron deficiency compromises learning capacity, and emotional and cognitive development.

Iodine deficiency is the leading cause of preventable mental retardation. As many as 50 million infants born annually are at risk of iodine deficiency. Pregnant women who are iodine deficient should be included in the target population for this particular intervention because pregnant women with iodine deficiency increases the chance of miscarriages and also lowers the development potential of the infant Global efforts for universal salt iodization are helping eliminate this problem.

According to Lasserini and Fischer et al., zinc deficiency may increase the risk of mortality from diarrhoea; pneumonia and malaria Almost 30% of the world's children are estimated to be zinc deficient. Supplements have been shown to reduce the duration of diarrhoea episodes

Interventions to prevent malnutrition include micronutrient supplementation, fortification of basic grocery foods, dietary diversification, hygienic measures to reduce spread of infections, and promotion of breastfeeding. Dietary diversification aims to increase the consumption of vital micronutrients in the regular diet. This is done by education and promotion of a diverse diet, and by improving access to micronutrient-rich and locally produced food.

Surgical disease burden

While infectious diseases such as HIV exact a great health toll in low-income countries, surgical conditions including trauma from road traffic crashes or other injuries, malignancies, soft tissue infections, congenital anomalies, and complications of childbirth also contribute significantly to the burden of disease and

impede economic development. It is estimated that surgical diseases comprise 11% of the global burden of disease, and of this 38% are injuries, 19% malignancies, 9% congenital anomalies, 6% complications of pregnancy, 5% cataracts, and 4% prenatal conditions. The majority of surgical DALYs are estimated to be in South-East Asia (48 million), though Africa has the highest per capita surgical DALY rate in the world.

As discussed above, injuries are the largest contributor to the global surgical disease burden with road traffic accidents (RTAs) contributing the largest share. According the WHO, more 3500 RTA related deaths occur daily with millions injured or disabled for life. Road traffic accidents are projected to rise from the ninth leading cause of death and DALYs lost globally in 2004, to the top five in 2030. This would place injuries ahead of infectious diseases by 2030

Chronic disease

The relative importance of chronic non-communicable disease is increasing. For example, the rates of type 2 diabetes, associated with obesity, have been on the rise in countries traditionally noted for hunger levels. In low-income countries, the number of individuals with diabetes is expected to increase from 84 million to 228 million by 2030. Obesity is preventable and is associated with numerous chronic diseases including cardiovascular conditions, diabetes, stroke, cancers and respiratory diseases. About 16% of the global burden of disease, measured as DALYs, has been accounted for by obesity.

In September 2011, the United Nations is hosting its first General Assembly Special Summit on the issue of non-communicable diseases. Noting that non-communicable diseases are the cause of some 35 million deaths each year, the international community is being increasingly called to take important measures for the prevention and control of chronic diseases,.

DISEASES OF AFFLUENCE

Diseases of affluence is a term sometimes given to selected diseases and other health conditions which are commonly thought to be a result of increasing wealth in a society. Also referred to as the "Western disease" paradigm, these diseases are in contrast to so-called "diseases of poverty", which largely result from and contribute to human impoverishment.

Examples of diseases of affluence include mostly chronic non-communicable diseases (NCDs) and other physical health conditions for which personal lifestyles and societal conditions associated with economic development are believed to be an important risk factor - such as type 2 diabetes, coronary heart disease, cerebrovascular disease, peripheral vascular disease, obesity, hypertension, cancer, alcoholism, gout and some types of allergies. They may also be considered to include depression and other mental health conditions associated with increased social isolation and lower levels of psychological well being observed in many developed countries. Many of these

conditions are interrelated, for example obesity is thought to be a partial cause of many other illnesses.

In contrast, the diseases of poverty tend to be largely infectious diseases, often related to poor hygiene, low vaccination coverage, inadequate public health safety or weak enforcement of environmental health regulations.

Despite the term, the so-called "diseases of affluence" are predicted to become more prevalent in developing countries, as diseases of poverty decline, longevity increases and lifestyles change. In 2008, nearly 80% of deaths due to NCDs - including heart disease, strokes, chronic lung diseases, cancers and diabetes - occurred in low- and middle-income countries.

Tuskegee Study of Untreated Syphilis in the Black Male

In 1932, the Public Health Service, working with the Tuskegee Institute, began a study to record the natural history of syphilis in hopes of justifying treatment programs for blacks. It was called the "Tuskegee Study of Untreated Syphilis in the Negro Male".

The study initially involved 600 black men – 399 with syphilis, 201 who did not have the disease. The study was conducted without the benefit of patients' informed consent. Researchers told the men they were being treated for "bad blood," a local term used to describe several ailments, including syphilis, anaemia, and fatigue. In truth, they did not receive the proper treatment needed to cure their illness. In exchange for taking part in the study, the men received free medical exams, free meals, and burial insurance. Although originally projected to last 6 months, the study actually went on for 40 years. It has been called "arguably the most infamous biomedical research study in U.S. history."

Note that a USPHS physician who took part in the Tuskegee program, John Charles Cutler, was in charge of the US government's syphilis experiments in Guatemala, in which Guatemalan prisoners, soldiers, orphaned children, and others were deliberately infected with syphilis and other sexually-transmitted diseases from 1946-1948 in order to study the disease, in a project funded by a grant from the National Institutes of Health. President Obama apologised to Guatemala for this program in 2010.

Emergency response since 1999

Commissioned Corps emergency response teams are managed by the Office of the Surgeon General. They are trained and equipped to respond to public health crises and national emergencies, such as natural disasters, disease outbreaks, or terrorist

attacks. The teams are multidisciplinary and are capable of responding to domestic and international humanitarian missions. Officers have responded to many such emergencies in the past, including:

Cholera out breaks in Uganda
Ebola out break in Uganda
Polio outbreak
Fire out break in Kenya
Internally displaced peoples camps in Northern Uganda
Mud slide in Uganda
HIV scourge in Africa
Malaria management

All the above are interventions which desperately required public health

HEALTH INTERVENTIONS

Many low-cost, evidence-based health care interventions for improved health and survival are known. Priority global targets for improving maternal health include increasing coverage of deliveries with a skilled birth attendant. Interventions for improved child health and survival include: promotion of breastfeeding, zinc supplementation, vitamin A fortification and supplementation, salt iodization, hand washing and hygiene interventions, vaccination, treatment of severe acute malnutrition. In malaria endemic regions, use of insecticide treated bed nets and intermittent pharmacological treatment reduce mortality. Based on such studies, the Global Health Council suggests a list of 32 treatment and intervention measures that could potentially save several million lives each year.

Progress in coverage of health interventions, especially relating to child and maternal health (Millennium Development Goals 4 and 5), is tracked in 68 low-income countries by a WHO- and UNICEF-led collaboration called *Countdown to 2015*. These countries are estimated to account for 97% of maternal and child deaths worldwide.

To be most effective, interventions need to be appropriate in the local context, be timely and equitable, and achieve maximum coverage of the target population. Interventions with only partial coverage may not be cost-effective. For example, immunization programs with partial coverage often fail to reach the ones at greatest risk of disease. Furthermore, coverage estimates may be misleading if not distribution is taken into account. Thus, mean national coverage may appear fairly adequate, but may nevertheless be insufficient when analyzed in detail. This has been termed 'the fallacy of coverage'.

While investments by countries, development agencies and private foundations has increased substantially in recent years with aim for improving health intervention coverage and equitable distribution, including for measuring progress towards the achievement of the Millennium Development Goals, attention is also being increasingly directed to addressing and monitoring the health systems and health workforce barriers to greater progress. For example, in its *World Health Report 2006*,

the WHO estimated a shortage of almost 4.3 million doctors, midwives, nurses and support workers worldwide, especially in sub-Saharan Africa, in order to meet target coverage levels to achieve the Millennium Development Goals 4 and 5.

Preventive medicine

Preventive medicine or **preventive care** refers to measures taken to prevent diseases, (or injuries) rather than curing them or treating their symptoms. The term contrasts in method with curative and palliative medicine, and in scope with public health methods (which work at the level of population health rather than individual health).

Levels

Preventive medicine strategies are typically described as taking place at the primary, secondary, tertiary and quaternary prevention levels. In addition, the term primal prevention has been used to describe all measures taken to ensure fatal well-being and prevent any long-term health consequences from gestational history and/or disease. The rationale for such efforts is the evidence demonstrating the link between fatal well-being, or "primal health," and adult health. Primal prevention strategies typically focus on providing future parents with: education regarding the consequences of epigenetic influences on their child, sufficient leave time for both parents, and financial support if required. This includes parenting in infancy as well.

Simple examples of preventive medicine include hand washing, breastfeeding, and immunisations. Preventive care may include examinations and screening tests tailored to an individual's age, health, and family history. For example, a person with a family history of certain cancers or other diseases would begin screening at an earlier age and/or more frequently than those with no such family history. On the other side of preventive medicine, some non-profit organizations, such as the Northern California Cancer Centre, apply epidemiologic research towards finding ways to prevent diseases.

<table>
<tr><td colspan="3" rowspan="3">Prevention levels</td><td colspan="2">Doctor's side</td></tr>
<tr><td colspan="2">Disease</td></tr>
<tr><td>Absent</td><td>present</td></tr>
<tr><td rowspan="2">Patient's side</td><td rowspan="2">Illness</td><td>absent</td><td>Primary prevention
illness absent
disease absent</td><td>Secondary prevention
illness absent
disease present</td></tr>
<tr><td>present</td><td>Quaternary prevention
illness present</td><td>Tertiary prevention
illness present</td></tr>
</table>

disease absent	disease present

Definitions

Level	Definition
Primary prevention	Methods to avoid occurrence of disease. Most population-based health promotion efforts are of this type.
Secondary prevention	Methods to diagnose and treat extant disease in early stages before it cause significant morbidity.
Tertiary prevention	Methods to reduce negative impact of extant disease by restoring function and reducing disease-related complications.
Quaternary prevention	Methods to mitigate or avoid results of unnecessary or excessive interventions in the health system.

Universal, selective, and indicated

Gordon (1987) in the area of disease prevention, and later Kumpfer and Baxley in the area of substance use proposed a three-tiered preventive intervention classification system: universal, selective, and indicated prevention. Amongst others, this typology has gained favour and is used by the U.S. Institute of Medicine, the NIDA and the European Monitoring Centre for Drugs and Drug Addiction.

Tier	Definition
Universal prevention	Involves whole population (nation, local community, school, district) and aims to prevent or delay the abuse of alcohol, tobacco, and other drugs. All individuals, without screening, are provided with information and skills needed to prevent the problem.
Selective prevention	Involves groups whose risk of developing problems of alcohol abuse or dependence is above average. Subgroups may be distinguished by traits such as age, gender, family history, or economic status. For example, drug campaigns in recreational settings.
Indicated prevention	Involves a screening process, and aims to identify individuals who exhibit early signs of substance abuse and other problem behaviours. Identifiers may include falling grades among students, known problem consumption or conduct disorders, alienation from parents, school, and positive peer groups etc.

Outside the scope of this three-tier model is *environmental prevention*. Environmental prevention approaches are typically managed at the regulatory or community level and focus on ways to deter drug consumption. Prohibition and bans (e.g. on smoking, alcohol advertising) may be viewed as the ultimate environmental restriction. However, in practice, environmental preventions programs embrace various initiatives at the *macro* and *micro* level, from government monopolies for alcohol sales through roadside sobriety or drug tests, worker/pupil/student drug testing, increased policing in sensitive settings (near schools, at rock festivals), and legislative guidelines aimed at precipitating punishments (warnings, penalties, fines).

Professionals

Professionals involved in the public health aspect of this practice may be involved in entomology, pest control, and public health inspections. Public health inspections can include recreational waters, swimming pools, beaches, food preparation and serving, and industrial hygiene inspections and surveys.

In the United States, preventive medicine is a medical specialty, one of the 24 recognized by the American Board of Medical Specialties (ABMS). It encompasses three areas of specialization:

- General preventive medicine and public health
- Aerospace medicine
- Occupational medicine

To become board-certified in one of the preventive medicine areas of specialization, a licensed U.S. physician (M.D. or D.O.) must successfully complete a preventive medicine medical residency program following a one-year internship. Following that, the physician must complete a year of practice in that special area and pass the preventive medicine board examination. The residency program is at least two years in length and includes completion of a master's degree in public health (MPH) or equivalent. The board exam takes a full day: the morning session concentrates on general preventive medicine questions, while the afternoon session concentrates on the one of the three areas of specialization that the applicant has studied.

In addition, there are two subspecialty areas of certification:

- Medical toxicology (MT)
- Undersea and hyperbaric medicine (UHB), formerly "undersea medicine"

These certifications require sitting for an examination following successful completion of an MT or UHB fellowship and prior board certification in one of the 24 ABMS-recognized specialties.

Prophylaxis

Prophylaxis (Greek: προφυλάσσω *to guard or prevent beforehand*) is any medical or public health procedure whose purpose is to prevent, rather than treat or cure a

disease. In general terms, prophylactic measures are divided between *primary* prophylaxis (to prevent the development of a disease) and *secondary* prophylaxis (whereby the disease has already developed and the patient is protected against worsening of this process).

Examples

Some specific examples of prophylaxis include:

- Many vaccines are prophylactic, vaccines such as polio vaccine, smallpox vaccine, measles vaccine, mumps vaccine and others have greatly reduced many childhood diseases; HPV vaccines prevent certain cancers; influenza vaccine.
- Birth control methods are used to prevent unwanted pregnancy. Condoms, for instance, are sometimes euphemistically referred to as "prophylactics" because of their use to prevent pregnancy as well as the transmission of sexually transmitted infections.
- Daily and moderate physical exercise in various forms can be called prophylactic because it can maintain or improve one's health. Cycling for transport appears to very significantly improve health by reducing risk of heart diseases, various cancers, muscular- and skeletal diseases, and overall mortality.
- Eating plenty of fruits and vegetables each day may be prophylactic. It may reduce the risk of heart disease.
- Fluoride therapy and tooth cleaning, either at home or by a professional, are parts of dental prophylaxis or oral prophylaxis.
- Antibiotics are sometimes used prophylactically: For example, during the 2001 anthrax attacks scare in the United States, patients believed to be exposed were given ciprofloxacin. In similar manner, the use of antibiotic ointments on burns and other wounds is prophylactic. Antibiotics are also given prophylactically just before some medical procedures such as pacemaker insertion.
- Tricyclic antidepressants (TCAs) may, *with caution*, be an example of a chronic migraine preventive (see amitriptyline and migraines' prevention by medicine).
- Antimalarials such as chloroquine and mefloquine are used both in treatment and as prophylaxis by visitors to countries where malaria is endemic to prevent the development of the parasitic *Plasmodium*, which cause malaria.
- Mechanical measures (such as graduated compression stockings or intermittent pneumatic compression) and drugs (such as low-molecular-weight heparin, unfractionated heparin, and fondaparinux) may be used in immobilized hospital patients at risk of venous thromboembolism.
- Risk reducing or prophylactic mastectomies may be carried out for carriers of the BRCA mutation gene to minimise the risk of developing breast cancer.
- Early and exclusive breastfeeding provides immunological protection against infectious diseases and well as reduced risk of chronic diseases for both mother and child.
- Polypill for prevention of e.g. cardiovascular disease.

- Potassium iodide is used prophylactically to protect the thyroid gland from absorbing inhaled or ingested radioactive iodine, which may lead to the development of thyroid cancer; radioactive iodine may be released into the environment in the event of an accident at a nuclear power plant, or the detonation of a nuclear explosive (see thyroid protection due to nuclear accidents and emergencies).
- Prophylaxis may be administered as oral medication. Oral prophylaxis includes: PEP, nPEP, or PrEP. PEP stands for post-exposure prophylaxis used in an occupational setting e.g., to prevent the spread of HIV or Hepatitis C from patient to staff following an accidental needlestick. nPEP is non-occupational post-exposure prophylaxis. nPEP may be used in a sexual or injection exposure to HIV, hepatitis, or other infectious agents; for example, during intercourse, if the condom breaks and one partner is HIV-positive, nPEP will help to decrease the probability that the HIV-negative partner becomes infected with HIV. (An nPEP is sometimes known as a PEPse - i.e. post-exposure prophylaxis sexual encounter.) PrEP is a measure taken daily (before, during, and after) possible exposure; for example, by a person who inconsistently uses condoms during sex with a partner who may have an HIV infection.

Limitations

Since preventive medicine deals with healthy individuals or populations the costs and potential harms from interventions need even more careful examination than in treatment. For an intervention to be applied widely it generally needs to be affordable and highly cost effective.

For instance, intrauterine devices (IUD) are highly effective and highly cost effective contraceptives, however where universal health care is not available the initial cost may be a barrier. IUDs work for several years (3 to 7 or more) and cost less over a year or two's time than most other reversible contraceptive methods. They are also highly cost effective, saving health insurers and the public significant costs in unwanted pregnancies. Making contraceptives available with no up front cost is one way to increase usage, improving health and saving money.

Preventive solutions may be less profitable and therefore less attractive to makers and marketers of pharmaceuticals and medical devices. Birth control pills which are taken every day and may take in a thousand dollars over ten years may generate more profits than an IUD, which despite a huge initial mark-up only generates a few hundred dollars over the same period.

List of preventable causes of death

The World Health Organisation has traditionally classified death according to the primary type of disease or injury. However, causes of death may also be classified in terms of preventable risk factors such as smoking, unhealthy diet, and sexual behaviour which contribute to a number of different diseases. Such risk factors are usually not recorded directly on death certificates.

Leading cause of preventable death
Leading causes of preventable death worldwide as of the year 2001

Cause	Deaths caused (millions per year)
Hypertension	7.8
Smoking	5.0
High cholesterol	3.9
Malnutrition	3.8
Sexually transmitted infections	3.0
Poor diet	2.8
Overweight and obesity	2.5
Physical inactivity	2.0
Alcohol	1.9
Indoor air pollution from solid fuels	1.8
Unsafe water and poor sanitation	1.6

Leading preventive interventions that reduce deaths in children 0–5 years old worldwide

Intervention	Percent of all child deaths preventable
Breastfeeding	13
Insecticide-treated materials	7
Complementary feeding	6
Zinc	4
Clean delivery	4
Hib vaccine	4
Water, sanitation, hygiene	3
Antenatal steroids	3
Newborn temperature management	2
Vitamin A	2

Tetanus toxoid	2
Nevirapine and replacement feeding	2
Antibiotics for premature rupture of membranes	1
Measles vaccine	1
Antimalarial intermittent preventive treatment in pregnancy	<1%

Public health programs

Today, most governments recognize the importance of public health programs in reducing the incidence of disease, disability, and the effects of aging, although public health generally receives significantly less government funding compared with medicine. In recent years, public health programs providing vaccinations have made incredible strides in promoting health, including the eradication of smallpox, a disease that plagued humanity for thousands of years.

An important public health issue facing the world currently is HIV/AIDS. Antibiotic resistance is another major concern, leading to the reemergence of diseases such as Tuberculosis.

Another major public health concern is diabetes. In 2006, according to the World Health Organization, at least 171 million people worldwide suffered from diabetes. Its incidence is increasing rapidly, and it is estimated that by the year 2030, this number will double.

A controversial aspect of public health is the control of smoking. Many nations have implemented major initiatives to cut smoking, such as increased taxation and bans on smoking in some or all public places. Proponents argue by presenting evidence that smoking is one of the major killers in all developed countries, and that therefore governments have a duty to reduce the death rate, both through limiting passive (second-hand) smoking and by providing fewer opportunities for smokers to smoke. Opponents say that this undermines individual freedom and personal responsibility (often using the phrase nanny state in the UK), and worry that the state may be emboldened to remove more and more choice in the name of better population health overall. However, proponents counter that inflicting disease on other people via passive smoking is not a human right, and in fact smokers are still free to smoke in their own homes.

There is also a link between public health and veterinary public health which deals with zoonotic diseases, diseases that can be transmitted from animals to humans.

Community health

Community health, a field within public health, is a discipline that concerns itself with the study and betterment of the health characteristics of biological communities. While the term community can be broadly defined, community health tends to focus on geographic areas rather than people with shared characteristics. The health characteristics of a community are often examined using geographic information system (GIS) software and public health datasets. Some projects, such as InfoShare or GEOPROJ combine GIS with existing datasets, allowing the general public to examine the characteristics of any given community in the United States.

Because health III (broadly defined as well-being) is influenced by a wide array of socio-demographic characteristics, relevant variables range from the proportion of residents of a given age group to the overall life expectancy of the neighborhood. Medical interventions aimed at improving the health of a community range from improving access to medical care to public health communications campaigns. Recent research efforts have focused on how the built environment and socio-economic status affect health.

In Africa, community health is studied in three broad categories:

- Primary health care which refers to interventions that focus on the individual or family such as hand-washing, immunisation, circumcision and use of condoms etc.

- Secondary health care refers to those activities which focus on the environment such as draining puddles of water near the house, clearing bushes and spraying insecticides to control vectors like mosquitoes.

- Tertiary health care on the other hand refers to those interventions that take place in a hospital setting such as intravenous rehydration or surgery.

Success of community health programmes rely on the transfer of information from health professionals to the general public using one-to-one or one to many communication (Mass communication). The latest shift is toward Health marketing with the centers for disease control (CDC) taking the lead.

Health promotion

Health promotion has been defined by the World Health Organization's 2005 Bangkok Charter for Health Promotion in a Globalized World as "the process of enabling people to increase control over their health and its determinants, and thereby improve their health". The primary means of health promotion occur through developing healthy public policy that addresses the prerequisities of health such as income, housing, food security, employment, and quality working conditions. There is a tendency among public health officials and governments -- and this is especially the case in liberal nations such as Canada and the USA -- to reduce health

promotion to health education and social marketing focused on changing behavioral risk factors.

Worksite health promotion

Health promotion can be performed in various locations. Among the settings that have received special attention are the community, health care facilities, schools, and worksites. Worksite health promotion, also known by terms such as "workplace health promotion," has been defined as "the combined efforts of employers, employees and society to improve the health and well-being of people at work". WHO states that the workplace "has been established as one of the priority settings for health promotion into the 21st century" because it influences "physical, mental, economic and social well-being" and "offers an ideal setting and infrastructure to support the promotion of health of a large audience"[19].

Worksite health promotion programs (also called "workplace health promotion programs," "worksite wellness programs," or "workplace wellness programs") include exercise, nutrition, smoking cessation and stress management. Reviews and meta-analyses published between 2005 and 2008 that examined the scientific literature on worksite health promotion programs include the following:

Health policy

Health care often accounts for one of the largest areas of spending for both governments and individuals all over the world, and as such it is surrounded by controversy. For example, it is now clear that medical debt is now a leading cause of bankruptcy in the United States. Though there are many topics involved in health care politics, most can be categorized as either philosophical or economic. Philosophical debates center around questions about individual rights and government authority while economic topics include how to maximize the quality of health care and minimize costs.

Philosophy
Right to Health Care

The United Nations' Universal Declaration of Human Rights (UDHR) asserts that medical care is a right of all people. Many religions also impose an obligation on their followers to care for those in less favourable circumstances, including the sick. Humanists too would assert the same obligation and the right has been enshrined in many other ways too.

An opposing school of thought rejects this notion. They (laissez-faire capitalists for example) assert that providing health care funded by taxes is immoral because it is a form of legalized robbery, denying the right to dispose of one's own income at one's own will. They assert that doctors should not be servants of their patients but rather they should be regarded as traders, like everyone else in a free society."

Government Regulation

A second question concerns the effect government involvement would have. One concern is that the right to privacy between doctors and patients could be eroded if governments demand power to oversee health of citizens.

Another concern is that governments use legislation to control personal freedoms. For example, some Canadian provinces have outlawed private medical insurance from competing with the national social insurance systems for basic health care to ensure fair allocation of national resources irrespective of personal wealth. Laissez-faire supporters argue that this blocks a fundamental freedom to use one's own purchasing power at will.

Controlling the Industry

When a government controls the health care industry, it defines what health care is available, and how it is paid for, privately or with taxes. Public regulation, investor owned HMOs and medical insurance companies (which are not under the democratic control of health care users) may all determine what health care a person might get.

Universal health care requires government involvement and oversight.

Impact on quality of health care

One question that is often brought up is whether publicly-funded health care provides better or worse quality health care than market driven medicine. There are many arguments on both sides of the issue.

Arguments which see publicly-funded health care as improving the quality of health care:

- For those people who would otherwise go without care, any quality care is an improvement.
- Since people perceive universal health care as *free*, they are more likely to seek preventative care which makes them better off in the long run.
- A study of hospitals in Canada found that death rates are lower in private not-for-profit hospitals than in private for-profit hospitals.

Arguments which see publicly-funded health care as worsening the quality of health care:

- It slows down innovation and inhibits new technologies from being developed and utilized. This simply means that medical technologies are less likely to be researched and manufactured, and technologies that are available are less likely to be used.
- Free health care can lead to overuse of medical services, and hence raise overall cost.
- Publicly-funded medicine leads to greater inefficiencies and inequalities.

- It is alleged that uninsured citizens can simply pay for their health care. Even indigent citizens can still receive emergency care from alternative sources such as non-profit organizations. Some providers may be required to provide some emergency services regardless of insured status or ability to pay, as with the Emergency Medical Treatment and Active Labor Act in the United States.

Impact on medical professionals

Proponents of universal health care contend that universal health care reduces the amount of paperwork that medical professionals have to deal with, allowing them to concentrate on treating patients.

Impact on Medical Research

Those in favor of universal health care posit that removing profit as a motive will increase the rate of medical innovation. Those opposed argue that it will do the opposite, for the same reason.

Health economics

Health economics is a branch of economics concerned with issues related to scarcity in the allocation of health and health care. For example, it is now clear that medical debt is the principle cause of bankruptcy in the United States.[1] In broad terms, health economists study the functioning of the health care system and the private and social causes of health-affecting behaviors such as smoking.

A seminal 1963 article by Kenneth Arrow, often credited with giving rise to the health economics as a discipline, drew conceptual distinctions between health and other goals.[2] Factors that distinguish health economics from other areas include extensive government intervention, intractable uncertainty in several dimensions, asymmetric information, and externalities.[3] Governments tend to regulate the health care industry heavily and also tend to be the largest payer within the market. Uncertainty is intrinsic to health, both in patient outcomes and financial concerns. The knowledge gap that exists between a physician and a patient creates a situation of distinct advantage for the physician, which is called asymmetric information. Externalities arise frequently when considering health and health care, notably in the context of infectious disease. For example, making an effort to avoid catching a cold, or practicing safer sex, affects people other than the decision maker.

Scope

The scope of health economics is neatly encapsulated by Alan Williams' "plumbing diagram" dividing the discipline into eight distinct topics:

- What influences health? (other than health care)
- What is health and what is its value
- The demand for health care
- The supply of health care

- Micro-economic evaluation at treatment level
- Market equilibrium
- Evaluation at whole system level; and,
- Planning, budgeting and monitoring mechanisms.

Health care demand

The demand for health care is a derived demand from the demand for health. Health care is demanded as a means for consumers to achieve a larger stock of "health capital." The demand for health is unlike most other goods because individuals allocate resources in order to both consume and produce health.

Michael Grossman's 1972 model of health production has been extremely influential in this field of study and has several unique elements that make it notable.[5] Grossman's model views each individual as both a producer and a consumer of health. Health is treated as a stock which degrades over time in the absence of "investments" in health, so that health is viewed as a sort of capital. The model acknowledges that health care is both a consumption good that yields direct satisfaction and utility, and an investment good, which yields satisfaction to consumers indirectly through increased productivity, fewer sick days, and higher wages. Investment in health is costly as consumers must trade off time and resources devoted to health, such as exercising at a local gym, against other goals. These factors are used to determine the optimal level of health that an individual will demand. The model makes predictions over the effects of changes in prices of health care and other goods, labour market outcomes such as employment and wages, and technological changes. These predictions and other predictions from models extending Grossman's 1972 paper form the basis of much of the econometric research conducted by health economists.

In Grossman's model, the optimal level of investment in health occurs where the marginal cost of health capital is equal to the marginal benefit. With the passing of time, health depreciates at some rate δ. The interest rate faced by the consumer is denoted by r. The marginal cost of health capital can be found by adding these variables: $MC_{HK} = r + \delta$. The marginal benefit of health capital is the rate of return from this capital in both market and non-market sectors. In this model, the optimal health stock can be impacted by factors like age, wages and education. As an example, δincreases with age, so it becomes more and more costly to attain the same level of health capital or health stock as one ages. Age also decreases the marginal benefit of health stock. The optimal health stock will therefore decrease as one ages.

Cost Determination

A large focus of health economics, particularly in the UK, is the microeconomic evaluation of individual treatments. In the UK, the National Institute for Health and Clinical Excellence (NICE) appraises certain new and existing pharmaceuticals and devices using economic evaluation.

Economic evaluation is the comparison of two or more alternative courses of action in terms of both their costs and consequences (Drummond et al.). Economists usually distinguish several types of economic evaluation, differing in how consequences are measured:

- Cost minimisation analysis
- Cost benefit analysis
- Cost-effectiveness analysis
- Cost-utility analysis

In cost minimisation analysis (CMA), the effectiveness of the comparators in question must be proven to be equivalent. The 'cost-effective' comparator is simply the one which costs less (as it achieves the same outcome). In cost-benefit analysis (CBA), costs and benefits are both valued in cash terms. Cost effectiveness analysis (CEA) measures outcomes in 'natural units', such as mmHg, symptom free days, life years gained. Finally cost-utility analysis (CUA) measures outcomes in a composite metric of both length and quality of life, the Quality-adjusted life year (QALY). (Note there is some international variation in the precise definitions of each type of analysis).

A final approach which is sometimes classed an economic evaluation is a cost of illness study. This is not a true economic evaluation as it does not compare the costs and outcomes of alternative courses of action. Instead, it attempts to measure all the costs associated with a particular disease or condition. These will include direct costs (where money actually changes hands, e.g. health service use, patient co-payments and out of pocket expenses), indirect costs (the value of lost productivity from time off work due to illness), and intangible costs (the 'disvalue' to an individual of pain and suffering). (Note specific definitions in health economics may vary slightly from other branches of economics.)

Market equilibrium

Health care markets

The five health markets typically analyzed are:

- Health care financing market
- Physician and nurses services market
- Institutional services market
- Input factors market
- Professional education market

Although assumptions of textbook models of economic markets apply reasonably well to health care markets, there are important deviations. Insurance markets rely on risk pools, in which relatively healthy enrollees subsidise the care of the rest. Insurers must cope with adverse selection which occurs when they are unable to fully predict the medical expenses of enrollees; adverse selection can destroy the risk pool. Features of insurance markets, such as group purchases and preexisting condition exclusions are meant to cope with adverse selection.

Insured patients are naturally less concerned about health care costs than they would if they paid the full price of care. The resulting moral hazard drives up costs, as shown by the famous RAND Health Insurance Experiment. Insurers use several techniques to limit the costs of moral hazard, including imposing copayments on patients and limiting physician incentives to provide costly care. Insurers often compete by their choice of service offerings, cost sharing requirements, and limitations on physicians.

Consumers in health care markets often suffer from a lack of adequate information about what services they need to buy and which providers offer the best value proposition. Health economists have documented a problem with supplier induced demand, whereby providers base treatment recommendations on economic, rather than medical criteria. Researchers have also documented substantial "practice variations", whereby the treatment a patient receives depends as much on which doctor they visit as it does on their condition. Both private insurers and government payers use a variety of controls on service availability to rein in inducement and practice variations.

The U.S. health care market has relied extensively on competition to control costs and improve quality. Critics question whether problems with adverse selection, moral hazard, information asymmetries, demand inducement, and practice variations can be addressed by private markets. Competition has fostered reductions in prices, but consolidation by providers and, to a lesser extent, insurers, has tempered this effect.

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Course Name : Micro Economics Theory
Course Code : APDPS 102
Course level : level 1
Credit Units : 4 CU
Contact Hours : 60 Hrs

Course Description
This course deals with major economic models and theories, the behavior of market forces, main features of the Uganda economy, basic features of international economies as well as understanding Uganda monetary and financial system.

Course Objectives
· To strengthen the student's capacity in determining the market forces of demand and supply in their countries.
· To assist in providing basic economics knowledge for policy makers, government officials as well as people working in the private sector.
· To enable students make rational decisions in their own businesses/organizations in terms of economic decisions.

Course content
Introduction to Micro Economic theory
· Definition & scope of Economics
· Basic principles of Economics
· The Production Possibility Curve(PPF)
· Its implication on development of an economy
· The concept of a market
· Types of markets
· Price determination in the market
· Types of prices

Demand theory
· Definition of demand function
· Law of demand
· Factors that influence demand for goods and services
· Market demand
· Derivation of the market demand curve
· Factors that influence a change in demand
· The slope of the demand curve

Supply theory
· Definition of supply
· Law of supply
· Factors that influence supply of goods and services

· The slope of the supply curve
· Change in quantity supplied Vs change in supply

Production theory
· Definition of production
· Levels/stage of production
· Types of production
· Examining different factors of production
· FOP and their relevance to national development

Theory of Costs
· Types of costs
· Short run costs of production
· Examining the relationship between TFC, TVC and TC
· Long run cost curves
· Derivation of the long run average cost curve

Economies of scale
· Internal economies of scale
· External economies of scale
· Internal diseconomies of scale
· External diseconomies of scale
· The product concept of the firm

Market structures
· Perfect competition
· Monopoly
· Monopolistic competition
· Oligopoly

Mode of delivery: Face to face lectures, Personal studies and Correspondence

Assessment
Course work 40%
Exams 60%
Total Mark 100%

DEFINING ECONOMICS

According to Robbins, ''Economics is a Science which studies human behaviour as relationship between ends and scarce means which have alternative uses". When defining economics, the following should be noted.

1. Economics is a social science because it studies and predicts human behaviour.
2. Human wants are insatiable (endless). It is assumed that man is borne greedy and that all his wants can never be satisfied.
3. Man satisfies some of his wants by consuming (using) goods and services (commodities). These commodities are produced by using resources (factors or means of production), which are scarce.
4. Means or factors of production have alternative uses. Therefore man has to allocate them well to produce the maximum possible amount of commodities.
5. The economic problem arises when man tries to allocate the scarce resources to produce commodities that would satisfy his wants (ends) the more.
6. Time is also scarce in the production process. There are 24 hours in a day, which have to be allocated to different tasks.

THE SCOPE OF ECONOMICS

This refers to the limit to which economic problems can be discussed in addition to what is implied in the definition, the following should be noted about the scope of economics.

1. The subject matter of economics. This covers all aspects of economics activity namely. Production, exchange, consumption & distribution of commodities. Production involves the "creation" of goods and services. Exchange is the transfer of goods and services Distribution concerns the division of goods and services among individuals and groups.
2. Economics is both an Art and science. As an art; Economics involves the utilisation of facts of science for practical purposes. As a science, economics is a systematized body of knowledge ascertainable by observation and experiment and it uses a scientific method to process theory.

   A scientific method consists of 2 approaches;

   (a) Induction: This involves the use of observation, collection and organisation of facts about events to derive laws (theories) which can be tested.
   (b) Deduction: This is where assumptions and conclusions about events are tested against actual events.

3. Economics is a positive & normative science. Positive economics is about what the world is, was or will be. It is about facts in real life.

   Normative economics is about what the world should be or would be or ought to be – normative economics depends on individual's opinion. Economics disagree on most normative statements but agree on most positive statements.
4. Economics is related to other social sciences. Other social sciences include political science; sociology psychology etc. problems in these sciences affect economic condition of any country.

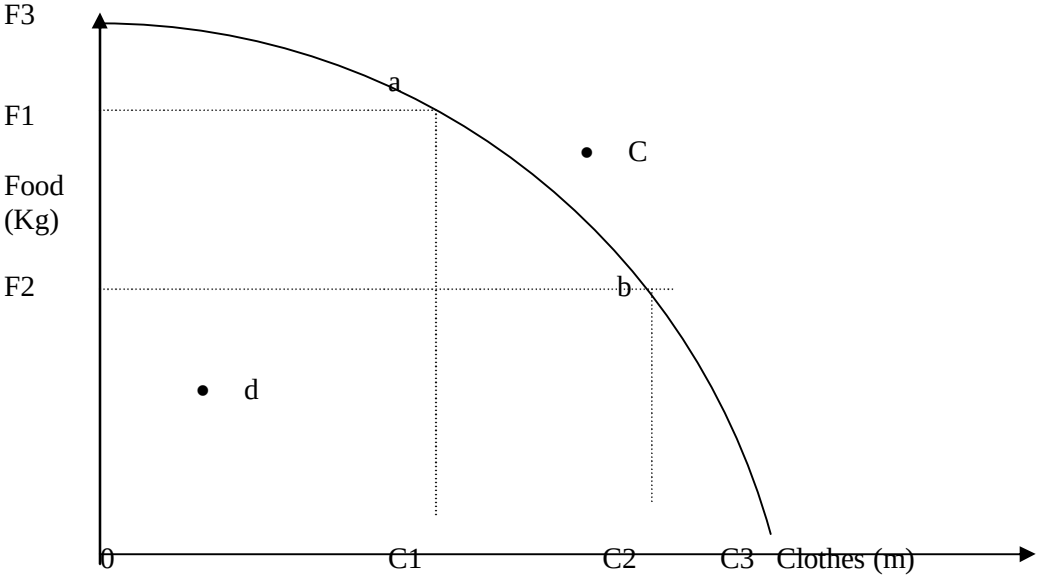
5. Economists get technical facts from natural science and engineering natural sciences like physics & chemistry can provide scientific facts, which can be used in economic analysis. However Economics and other social sciences differ from natural science because;
   (a) Social sciences deal with the behaviour of man, which change over time with changes in economic social and political conditions.
   (b) Experiment in social sciences cannot be controlled. E.g. When investigating the relationship between the price and quality demanded of a commodity one can not control other factors like income tastes and preferences etc. which also affect demand in such a case it is assumed that other factors remain constant (ceteris paribus) while investigating economic phenomenon.

BASIC PRINCIPLES OF ECONOMICS

Basic principles of economics explain fundamental economic problems of man. These principles are:
1. Scarcity: Scarcity means that all commodities are relatively less than people's desires for them. This is because resources are not enough to produce all commodities that people want to consume. Scarce goods are called economic goods where as those which exist in abundance are called free goods. Economists are mainly concerned with economic goods. However scarcity is relative term, e.g. Gold is more scarce than sand because it has more demand than supply compared to sand.
2. Choice: Choice refers to the taking of the right decision. It arises because of scarcity, which requires one to find consumers to issues like what goods shall be produced? For who shall be produced? How much shall be produced? Etc. If human beings were rational they would rank their wants in their order of preference (priorities) such that they would first satisfy the most pressing wants and end with the least pressing wants. Such a list of wants organised according to priorities is called the scale of preference deadline.
3. Opportunity cost: It refers to the next alternatives foregone when choice is made. It also arises because of scarcity e.g. by buying a car, you can forego a house when resources are not enough to buy both. If the house is the next alternative on your scale of preference, the opportunity cost of having one car would be the number of houses that you forego (do with out). This principle is illustrated on the opportunity cost curve or production possibility frontier (PPF).

THE PPF

It is a locus of points showing the combinations of commodities that may be produced when all resources are fully utilised E.g. assuming that a country utilises all its resources to produce clothes and food, the production possibility curve would appear as shown below.

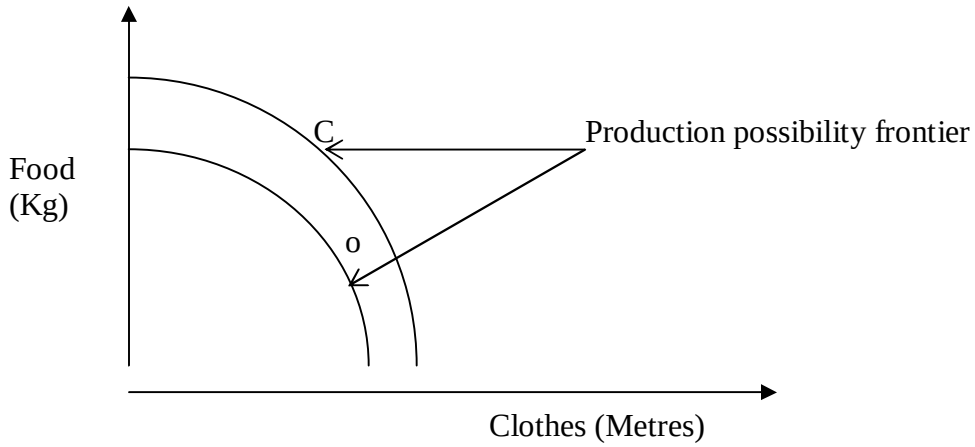


The above figure shows that a country can produce either 0F3 Kg of food or 0c3 metres of clothes or various combinations of food and clothes.

The PPF illustrates the following:

1. Scarcity and choice: Resources are scarce because the country cannot produce beyond its production possibilities curve using the fixed resources. According to the above figure, to produce C_1, C_2 more metres of cloth, we forego F_1, F_2 kg of food. Hence there is a need to choose between the two and to assume questions; what to produce? How much of each commodity to produce?
2. Opportunity Cost: This is illustrated by a movement along the production possibility frontier. E.g. in the figure above, from a to b, to produce C_1, C_2 more metres of cloth, we forego F_1, F_2 kg of food. Therefore, the opportunity cost of producing C_1C2 extra metres of clothes is $F1F_2$ kg of food that we forego.
3. Efficiency in production: In figure above points on the curve (e.g. a and b) show efficient utilisation of available resources. Points inside the curve (e.g. d) shows that some resources are not utilised i.e. there is under employment or inefficiency. Points outside the curve (e.g. c) are not attainable using available resources.

4. Economic growth: This is illustrated by the shift of the production possibility frontier outwards (to the right as shown below.



The above figure indicates that there is an increase in resources and hence increase in commodities produced. This may be the result of discovering more resources e.g. minerals or importing more resources.

ECONOMIC THEORY

(a) This involves presentation and analysis of small economic group or groups of individuals e.g. price of one commodity, SS & dd of one commodity, study of one firm etc.
(b) Macro economics:- This deals with total or aggregate behaviour of all individuals in each economy. It looks at the economy as one functioning unit e.g. aggregate income, aggregate dd and SS, inflation, unemployment etc.

Obviously macro economics explanations are not necessarily separate from micro economic explanations e.g. the growth of the economy is most likely to have been affected by the allocation of investment funds across the various sectors of the economy; Unemployment will be affected by the

decline and rise of individual industries, but the fundamental reason for a distinction being made is the notion that broad aggregates might behave differently from the way that is predicted by theories based on observing the behaviours of individual's markets, e.g. a cut in wages in one industry may make it profitable for employers in that industry to employ more workers but Keynes suggested that a cut in wages across the economy as a whole might reduce the aggregate demand for goods and services hence forcing all employers to cut back on production and hence workers.

(c) Development theory: this involves the analysis of the whole society it looks at the past trend, analyses the present and predicts what will happen in the future e.g. it looks at change in national income in a changing society.

ECONOMIC SYSTEM

This refers to the organisation of ownership, allocation and distribution of resources in each economy. The major economic systems include planned/command economies, market economies, subsistence economies and mixed economy.

Planned/Command economies: In a command economy, all or most decisions about resource allocation are made by central planning authority. The government fixes the quantity of each good to be produced and the price at which is sold.

It sets quotas for each individual production unit. It decides how many resources should be employed in producing the goods. The state decides how each worker is to specialise. Such a government believes that it knows best how to organise, distribute and co-ordinate a country's resources.

There is no private profit, because all resources are public owned. The individuals consumer, although being able to express a desire for certain types. Communist economies are command economies. In such planned economy, economic efficiency depends on the accuracy of the government's plan in fore costing society's wants and allocating resources to meet them. Frequently the chosen output mix will be inefficient, for instance the prices of certain consumer goods may be set at a lower level than the free market price for ideological reasons.

In a communist economy people there have only limited freedom, if any in their economic decisions, but in return they have greater security and greater social equality, basic necessities should be made available to every one at the price fixed by the government that they can all afford, but there are frequently shortages of consumer goods, which limit that choice.

The disadvantages of a planned/command Economies.

1. Having the state controlled price system it becomes impossible to judge the wants of households and so what is produced might not be what the household wanted.
2. Planning usually involves large bureaucracies, which are wasteful labour resources.
3. The co-ordination and management of large-scale economic plans are difficult in practice because of the enormous scale of the undertaking.
4. It is arguable that government of individualship lessens the incentives, of individuals and reduces initiatives, efforts and productivity due to absence of profit motive.
5. There is no consumer sovereignty; therefore freedom of choice is violated.
6. Due to opposition of masses, centrally planned economies have always been characterised by lack of domestic institutions.

7. There is absence of competition in a command, which is a discentive to efficiency.

Advantages of Command/Planned Economy

1. It ensures proper allocation of resources
2. There is price and economic stability, which can lead to rapid economic growth e.g. the communes of China.
3. Maximisation of social welfare due to public ownership.
4. The state gets full control and is able to implement economic plans effectively.
5. It reduces income inequalities by removing inequalities of opportunity in society.
6. The production and consumption of un desirable goods (demerit goods) can be prevented.
7. Public goods and merit goods can be provided since production in a planned economy is not for profit motive.

Capitalist system/Litisses faire/free market economy:

A capitalist free market economy is a complete contrast to a planned economy because economic decisions are left to individuals.

The allocation of resources is the result of countless individual decisions by producers & no role for the government (state) in directing and allocation of resources.

In this system there is freedom of choice in that individuals are free to buy and hire economics resources, to organise these resources for production to sell their products in markets of the own choice. Because of this, individuals are free to enter and leave any industry producers are motivated by profits their production decision.

Thus in a market economy quantities produced, prices and resource allocation are all market determined. However, a free market economy might create un satisfactory outcomes for how wealth is distributed, what goods are produced and how they are produced.

Disadvantages of the market Economy

1. Since all resources are only available at their prevailing market prices some members of the community might be badly deprived, unable to afford even the basic necessities of the life.
2. It might result in a very unsatisfactory and socially un acceptable distribution of income.
3. Some desirable products may not be produced for lack of profitability e.g. construction of roads, Health centres etc.
4. Some un desirable products may be produced e.g., dangerous addictive drugs.
5. Competition may be eliminated by monopolies and other restrictive practices, reflecting the disproportionate economic power of certain firms and groups of society.
6. Competition may lead to a wastage of resources e.g. excessive advertising.
7. Private wealth may be maximised at the expense of others. Where such equalities of wealth exist, resources may be allocated to production of luxury goods to the exclusion of necessities for the poor.
8. Some vital services (e.g. police and courts of law, fire services, etc) would not be provided by private enterprises and must be provided by the government.
9. Some prices of key goods (e.g. agricultural goods) might be volatile, subject to big rise and falls unless measures for prices stabilisation are taken by the government.

10. Some other key goods, such as health and education, might be provided in inadequate quantities in a free market. And provision of those goods by the state will be necessary to create them in adequate quantities.

Advantages of the market economy

1. Good quality products are likely to be generated since in free market economy there is competition, which encourages the improvement in quality or products.
2. It does not require any person to monitor it and thus costs of administration are reduced.
3. It provides an incentive to work hard and efficiency through price and profit signals. Resources go to those who can utilise them better.
4. Goods and services may be available to consumers at cheap prices. Since individuals are not forced to buy goods which he cannot afford especially if they are not essential goods.
5. Consumers sovereignty is promoted. Producers produce goods which consumers buy more.
6. Flexibility in production depending on profitability.
7. There is no resource wastage.

Mixed Economics

There is a system, which combines competitive private enterprises with some degree of central control. The disadvantages of both an entirely command economy or an entirely free market economy suggest that, a certain amount of government planning is valuable, despite the problems of a controlled economy.
Thus a mixed economy is that economy where some resources are owned by state (government) and others by private individuals.

Reasons as to why the government have no intervene in a free economy.

1. To restrain the unfair use of economic power by monopolies or other bodies who might be able to impose their wishes on the rest of society.
2. To correct the inequalities of the free market system, distributing wealth between individuals and regions.
3. To provide goods and services that private enterprises would be reluctant or unable to provide in sufficient quantities and at an acceptable price e.g. special equipment for handicapped people, armed forces and the provision of electricity and railway system.
4. To remove socially undesirable consequences of private production e.g. pollution control, regional imbalance in employment.
5. To direct change in the structure of the nations industries, by retraining programmes, aid to renew industries, investment in research and development etc.
6. To manage inflation rates, employment levels, the balance of payments and the economic growth rates in accordance with social objectives.
7. To moderate the ups and downs in the trade cycle, by trying to deepen dd when it is so high that steep price inflation occurs.

PRICE THEORY

Price theory is the study of prices. Prices are relative values of goods and services in terms of money at a particular time. Price theory is also concerned with the economic behaviour of individual consumers,

producers and resource owners. It explains the production, allocation, consumption and pricing of goods & services.

THE CONCEPT OF A MARKET.

In economics, a market is an arrangement in which buyers and sellers negotiate the exchange of a well defined commodity. In the market, buyers and sellers must communicate together.

TYPES OF MARKETS

1. Product markets: These are markets in which goods & a service to consumers are bought and sold.
2. Resource markets: These are markets in which production resources especially labour and capital are bought and sold.
3. Spot market: This is a market where a commodity or a currency is traded for immediate delivery.
4. Forward market: This is also referred to as future market. This is a market where buyers and sellers make a contract to buy or sell commodities or services at a fixed date of the price agreed in the contract.
5. Free market: This is a market where there is no government (central authorities) intervention.
6. Controlled market: This is a market controlled by the government.

Types of markets as per structure.

7. Perfect market: This refers to the market where non of the buyers or sellers had the power to influence prices in a market by either influencing demand or supply.
8. Imperfect market: This is a market where a buyer or a seller has the power to influence the price in the market by either influencing demand or supply.

PRICE DETERMINATION IN THE MARKET

Price: The price of a good or in put shows what has to be given up in order to obtain a good or service. It is usually denoted in money terms, although payment not need be in monetary terms only.

In the market, price is determined in the following ways.

1. Haggling: This is when a seller asks for a given price and a consumer urges for a suitable price. The seller keeps on reducing the price and the buyer keeps on increasing the amount is willing to pay. Both parties will reach a compromise and that will be the price of a commodity. If a consumer have got more power, the price will be in his favour and vis –versa.
2. Fixing by treaties: Here buyers and sellers come together to fix the price of a commodity. The price agreed upon can later be revised by amending the treaty, e.g. the prices of coffee used to be fixed by the international coffee agreement. Prices of commodities can also be fixed by the government.
3. Sales Auction: This takes place when there is one seller and many buyers. Buyers compete for the commodity by offering high prices. The commodity is taken by one who pays the higher prices (the highest bidder) the seller at times fixes the reserve price or the minimum price he/she can accept.
4. Determination of price by forces of demand and supply.
5. Resale price maintenance: Some manufacturers want to control the prices at which the retailers will sell their products. They (manufactures) allow a discount to retailers and indicate to them the price to change consumers e.g. newspapers.

TYPES OF PRICES

(a) Equilibrium Price: This is a price determined by forces of demand and supply.
(b) Market Price:- This is the price prevailing in the market at any particular time.
(c) Normal price:- This is the equilibrium price which is established after along period of fluctuations.
(d) Reserve Price: This is the minimum price below which a seller will not sell his commodity in a perfectly competitive market.

ANALYSIS OF DEMAND AND SUPPLY

DEMAND THERORY

Demand refers to the desire backed by the ability and willingness to have the commodity desired. The total demand in an economy is referred to as "aggregate demand". Demand backed by actual payment may be described as effective demand"

DEMAND FUNCTION

This is an algebraic expression of the dd schedule expressed either in general terms or with specific numerical values expressed for various parameters and usually including all factors affecting dd.
i.e. Qd = F(pi, pj, yh, t, E, Dy, A, G, P_n, Setc)

Qd = demand of a good
Pi = Price of goods
Pj = price of other goods
Yh = the size of household income
T = tastes and fashion
E = expectations
Dy = the distribution of income
A = Advertising
G = Government policy
Pn = Population
S = Seasonal changes

Thus the demand for a commodity is influenced by so many factors some of which are the following:

Demand and price of the good

The demand of a good depends on its own price. The higher the price, the lower the quantity demanded and vice versa. When the price increases, consumers will buy less of the commodity whose price have increased and buy more of the substitute whose price will have not changed.

The demand schedule.

This is a table showing the level of demand for a particular good at various levels of price of the good in question. It relates to the specific period of time (e.g. per annum, per month etc) it is drawn on the basis

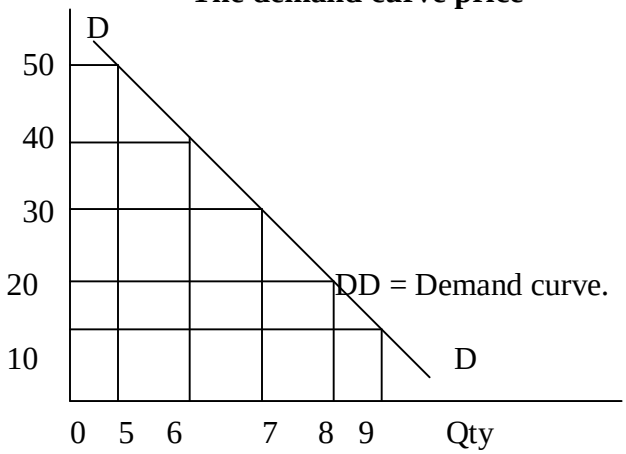
that other factors affecting the level of demand e.g. income, tastes, price of other goods etc are held constant.

Demand schedule for soap powder

Price per Kg	Quantity demand in 10 kgs
10	9
20	8
30	7
40	6
50	5

We can show this schedule graphically with price on Y-axis and quantity demanded on the X-axis.

The demand curve price



The demand curve is drawn by joining the points shown in the figure above by a continuous line DD. Thus the demand curve is a graphical representation of the demand schedule. It is a locus of points showing quantity demanded of the commodity at various prices per period of time. It is drawn on the assumption that the higher the price the lower the quantity demanded and vis-versa other factors remaining constant.

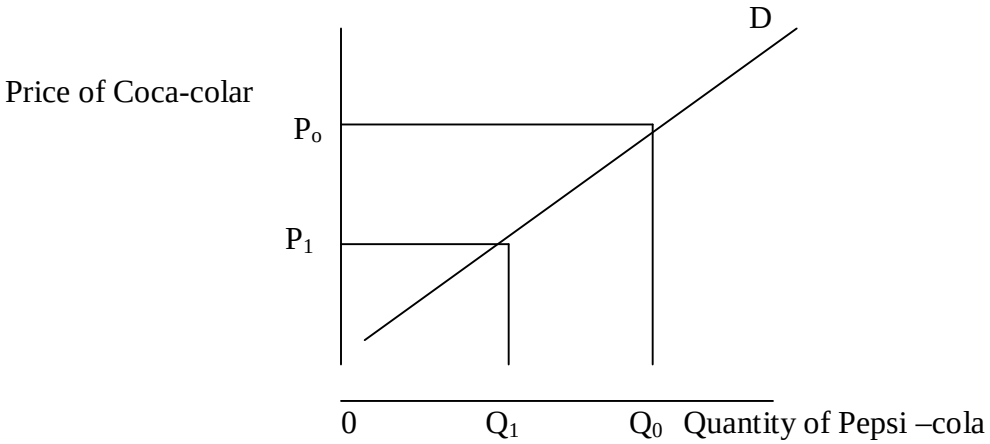
2. Demand and the price of the other goods.

The change in one good may not necessarily change the demand for another good e.g. on increase in the price of salt will not affect the demand for motor cars, However there are goods for which the market demand is in some way interconnected these inter-related goods are referred to as either substitutes or complements.

Substitutes goods

These are goods that are alternative to each other, so that an increase in demand for one is likely to cause a decrease in the demand for another e.g. Coca-cola and Pepsi –cola, bus rides and car rides etc.

The cross demand curve of substitutes.



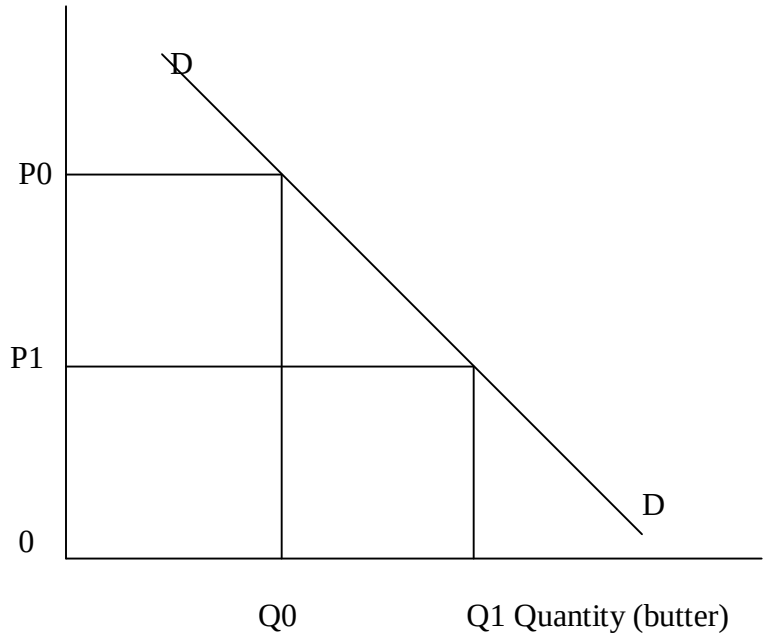
In the figure above, a fall in price of coca-cola (Po-P1) causes a decrease in the demand for Pepsi-cola from Q0 to Q1.
Goods are regarded as substitutes if a rise (or a fall) in the price of one good results in a rise (or fall) in demand for the other. The extent or amount of substitution that takes place depends on:

(a) The amount of price change
(b) The closeness of substitutes.

Complements
These are goods that tend to be bought and used together so that an increase in the demand for one is likely to cause an increase in the demand for the other e.g. motor cars and fuel, bread and butter etc.

In the above figure a fall in the price of bread from P0 to P1 will increase the quantity of butter demanded from Q0 to Q1 because demand for bread will rise in response to the price change.

The demand curve of complements
Price of bread

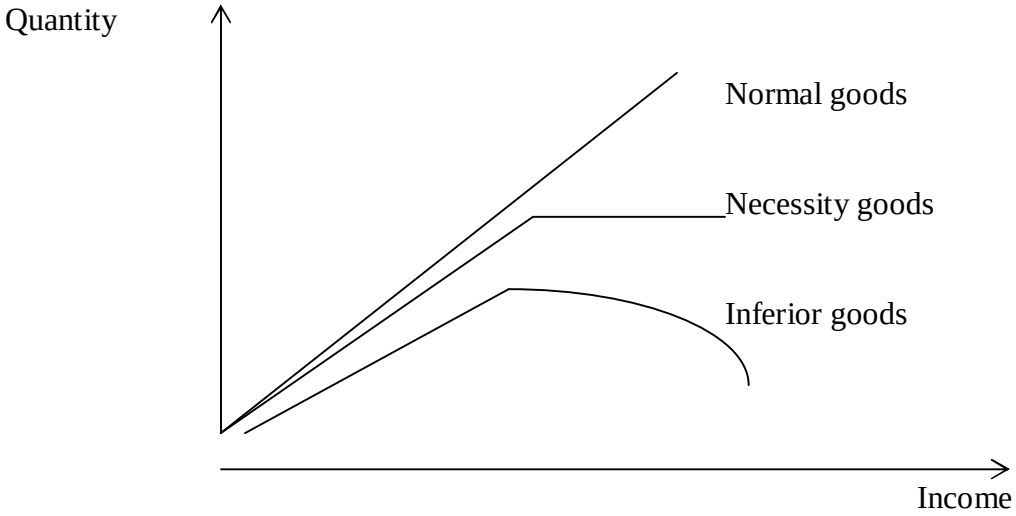


3. Demand and the size of the household income

   The level of income that a household earns will affect the demand for a good. More income will give household more to spend and they will want to buy more goods at exiting prices. However, a rise in household income will not increase the market demand for all goods and services. The effect of a rise in income on demand for an individual good will depend on the nature of the good.

   (a) If arise in household income increases demand for a good, then such a good is a normal good.
   (b) If demand increases up to a certain point and then remains uncharged as house hold income continues to rise e.g. basic foodstuffs such as salt, bread etc for which demand can reach a maximum level because there is a limit to what consumers can or want to consume then such goods are necessities.
   (c) Goods whose demand eventually falls as income rises are called interior goods e.g. tripe, Kasese Waragi etc. The reasons for falling demand is that consumers will prefer superior products to interior products (e.g. beef instead of tripe, Uganda waragi instead of Kasese (crude) then goods are interior goods.

The above three cases can be illustrated with the figure below:



4. Demand taste and fashion.

   A change in fashion will alter the demand for a product. Changes in taste may stem from psychological, social or economic causes e.g. if it becomes fashionable for middle class households in Sheraton Hotel to drink wine with their meals, the flow of expenditure on wine will increase.

   Taste of fashion is likely to be un predictable and so changes in demand might be only temporary e.g. the influence of an advertising campaign may have a temporary effect on demand.
5. Demand and expectations

   Where consumers believe that prices will rise, or that shortage will occur, they will attempt to stock up the product, thereby creating excess demand in the short run which will increase the prices. This can then lead to panic buying e.g. fear of war, expectation of the budget, the effects of strikes etc.

6. Demand and the distribution of national income

   Market demand for a good is influenced by the way in which the national income is shared between households when income is equitably distributed in the economy, the market demand for the product will be high and vice-versa.
7. Demand and seasonal changes

   The demand for certain product changes according to changes in seasons e.g. X-mas cards, tapes etc. When the season is favourable, the demand will be high and vice –versa.
8. Government policy and demand

   When the government imposes taxes on goods, prices of goods increases.
   This discourages consumers and quantity demand reduces. The offering of subsidies by the government encourages consumption and therefore quantity demanded increase.

9. Population

   The demand for the production is influenced by the size of the population, a big size of population will lead to move effective demand than a small one provided by the population has an ample purchasing power.

   <u>The individual demand curve</u>

   The individual demand curve focuses the attention on the effects of a change in the prices of one commodity on the consumer's behaviour. It is influenced by factors like:

   (a) The goods own price
   (b) Price of other goods
   (c) The size of household income
   (d) Tastes and fashions
   (e) Expectations
   (f) Advertising.

<u>Market Demand</u>

The market demand is the summation of the individual consumer's demands for a homogeneous commodity. The summation of different quantities of a commodity demanded by a number of individuals at various prices will give "a market demand schedule)".

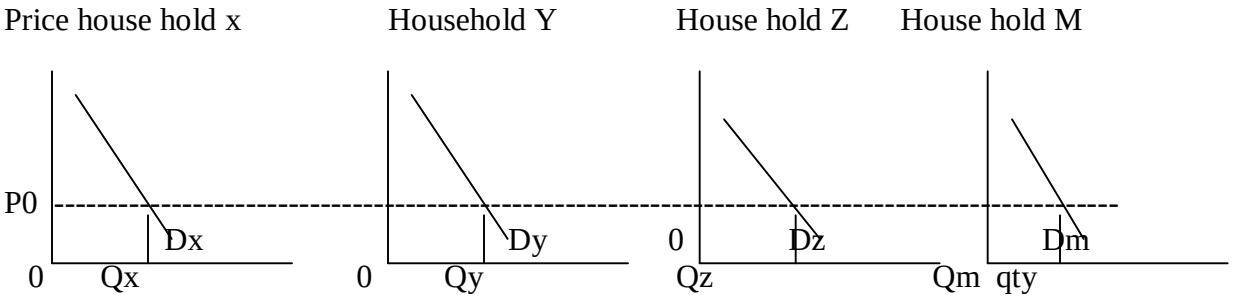
The market demand schedule for three consumers (X,Y,Z)

Price (shs)	Quantities dded in 000kgs			Total demand in 000kg
	X,	Y,	Z	
600	5	3	2	10
500	8	7	5	20
400	11	10	9	30
300	14	14	12	40

Market demand curve

This curve is also drawn from the demand schedule, expressing the expected total quantity of the good that would be demanded by all consumers together at any given price.

Derivation of the market demand curve.



In the Market Qm quantity will be bought which is made up by adding together the quantities (Qx,+Qy+Qz). The market demand curve Dm is obtained by the horizontal summation of the individual demand curve (Dx, Dy, and Dz)

NB: Market demand is influenced by factors like:

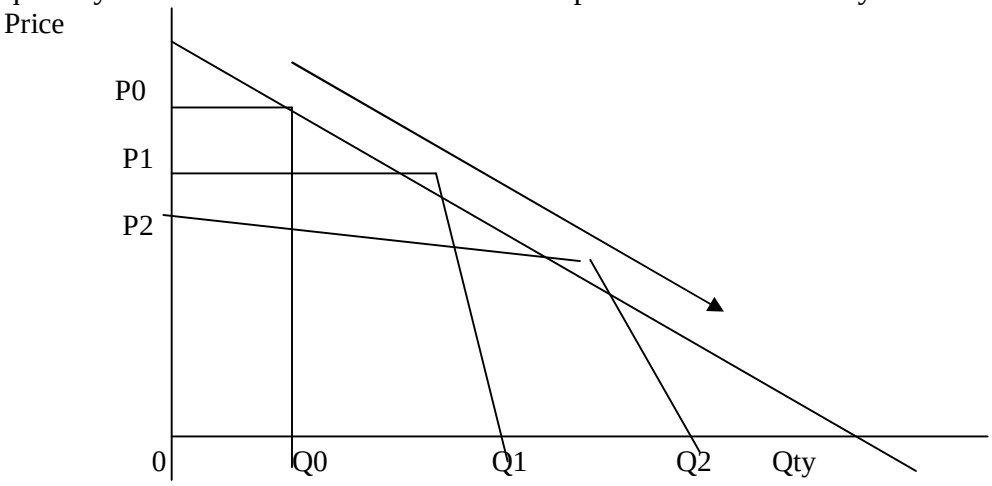
(a) The market price of the commodity
(b) Price of other commodities
(c) Income distribution
(d) Taste and preference of all households
(e) Size of population
(f) Total household income etc.

Movement along the demand curve when the price changes.

Changes in quantity demanded caused by changes in price are represented by movements along the demand curve movement along the demand curve represented by changes in price at the same demand curve.

Extension of the Demand curve

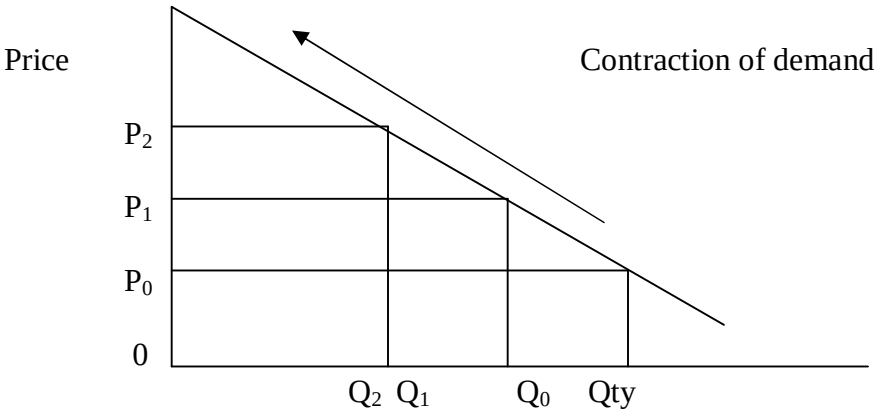
This is indicated by the down ward movement along the same demand curve. It refers to an increase in quantity demanded due to a reduction in the price of the commodity.



In the figure above, as the price reduce from P0 to P1, to P2 quantity increases from 0Q0 to 0Q1 to 0 Q2.

Contraction of demand

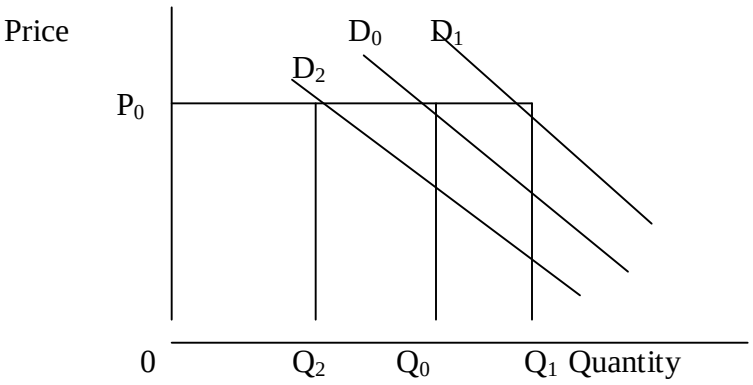
This is indicated by the upward movement along the same demand curve. It refers to a decrease in quantity demanded due to an increase in the price of the commodity.
Illustration



CHANGE IN DEMAND

It refers to the change in quantity demand ed at constant prices brought about by changes in factors which determine demand.

When there is change in other factors that affect demand, the relationship between quantity demanded and price will also change and there will be a different price quantity demanded schedule and so a different demand curve. We refer to these changes as a shift of the demand curve.



The figure above depicts arise in demand at each price level with the demand curve shifting to the right from D_0 to D_1 e.g. at price $0p_0$ demand for the good would rise from OQ_0 to OQ1. This shift could be caused by any of the following;

(a) A rise in household income
(b) A fall in the price of substitutes
(c) A fall in price of the complements

(d) A change in tasted towards this product
(e) An expected rise in the price of the product
(f) Increase in population
(g) Subsidisation of consumers
(h) A more less equal distribution of income.

The above figure also depicts "decrease in demand" at each price level, which is represented by a shifting to the left of the demand curve from D_0 to D_2. This may be caused by the reverse of the changes described in the points above. At price Opo, the demand will fall from $0Q_0$ to $0Q_1$

NB:

1. A shift of the demand curve to the right portrays an increase in the quantity demanded at any given price.
2. A shift of the curve to the left portrays a reduction in the quantity demand at any given price.

THE SLOPE OF THE DEMAND CURVE.

The demanded curve is a locus of points showing quantity demanded of a commodity at a various prices per period of time. The demand curve slopes down wards from left to right it illustrates the LAW OF DEMAND which states that
The higher the price, the lower the quantity demanded and vise-versa (ceteris peribus). This is due to the following factors;

1. The law of diminishing marginal utility: It states that as one consumes more of a commodity, after a certain point, the satisfaction derived from additional units (marginal utility) diminishes (reduces. As the consumer purchases more of the commodity, marginal utility diminishes. He can consume additional units only if the price is reduced.
2. Income effect;

   As the price falls real income of the consumer increases i.e. they can purchase more units of the commodity with the same money income. Alternatively an increase in price reduces real income and reduces quantity demanded. Thus real income is money income over price. It is the actual quantity of goods obtained from the money income.
3. Substitution effect

   As the price of the commodity falls keeping the prices of substitutes constant, consumers purchase more of it and purchase less of the substitutes. When the price of the commodity increases, consumers abandon it and buy its substitutes, which are relatively cheaper.

4. The price effect;

   This is a combination of income effect and substitution effect when the price of the commodity falls, consumers buy more of it because of the substitution and income effects.

5. Presence of low income groups

   Ordinary people (low income group) buy more when price falls and less when price arises. The rich do not have any effect on the demand curve because they are capable of buying the same quantity even at a higher price.

6. Different uses of the commodity. If the commodity has many uses, then it means those uses have some substitutes. Therefore the price of the commodity increases, people will divert A to those substitutes and therefore quantity demanded will decrease and vis-versa.

SUPPLY

Supply refers to the quantity of goods and services that existing suppliers would want to produce for the market at a given price in a given period of time.

The supply function

This is the statement which shows the technical relationship between quantity supplied and the major determinants of quantity supplied of the commodity.

Qs = F(P1, P2, P11, F1, Fn, G, T etc)

Where P1 = The commodity's own price
P_2,P_n = Factors of production
G = Goals of the firm
T =Technology

The factors which influence the quantity supplied

1. Price of commodity itself: In general, suppliers will want to supply a greater quantity of their out put at higher prices. Higher prices may mean greater profits and so the firm would be attracted by the prospects of bigger profits into supplying more units of out put. This can be shown by the supply schedule below.

The supply schedule

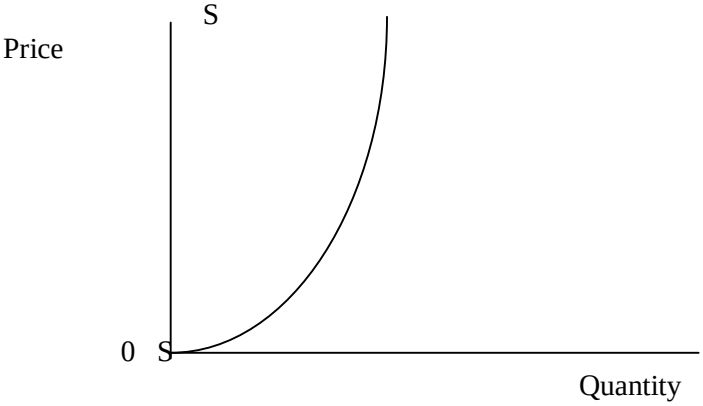
This is a numerical representation showing the amount of the commodity brought to the market at various prices per period of time.

A table showing the supply schedule for product Y

Price per Unit (SHS)	Quantity Supplied per Month (Kgs)
100	10,000
150	20,000
300	30,000
500	40,000

This schedule can be shown graphically with price on Y – axis and quantity supplied on X – axis

The supply curve



SS= Supply Curve

The supply curve is drawn by joining the points shown in the figure above by a continuous line SS. Thus the supply curve is a graphical representation of the supply schedule. It is the locus of points showing quantity supplied of each commodity at a various prices per period of time, the greater the quantity supplied other factors remaining constant.

2. The price of other goods

   An increase in the price of other goods would make the supply of a good whose price does not rise more un attractive to suppliers. Keeping other factors constant, when the prices of substitutes increases it becomes more profitable to produce substitutes which fetch higher and profits. When the price of substitutes fall, quantity supplied of the commodity increase because it becomes more profitable to produce the commodity whose price is relatively higher e.g. when the price of cassava fall, producers reallocate resources from cassava production to potato production whose price are relatively high for products which are produced together. An increase in supply of the other e.g. an increase in price of shirts would lead to an increase in supply of cotton, cotton oil dye etc.

3. The cost of production

   The cost of production which in turn depends on the prices of factors of production i.e. wages, interest rates, rent and profits. A rise in price of these factor (increases costs of production) which reduces supply and vise-versa.

4. Changes in technology
   Technological developments which reduce costs of production and increase productivity will rise the quantity supplied of a good & vice-versa.

5. Natural Factors

   Unfavourable natural factors decrease supply and vice-versa (e.g. agricultural goods)

6. Goals of the firm

   If the goal of each firm is profit maximisation, then supply will be low so as to change higher prices. If it is sales maximisation, then supply will be high and produces would want to sell as much as even though they are getting little profits.

7. Number of produces

   If there are many produces of a commodity quantity supplied is likely to be higher than where are few producers.
8. Working conditions

   Favourable terms of services would like good working condition prestige of work of services, power, professional excellence etc. will increase supply. These terms are referred to as non-pecuniary advantages (are not measurable in monetary units). While poor working conditions (non- pecuniary disadvantages) will reduce supply.

9. Government Policy

   Taxation will increase costs of production which lead to low quantity supplier and subsides would lead to a reduction in cost of production and an increase in quantity supplied.

10. Gestation period

    This is the production period (maturing period). The longer gestation period reduces SS and a shorter gestation period increase the SS.

11. Entry of new firms in the industry

    Once the market price and profits are conducive enough, this will act as a factor that will attract other firms in the industry leading to an increase in the SS of the commodity on condition that there is free entry and exit (perfect competition). In case of blocked entry (monopoly) SS will be restricted so as to sell at high prices.

12. Demand

High market demand calls for increase production and SS and Vice-versa.

13. Availability of inputs

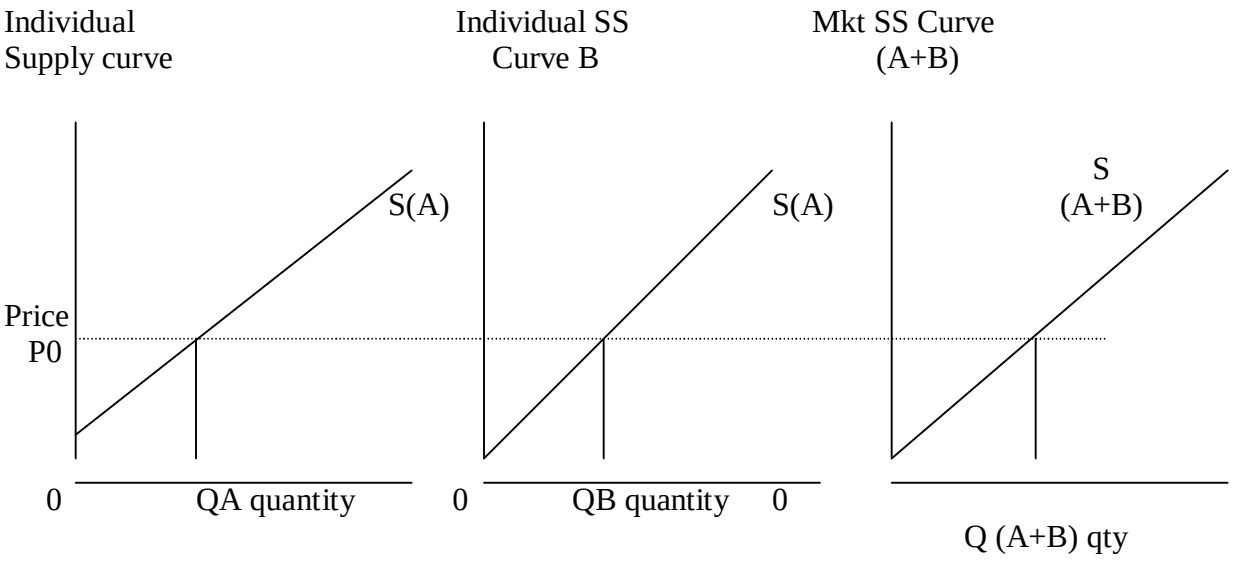
The more available the inputs the greater the supply. Scarcity of factor inputs reduces SS.

The Individual SS Curve

An individual SS curve shows the quantity of a good that the individual firm want to SS to the market at any given price.

The market supply Curve

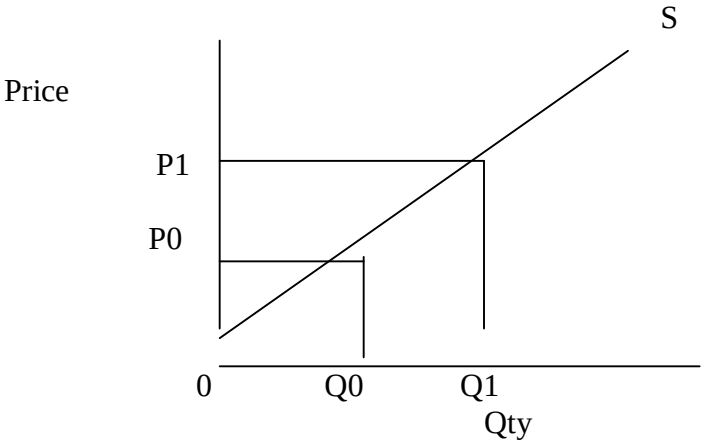
The market supply curve shows the horizontal summation of the SS curves of all individual suppliers in a commodity. The market supply curve is more elastic than the supply curves of the various individual's suppliers. This can be illustrated in the figure below.



In the figure above the quantity supplied in the market is the summation of the quantities supplied by (A) and (B) i.e. Q (A+B).

THE LAW OF SUPPLY

This law states, keeping other factors constant, the higher the price the greater the amount of the commodity supplied and vice-versa. It is illustrated by the supply curve.



In the figure above, when the price increases from OP0 to OP1 quantity supplied increases from OQ0 to OQ1 and vice versa.

The slope of the supply curve.

The SS curve is positively sloped (it sloped upwards from left to right) showing the direct relationship between price and quantity supplied. (see the figure above)

The positive slope is explained by the following factors:

1. Entry of new firms in the industry;

   When the price of a commodity increase new firms will be attracted to enter the industry due to prospects of increase profits. This will lead to an increase in SS as the price increases.

2. Profit Motive;

   If the goal of the firm is to earn more profits, then as the price of the commodity increase suppliers will SS more in order to make more profits.

3. The attempt by firms to maintain equilibrium under project competition.

4. The struggle to maintain equilibrium in the free market condition.
   As demand increases, prices will due to a shortage, firms will increase output in order to cover the shortage.
5. Ease of diverting resources from the production of the commodity whose price has reduced to the production of the commodity whose price has increased e.g. if the price of groundnut increase keeping the price of beans constant producers will easily divert resources (land, labour, capital) from

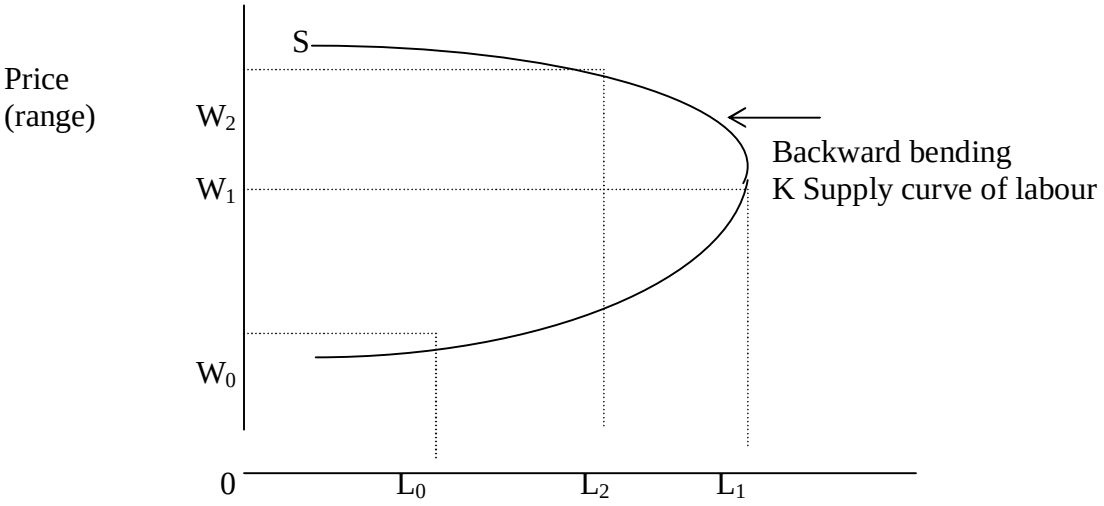
the production of beans to the production of groundnuts. This will lead to an increase in SS of groundnut as the price increases since producers will be expecting higher profits.

6. The attempt by firms to maintain equilibrium under perfect completion:
   Under such conditions firms aim at producing at a point where P=MR=AR=MC. So firms always struggles to adjust output so as to equate price and marginal cost.

ABNORMAL/RESRESSING/EXCEPTIONAL SUPPLY CURVE.

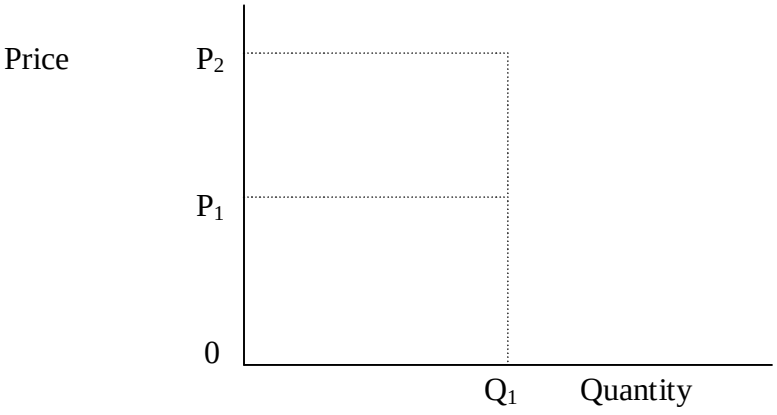
Normal supply curve usually slopes upwards from left to right. In this case the regressive supply curves do not obey the law of supply and they do not slope upwards from left to right. Examples are:

1. The supply curve of labour



In the figure when the range is increased from 0W0 to 0W1, labour supplied increase from 0L0 to 0L1. After point K, as the range increases from 0W1 to 0W2, labour supply reduces from 0L1 to 0L2. After point K, makes start working less hours because the range 0W1 was enough to meet their targets. Some workers may later abandon work after working enough money. Such workers are called target workers because they work only to full fill certain targets after which they leave work or work less hours. Also as people work more money, they prefer leisure to work.

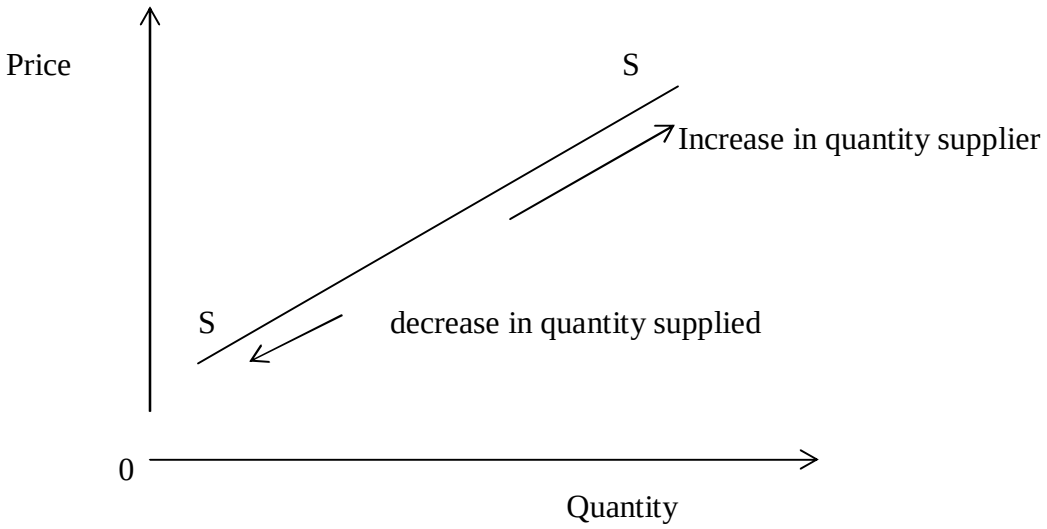
2. Fixed supply: This is another case of abnormal supply curves



In the figure despite the increase in price from 0P1 to 0P2, quantity supplied remains the same (0Q1) e.g. the supply of Agriculral products in the short run.

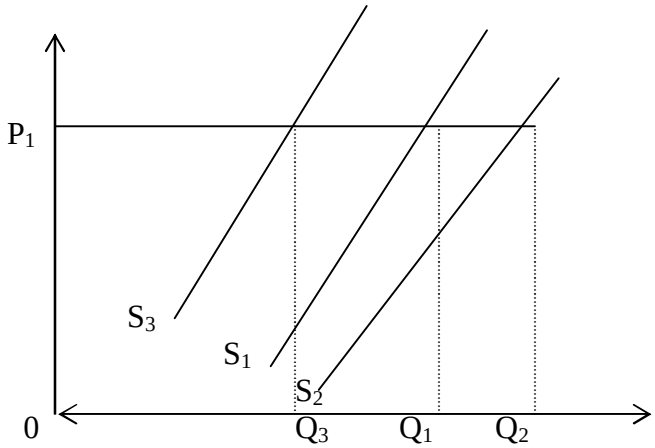
CHANGE IN QUANTITY SUPPLIED AND CHANGE IN SUPPLY

1. Change in quantity supplied. This occurs when there is a change in price of a commodity when other determinants of quantity supplier are assured to remain constant. It is illustrated by movements along the same supply curve as shown below:



2. Change in supply

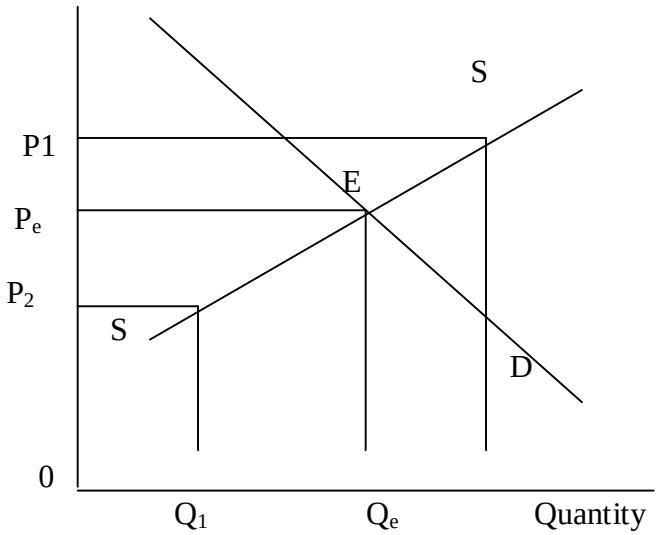
   This refers to the change in the state of supply at constant prices which arises from changes in variables which are assumed constant by the law of supply e.g. technology, price of competing commodities, etc. It is illustrated by the strict of the supply curve.



From the figure, at each possible price e.g. 0P1, quantity supplied can increase or decrease because of changes in other determinants a quantity supplied. Increase in supply curve to the right (S1 to S2). Quantity supplied increase from 0Q2 to Q2 at a constant price 0P1. Decrease in supply is illustrated by strict of the supply curve to the left (S1 to S3). Quantity supplied decreases from 0Q1 to 0Q3 at a constant price 0P1.

PRICE DETERMIANTION BY FORCES OF DEMAND AND SUPPLY.

In a competitive market, prices are determined by the mechanism which is the coordination of different objectives and activities of buyers and sellers by 'invisible forces' of demand and supply. This can be illustrated graphically as shown below.



In the figure at a high price, 0P1, simply exceeds demand i.e. we have excess supply (Q1,Q2) because producers supply too much because of the high price. Suppliers reduce the price to 0P2 so as to sell the excess supply. At a low price 0p2, there is high demand which leads to excess demand i.e. a situation where demand exceeds supply. Excess demand implies that there is a shortage of commodities which results into an increase in the price. The trend of increasing and falling price continues until quantity demanded is equal to quantity supplied. This point (E) is called equilibrium. From the figure above, 0Qe is equilibrium quantity bought and sold. 0Pe is equilibrium price. When equilibrium price is stable for some time (i.e. in the long run) it is called the normal price or the natural price.

NB: Equilibrium price may be different from the market price. Market price refers to any price determined by buyers and sellers in the market. Irrespective of whether supply is equal to demand or not. Therefore, equilibrium price is the market price where what is brought to the market by suppliers is cleared by buyers without learning any excess supply or excess demand.

PRODUCTION THEORY

Production refers to the process through which utility is created in the goods and services in order to satisfy human wants which may be private or public. It involves the following:-

a) Change of form e.g raw materials to finished products or intermediate goods.
b) Change of place. This involves the transportation of raw materials and finished products
c) Change of ownerships which involves exchange of goods and services.
d) Provision of direct services such as those of a teacher an engineer, a doctor etc.

LEVELS OPF STAGES OF PRODUCTION

1. Primary production: This refers to the extraction of basic raw materials from land, seas, air, etc and application of labour on these resources to produce primary products, such production includes farming, mining, hunting, fishing etc.
2. Secondary production. This involves the transformation of raw materials into finished commodities which are ready for use. It is the actual creation of utility in goods to make them provide satisfaction. It includes manufacturing, construction etc.
3. Tertiary production. This involves the production of services. These services may be direct as those of a teacher, doctor, lawyer, etc or commercial services which facilitate trade e.g insurance, transport, banking, warehousing etc. The provision of these services is necessary in order to bridge the gap between the producer and consumer

TYPES OF PRODUCTION.

a) Direct production: This involves the production good and services for one's own satisfaction. This type of production is also called substance production e,g making of tools for one's own use, treating your own child etc.
b) Indirect production: This is the production of goods and services for exchange (for market)
c) Round about production. This is the production of items not for consumption but for further production e.g production of machines, inputs like chemicals used in some industries, etc.

The products of this type of production are known as producer goods

FACTORS OF PRODUCTION

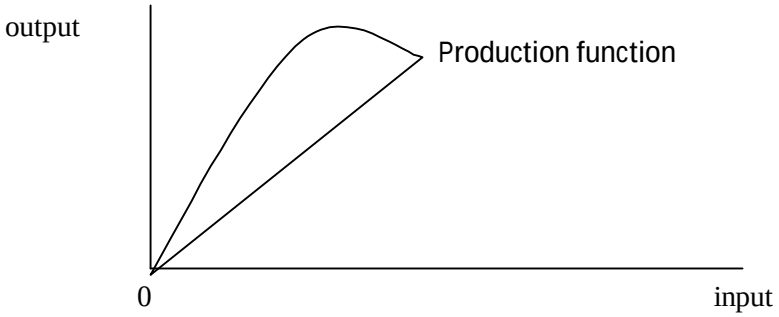
These are known as agents of production. They refer to the resources or inputs required in the production of goods and services. They include land, labour, capital, and entrepreneur.

Every time a unit of output is produced, inputs must be combined to bring about transformation. The technical relationship (physical) between producer inputs and the output per unit of time is known as the production function e.g in producing 5 bags of beans, one can require one acre of land, 2 hoes, 2 workers, fertilisers, etc, mathematically, it is represented as:-

$Qx = f(L, K, N, T, \ldots\ldots)$

Where QX = quantity produced (output)
L = land
K = Capital
N = Labour
F = Functional relationship
T = Technical progress

Graphical representation of production function



The above figure shows the relationship between output and input.

CAPITAL

This refers to any man made resource which is used in the production process e.g machinery, roads, buildings, money etc. the payment to capital is interest.

Capital accumulation

It refers to a process through which the capital of a country increases over time. Capital accumulation is necessary because it increases resources utilisation, standards of living and acts as an engine for development.

LABOUR

This refers to all human effort both mental and physical inherited or acquired which is used in the production process labour can be skilled, unskilled, semi-skilled, productive and un productive labolur

LABOUR SUPPLY

Labour supply refers to the number of all able bodies individuals willing to work at the ongoing wage rate. It also refers to the number of hours a labourer is willing to offer for work. Its payment is a wage or salary.

FACTORS AFFECTING LABOUR SUPPLY.

1. The age structure of the population. The labour force of a country is constituted by people of age between 16 – 64 years. The age category of 0 – 15 years and of 65 years plus is considered unproductive labour. In a country where the first category is higher, labour supply will be high and where the second category is high, labour supply will be low.
2. The size of population is likely to have a high supply of labour than that one with a small size of population
3. Education level. This determines the supply of skilled and educated labour. Once the level of education is low, supply of skilled labour will be low and vis-versa.
4. Degree of job security. Jobs with job security attract more labour than those without. Workers are often attracted in occupations with limited changes of being chased anyhow.
5. Rate of investment in the economy where there is a high rate of investment especially in the industrial sector, supply of labour will increase due to availability of training facilities for labour.
6. Period of training where the period of training is long, labour supply will be low and vis-versa. This is especially true with skilled labour.
7. Job esteem (respect). Jobs with low esteem attract less labour for example there are very few people willing to work as toilet cleaners, therefore labour supply in such occupations is low due to the low level of respect in such jobs.
8. Political stability. In areas with political unstability and insecurity will not attract labour. This factor explains the levels of labour supply especially in form of foreign expatriates in countries besieged with political instabilities.

LAND

It refers to all natural resources which aid in production found any where on the earth or above it. It includes soil, minerals, forests, swamps, rivers, lakes, seas and atmosphere. Its payment is rent.

THE ENTREPRENEUR

This is a person or group of persons who combine the other three factors of production into an organised relationship to make the production process possible.

FUCTIONS OF AN ENTREPRENUER

1. Co-ordinator. He combines all other factors of production together, he puts them in a 'pot' of production and he generates goods and services. Right quantities of each input and the best proportions are chosen to ensure efficiency and the best quality of products.

2. Controller. He controls or manages the enterprise. He takes care of the staff discipline, supervise them and he looks into staff welfare and ensure proper use of finance.

3. Decision maker. He takes a high level of decisions concerning the running of the business i.e he decide what to produce, how to produce, for whom to produce, where to produce and what price to charge etc.
4. Risk and uncertainty bearing. There are many risks and uncertainties in business e,g theft, a fall in demand, change of government policy etc. The entrepreneur risks his capital against such risks and uncertainties. He insures against risks or spreads them by producing many products in which case it is called hedging so as to reduce losses.

5. Innovator. An entrepreneur looks into the future of his business to predict whether it is bright or gloomy. He designs appropriate measures to make improvements or tackle problems. He looks out for new methods of production, new methods of combining factors of production to produce the same commodity in the cheapest manner.

6. Director. He directs all the factors of production.

The payment to entrepreneur is profit.

THE THEORY OF COSTS

Costs of production refers to what is incurred to produce a given amount of output. Costs of production include:

1. **Implicit costs**: These are costs which cannot be computed in monetary terms. They are not included in the calculation of the costs of the firm. Such costs are incurred by the producer's own labour, estimated rent for his building, the interest on capital invested by the entrepreneur himself, the salary he would get if he was not content with the profits, the salary he would pay his house wife, etc.

2. **Explicit costs**: These are costs (expenses) which are production. They are calculated in monetary terms. They include: Labour costs, raw material costs, power, transport, etc.

3. **Economic costs**: These are payments made by the producers to resource suppliers in order to ascertain continuous supply of raw materials.

4. Social costs; They refer to the disadvantages which are imposed on society as a result of private production. Such costs include pollution, resource depletion, etc. Sometimes these costs are referred to as externalities of production.

SHORTRUN COSTS OF PRODUCTION

Shortrun is a period in the production process in which a firm cannot alter its size, equipment and scale of organisation to meet increasing demand such costs include:

(a) **Fixed costs(FC)**: These are costs which do not vary with the level of out put. They are costs which are incurred irrespective of out put levels. They include: Rent, interest on capital, salaries of top management, etc. Fixed costs are also referred to as supplementary costs, over head costs, un avoidable costs or indispensable costs of production.

Total fixed costs(TFC) is the summation of all the fixed costs.

(b) **Variable costs** (VC): These are costs of production which vary with the level of output. As output changes costs also change. They are also referred to as prime costs, direct costs or avoidable costs of production. Total variable cost (TVC) is the summation of all the variable costs of production.

(c) Total cost (TC): This is the overall cost the firm incurs in order to produce its output. It is the sum of the variable costs and the fixed costs. This can be expressed.

Total cost (TC) = Total Fixed Cost (TFC) + Total Variable Costs (TVC)
i.e. TC = TFC + TVC

RELATIONSHIP BETWEEN TFC, TVC AND TC

1. The total fixed curve is a straight line because total fixed costs do not vary with output levels.

2. The TFC curve begins above zero because of the fixed costs, i.e. even when output is zero some costs have to be incurred.

3. The TC curve lies above the TVC because it is a sum total of both the TVC and TFC i.e. TC = TFC + TVC.

4. When output is zero, there are no costs incurred (TVC = 0, so TC = TFC).

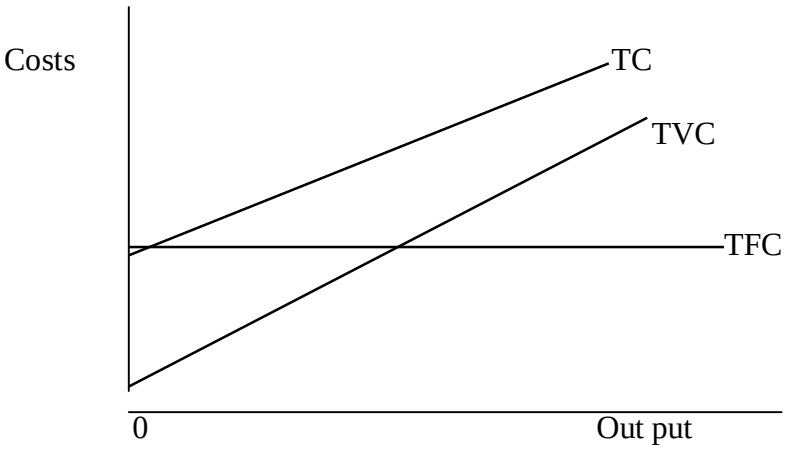
5. The TVC curves slopes upwards from left to right because variable costs increase as output increases.

A TABLE SHOWING TFC, TVC AND TC

Out put (O)	TFC	TVC	TC = TFC + TVC
0	60	0	60
1	60	30	90

2	60	40	100
3	60	45	105
4	60	55	115
5	60	75	135
6	60	120	180

This relationship can graphically be shown as below



PER UNIT COST OF PRODUCTION

1. Average total cost (ATC): This refers to the total cost of production per unit output. This can be expressed as:

   $ATC = \frac{TC}{Q}$

   Where Q is the output.

2. **Average fixed costs** (AFC): This refers to the fixed costs incurred in producing each unit of out put. IT is equal to the total fixed costs divided by total output i.e.

   $AFC = \frac{TFC}{Q}$

3. **Average variable costs** (AVC): This refers to the variable costs incurred in producing each unit of output

   $AVC = \frac{TVC}{Q}$

4. Marginal cost (MC): This refers to the additional costs incurred in producing an extra unit of out put. It is expressed as:

   $MC = \frac{\text{Change in Total Cost}}{\text{Change in out put}} = \frac{\Delta TC}{\Delta Q}$

   Where Δ = Change

Illustration Table

Output	TFC	TVC	TC	AFC	AVC	AC	MC
1	60	30	90	60	30	90	-
2	60	40	100	30	20	50	10
3	60	45	105	20	15	35	5
4	60	55	115	15	13.75	28.75	10
5	60	75	135	12	15	27	20
6	60	120	180	10	20	30	45

Graphical Representation

RELATIONSHIP BETWEEN MC, AC, AFC AND AVC

1. AC, MC and AVC curves all take a U-shape i.e. they first decrease, reach a minimum and later rise as out put increases implying that initial costs drop and later rise. This U-shape is attributed to the law of variable proportions.

2. As production expands, AVC tends closer to AC curve because of the continuous fall in the AFC, i.e. AFC tends to zero as out put rises.

3. The AFC curve slopes downwards continuously because the fixed costs are divided by the increasing out put. This implies that increasing out put will make the AFC curve to fall continuously.

4. AVC always lies below the AC when the fixed costs still exist. This is because AC at any out put includes AVC and AFC at that out put. From the cost theory of the firm, AC = AFC + AVC.

5. After the AVC has reached its lowest point and starts rising, its rise over a certain range is offset by the fall in the AFC so that the AFC continues to fall (over that range) despite the increase in AVC.

6. MC curves cuts the AC and AVC at their lowest points and from below.

7. The point where MC = AC is referred to as the optimum point of the firm and at this point average costs are lowest (at minimum).

IMPORTANCE OF THE CONCEPT OF MARGINAL COST IN FORMULATION OF THE THEORY OF THE FIRM

The concept of marginal cost has great relevance in the formulation of the theory of the firm. Its importance include:

1. It is very vital in the determination of the equilibrium point of the firm. Using marginal cost approach a firm is in equilibrium where marginal cost (MC) is equal to marginal revenue (MR) i.e. MC = MR.

2. Marginal costs help a firm to determine the optimum out put or size of the firm. This is determined at a point where marginal cost (MC) is equal to equal average cost (AC) i.e. MC = AC.

3. Marginal cost curve is helpful in the derivation of the supply curve of a firm under perfect competition where we take part of the marginal cost curve above the AVC.

LONG RUN COST CURVES

This is also known as a planning curve or an envelope curve. It is referred to as envelope curve because it is formed by a series of short run average cost curves. Each point on the longrun average cost curve (LAC) corresponds to a point on the shortrun average cost curve (SAC) which is tangent to the LAC at that point. It is also known as a planning curve because it enables the firm to have trial factor combination until it achieves the best size. Each time when there is a change in out put as a result of changed scale of operation, there is a new shortrun average cost curve, the firm will continue with these trials until it achieves the best size i.e. it gets the lowest shortrun average cost curve which is tangential to the longrun average cost curve.

DERIVATION OF THE LONG RUN AVERAGE COST CURVE

When does a firm decide to use a larger plant?

Assuming that the available technology to the firm at a particular time includes three methods of production, each with different plant size. I.e. a small plant, medium plant and large plant. These plants can be illustrated in the figure below:

In the figure above, a small plant operate with costs demoted by the curve SAC1, the medium size plant operates with the costs on SAC2, and large with SAC3 respectively. If the firm plans to produce output OQ1, it will choose a small plant if it plans to produce OQ2, it will choose the medium plant. If it wishes to produce OQ3, it will choose the large size plant.

If the firm starts with a small plant and its demand gradually increases, it will produce at lower costs (up to level Q1) beyond that point costs start increasing. If its demand reaches the level Q1, the firm can either continue to produce with the small plant or it can install the medium size plant. The decision at this point depends not on costs but on the firms expectations about its future demand.

In the limit if there is very large number (infinite number) of plants, we obtain a continuous curve which is the planning long run average cost curve of the firm. Each point on this curve shows the minimum (optimal) cost of producing the corresponding level of out put.

Therefore, the longrun average cost curve (LAC) is the locus of points denoting the least cost of producing the corresponding level of out put. The LAC is U-shaped and it is often called the “envelope curve” because it envelopes the short run average cost curves (SAC).

In the longrun, there are no fixed costs. Time is long enough such that the firm is able to vary all the factors of production and therefore all costs become variable. To increase out put therefore, the firm expands in size. Cost per unit can increase or remain constant or reduce as the firm expands in size depending on whether the firms is enjoying the advantage of expansion (economies of scale) or disadvantages of expansion (diseconomies of scale).

ECONOMIES OF SCALE

Economies of scale refers tot he advantages accruing to the firm in form of reduced average cost of production resulting from increasing the size of the firm. This is illustrated in the figure below:

From the figure, at the lowest point of the shortrun AC curve (SAC) i.e. At a, the firm begins to face the law of diminishing returns. In the longrun, the firm is expanded by hiring more units of all the factors. The expansion in size of the firm leads to the reduction in average costs from OC1, to OC2 and eventually to OC3. The trend of increasing the size of the firm and reducing average cost continues (because of economies of scale) until point C when costs per unit out put begin to increase as the firm over expands in size. This eventual increase in average cost of production is due to diseconomies of scale and is due to over expansion of the firm.

From the figure, OQ3 is the optimum size of the firm in the longrun. Therefore, the longrun average cost curve (AC) is U-shaped because of economies and diseconomies of scale while the shortrun average cost curve (SAC) is U-shaped because of the law of diminishing returns.

Economies of scale can be classified as:

1. Internal economies of scale
2. External economies of scale

INTERNAL ECONOMIES OF SCALE

Internal economies of scale refers to the fall in Average costs of production arising from specialisation which is encouraged in the large firm. Internal economies are enjoyed by the firm in the following forms.

1. Technical Economies:

These arise out of specialisation of capital (machines) which result into reduced average cost of production.
E.g. a large firm can afford to purchase specialised machines like tractors, milking machines, etc. which lead to increased out put and reduced average costs
(since AC = $\frac{TC}{Q}$, increase in Q reduces AC).

2. **Managerial (Administrative) Economies**:

These arise out of specialization of labour which leads to efficiency; increased output and reduced average costs. A large firm can afford to employ specialists like accountants, engineers, etc.

3. **Financial Economies**:

A large firm can easily secure loans from financial institutions because it has securities. Financial institutions usually trust large firms.

4. Marketing Economies:

A large firm can afford to buy factors of production in bulk from many areas. It can also afford to sell commodities in bulk in several markets since it can own trucks for purchasing and distributing tasks by

diversifying its input markets, a large firm buys in puts at favourable prices which leads to reduced average costs. A large firm can also afford to advertise e.g. giving samples.

5. Transport economies:

When raw materials or commodities are transported in bulk, the costs per unit out put is always low e.g. when hiring a vehicle, a large firm transporting say 10 tonnes per trip is likely to pay almost the same amount as a small firm transporting 5 tonnes per trip.

6. **Storage economies**:

Storage costs per unit out put reduce when commodities or raw materials are stored in bulk. E.g. when a large firm rents a store to keep 100 tonnes of commodities, it would pay the same amount as a small firms which stores 10 tonnes in the same store.

7. **Research Economies**:

A large firm can afford to finance research e.g. by establishing a laboratory or hiring research assistants. Research can lead to new technology, increased out put and hence reduction in average costs.

8. **Welfare Economies (Social economies);**

Large firms can afford to provide their workers with facilities like houses, medical facilities, etc. These can lead to improved efficiency of labour which leads to increased out put and reduced average costs.

9. Risk-bearing Economies:

A large firm can afford to pay premiums and to produce a variety of products. All these reduce risks of loss.

EXTERNAL ECONOMIES OF SCALE

These are advantages accruing to the firm in form of reduced average costs of production resulting from the expansion of the industry as a whole. In other words, they arise from the concentration of many firms in one area. They are enjoyed by all firms in the industry.

External economies of scale include:

1. Economies of concentration: This is where firms in one area:-

(a) Share training facilitate.
(b) Share the same transport facilitates and other infrastructure.
(c) Carry out technical implements together etc. All these result into reduced cost of production in each firm since firms share costs.

2. Economies of information. Firms in one area can co-operate to enhance the formation of associations which provide information for improvements.

3. **External technical economies:**

Firms in one area can share specialised maintenance facilities e.g. garage, carpentry workshops etc. The sharing of costs leads to reduction in average costs in each firm.

4. **External financial economies**:

Firms in one area can attract new financial institutions like banks, building societies, etc.

NB: Economies of scale can also be classified as:

1. Pecuniary Economies: These arise out of paying lower prices for inputs and distribution of the product at a low cost by the large firm. They are as a result of bulk buying and bulk buying and bulk selling.

2. Real economies: These are associate with reduction in physical quantity of inputs per unit out put arising out of large scale production.

DISECONOMIES OF SCALE

These are disadvantages accruing to the firm in form of increased costs of production per unit out put arising form over expanding the scale of production. Diseconomies of scale can also be classified as:

1. Internal diseconomies and
2. External diseconomies of scale

INTERNAL DISECONOMIES OF SCALE

These arise out of over expansion of the firm. They include:-

1. **Managerial diseconomies:**
Supervision of workers and decision making becomes difficult co-ordination between workers and management becomes difficult. This results into inefficiency and increased costs per unit out put.

2. **Technical diseconomies**:
As the firm over expands, wear and tear of machines increases. Also the cost of maintaining gadgets increases.

3. **Financial diseconomies**:
As the result of over expansion of the firm, it becomes very difficult to get enough funds to run the firm. Also the cost will be increased by the high cost of borrowing (interest).

4. **Marketing diseconomies**:
It becomes difficult to get enough quantities of raw materials for the large firm. As a result, the price of raw materials may go up resulting into high cost of production. Also it becomes difficult to get enough market for commodities. This leads to high distribution costs and advertising costs.

EXTERNAL DISECONOMIES OF SCALE

This refers to increase in average costs of production of the firm as a result of over expansion of the industry as a whole. They are the result of many firms concentrating in one area. As a result of over expansion of the industry, the following would lead to increase in average cost of production.

1. Land rent would be high because of increased competition.

2. Accommodation and cost of living would be high because of competition.

3. Transport costs would increase and there would be congestion of vehicles and human beings.

4. Pollution would result out of congested factories and would affect the health of workers. Also the firm would incur costs to fight pollution e.g. purifying water, etc.

All the above factors affect all the firms in the same locality and lead to increase in cost per unit out put.

THE PRODUCT CONCEPT OF THE FIRM

In production economics, there is a strong relationship between cost of a firm and its out put. The out put can be categorised as follows:

(a) Total product (TP)

This is the total amount of a particular commodity resulting from employment of all factors of production (variable and fixed).

(b) Marginal product (MP)

In production economics, the term margin refers to addition to total. Marginal product therefore refers to the additional output resulting from employment of an extra unit of available factor.

$$MP = \frac{\text{Change in total product}}{\text{Change in variable input}}$$

If we take labour as the variable factor

$$MP = \frac{\Delta TP}{\Delta L}$$

Where Δ represent change
i.e. ΔTP = change in total product
ΔL = change in labour units

(c) Average product (AP); This is output per unit of the variable factor. It is the total product divided by the variable in puts employed.

$$AP = \frac{\text{Total product}}{\text{Total variable factor}} = \frac{TP}{TVF}$$

Table of Illustration

Variable factor	Total product (TP)	Average product (AP)	Marginal product (MP)
1	8	8	8
2	24	12	16
3	54	18	30
4	82	20.5	28
5	95	19	13
6	100	16.7	5
7	100	14.3	0
8	96	12	-4

The table above illustrate the relationship between MP, AP and TP.

Graphical Illustration

Relationship between AP, MP and TP

(i) When total product is at maximum marginal product is zero.

(ii) As MP becomes negative, TP begins to decline.

(iii) When MP rises, AP is also rising and when MP begins falling, AP will be increasing at a decreasing rate.

(iv) The MP curve cuts the AP curve at its maximum point.

(v) All the MP, TP and AP at first increase at an increasing rate, then increase at a constant rate and finally begins to decline. This is explained by the law of variable proportions.

THE LAW OF VARIABLE PROPORTIONS

This law states that, as more and more units of the variable factor are employed, holding the quantities of the fixed factor constant, a point is reached beyond which the marginal product. Average product,

and total product will increase at an increasing rate then increases at a constant rate and eventually they diminish. In order to understand the law of variable properties. It is necessary to see the relationship between the fixed and variable factors at the different stagees as seen above on the figure.

STAGE I

This is a stage of increasing returns. The TP, AP and MP are increasing. IN this stage the fixed factors are too much in relationship to labour (variable factor) and as capital is used intensively it becomes efficient hence TP, MP and AP will increase.

STAGE II

This is a stage of diminishing marginal product. It begins where the AP is at maximum because labour becomes inefficient as less of the fixed factor is available, i.e. additional out per worker is reducing.

STAGE III

During this stage, MP, AP and TP will all decline until MP becomes zero and the efficiency of the workers could have declined.

Conclusion from the law

1. Fixed factors like land have a limit beyond which output cannot be increased even if there is employment of more variable factor.

2. When TP, MP and AP begin to decline, it becomes un profitable to continue producing, therefore the ratio of the variable factor must constantly be reviewed to avoid loses.

3. Employment of more units of labour does not make output increase indefinitely. The productivity of each worker decreases when the ratio of labour to the fixed factor increases.

NB: The law of variable proportions is the same as the law of diminishing returns.

SURVIVAL OF SMALL SCALE FIRMS

Despite the fact that large firms enjoy economies of scale, small firms survive alongside the large firms because:

1. Small firms do not need to advertise extensively as large firms and hence incur less costs.

2. Small firms are easy to manage. This results into efficiency and reduced costs of production.
3. Small firms do not face the problems of internal diseconomies of scale.

4. At times small firms are located far from large firms and hence they monopolize local markets despite the fact that they may be selling at higher prices than large firms which are far.

5. Some small firms use by-product of large firms e.g. sweets use the by-products of the sugar industry. The two firms cannot compete with each other.

6. Owners of small firms can easily develop personal contacts with customers. Later they can start giving credit facilities. In such a case they would maintain their market despite the fact that they may be selling at a high price.

7. Small firms may sell to customers the appropriate small quantities whereas large firms tend to sell in bulk (wholesale).

8. Where the market size is small it necessitates establishment of a small firm.

9. Some activities do not require large firms e.g. shoe shining, hair salons, etc.

THE REVENUE OF THE FIRMS

Revenue refers to the proceeds or returns realised or derived from the sale of a commodity at given price. Revenue of the firm can be looked at in 3 ways:

1. Total revenue (TR): This is the total amount of money received by the firm as a result of selling its total output produced per unit of time.

   TR = P x Q
   Where Q is quantity sold and P is the price per unit

2. Average revenue (AR): This refers to revenue per unit output. It is the same as the average price.

   $AR = \frac{TR}{Q} = \frac{PQ}{Q} = P$
   Where Q is quantity

3. Marginal Revenue (MR): This is the additional revenue resulting from selling an extra unit of out put.

$MR = \frac{\Delta TR}{\Delta Q}$
Where ΔQ is change in output sold.

THE PROFIT OF THE FIRM

The term profit has been defined in very many ways by economists, accountants and even policies economists. In simple terms;

Profit (Π) = Total Revenue (TR) - Total Cost (TC)

i.e. Π = TR - TC
Since TR = P x Q. A firm can maximise profits in 2 ways.

1. By maximizing revenue through out put maximization and increase in price of commodities.

2. By minimising costs.

Normal profits

This refers to where the firm's average cost is equal to the price (AR) at which it sells output. In other words, a firm which earns normal profits covers its opportunity cost of production or in lay man's language, it earns zero profits (i.e. TR -TC = 0).

Abnormal profits

This is earned by the firm which sells its out put at a price greater than the average cost (P>AC). In other wards, the firm sells at the price which is greater than the opportunity cost of production.

A FIRM AND AN INDUSTRY

A firm is a productive unit under unified control and management. It may be a sole proprietor, a partnership, a company or a government owned firm, e.g. a factory.

An industry is a description of several or many firm's which are engaged in producing the same kind of commodities (although each firm may be under its ownership and management, or may use its label). E.g. a tea producing industry would include all firms (factories producing tea).

DERIVING THE SUPPLY CURVE OF AN INDUSTRY

Since the industry is a combination of firms, its supply curve can be derived by horizontal summation of supply curves of the various firms in the industry. This is illustrated graphically in the figure below;

From the figure, Firm A supplies 5 units at 4 shillings per unit. While firm B supplies 6 units at the same price. In the whole industry, 5+6 = 11 units will be supplied at 4 shillings. Note that the industry supply curve is more elastic than the supply curves of various firms in that industry.

EQUILIBRIUM OF THE FIRM AND EQUILIBRIUM OF AN INDUSTRY

The term equilibrium refers to the state of stability when there is no tendency to change.

Equilibrium of the firm refers to the point of profit maximisation when the firm has no tendency to increase or reduce output. At this point, marginal cost (MC) is equal to marginal revenue (MR). If the firm increases out put and produces beyond this point, marginal cost would be greater than marginal revenue and hence the firm would be operating at a loss. When the firm produces below the point where MC = MR, profits would be less because less units of output are produced. The condition for profit maximisation (MC = MR at the highest level of out put) applies to all firms.

Equilibrium of an industry is reached when there is no tendency for its out put, to increase or reduce. At this point, there are neither new firms entering the industry nor old firms leaving the industry. In other words all firms are earning normal profits which do not attract new firms or force firms out of the industry immediately.

MARKET STRUCTURES

Market structures can be classified according to the number of firms in the industry as follows:

1. Perfect competition
2. Monopoly
3. Monopolistic competition
4. Oligopoly

PERFECT COMPETITION

Assumptions of perfect competition

Perfect competition is a market structure which fulfils the following assumptions.

1. Many firms (sellers) of the same size. This means that one firm cannot influence the price in factor or commodity markets. Sellers are therefore price takers and not price makers. It is also assumed that there are many buyers.

2. Homogenous products: There is no product differentiation or any other form of non-price competition. Therefore competition is centred on only prices. Also consumers cannot differentiate the products produced by any firm. Due to this under perfect competition, there is no advertisement.

3. Free entry and exit: when firms earn abnormal profits (supernormal profits), other firms are free to join the market and exhaust the profits. In the long run, where there are no profits, firms are free to leave the industry.

4. Perfect knowledge i.e. no ignorance on side of buyers and producers about factor and commodity markets, or about future trends relevant to their decision - making now. Consumers are aware of prices charged in the whole market and the know the quantity of products.

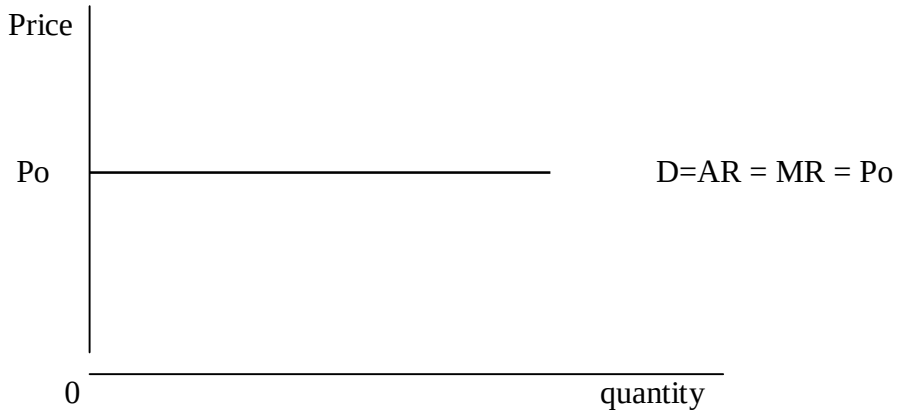
5. Perfect mobility of factors of production. I.e. factors of production can move freely from one firm to another throughout the economy and raw materials are not monopolised. In otherwards, there is perfect competition in the factor market.

6. No government regulation. I.e. no government intervention I form of tariffs, subsidies, rationing, etc.

7. Profit and utility maximization. The goal of all firms is profit maximisation. All consumers (buyers), aim at maximising satisfaction (utility) and therefore buy from the cheapest source.

Note; Perfect competition satisfies all the above conditions. In pure competition, conditions number 4 and 5 are not fulfilled and thus there is an element of monopoly though sellers are price-takers.

THE DEMAND CURVE OF A FIRM IN PERFECT COMPETITION



The demand curve of a firm in perfect competition is perfectly elastic because of competition. No firm can influence the over all price in the market. The price tends to be constant at OPo (in the figure above). Above OPo nobody buys from the firm, i.e. buyers would buy form other sellers. If a firm reduces the price below OPo, other firms would also do the same.

SHORT RUN EQUILIBRIUM PRICE, OUT PUT WITH PROFITS IN PERFECT COMPETITION

Profit maximization (equilibrium) is attained at the profit where Marginal Cost (MC) equals Marginal Revenue (MR).

A diagram showing short run equilibrium of the firm under perfect competition

From the figure, OP1 is the cost price per unit. With out put OQo, Total cost (TC) = OP1B Qo.

OPo is the selling price per unit with the out put OQo, Total Revenue (TR) = OPo AQo.

Profit (Π) = TR - TC

= OPo AQo - OP1BQ
= P1PoAB (the shaded region)

Therefore, OPo is the profit maximising price (equilibrium price), OQo is the profit maximising out (equilibrium output) and P1PoAB is abnormal profits (supernormal profits).

LONGRUN PROFIT MAXIMISATION IN PERFECT COMPETITION

Because there is free entry of firms, in the longrun, other firms are attracted by the abnormal profits to join the market and hence form the industry. As a result, total out put would increase leading to fall in price and fall in profit until when all firms start to earn normal profit.

The figure shows that, in the longrun, profit maximisation of a firm in perfect competition is at point (e) where longrun marginal cost (LMC) is equal to marginal revenue (MR). This point is at the lowest point of the longrun. Average cost curve (LAC) out put OQ1 is produced at cost of OP1 per unit and sold at the price OP1. Since P = Ac, (and TR = TC), the firm is earning normal profit (zero profit). This applies

to all firms in the industry. A firm which covers only its average cost (which sells at P = Ac) is called a marginal firm.

THE SHUT DOWN POINT AND BREAK EVEN POINT

From the figure we note the following:

1. In shortrun, the firm in perfect competition produces out put OQ1 and sells it at price OP1, earning abnormal profits P1P4DA.

2. In the longrun, the abnormal profit attracts new firms to join the market and form the industry. This leads to increase in total out put which results into fall in price from OP1 to OP2. All the firms earn normal profits. (Since P = AC) at pint B. This point B where the firm neither incurs losses nor earns profits is called the **Break-even point**.
3. Because of competition and increased total out put, the price can even fall to OP3. This pint (C) below which the firm cannot operate is called **shut down point**. At this point, P = AVC. In otherwards the firm just covers the variable costs of production. Below the shut down point, P<AVc and therefore, the firm would not operate because it cannot cover variable costs e.g. cost of raw materials, wages, etc.

4. The supply curve of a firm in perfect competition is that part of the marginal cost curve above the point where price (P3) = AVC i.e. above point C or above shut down point. Below point C, the firm cannot supply anything since it cannot cover variable costs.

5. A firm can keep on operating even if it does not cover the total costs of production (between B and C) This is because of the following factors:

(a) In the shortrun, the firm would keep on operating provided it covers variable costs. E.g. it can buy raw materials, pay wages etc., though it cannot cover fixed costs like insurance, rent, etc.

(b) It may expect to enjoy economies of scale in the longrun, i.e. to produce at low costs and earn profits.

(c) If a firm is run by the government, and is vital to society, it would afford to operate at a loss, e.g. water supply, roads, electricity supply, etc.

(d) The goal of the firm may be to provide employment for members of the family. In such a case if would keep on operating at a loss in the short run.

(e) When the producer has invested in many assets in the business, he/she may be reluctant to sell them and hence keep on operating hoping to make improvements.

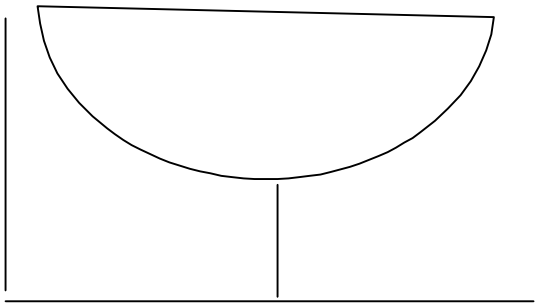
(f) The firm may have prospects of securing a loan from financial institutions so as t make improvements, reduce costs and earn profits.

(g) The entrepreneur may want to maintain his/her reputation and good faith to the public and to his/her customers.

(h) The entrepreneur may adopt new and better methods of production. He/she can try to reduce costs of production by reducing the number of workers, changing the administration, etc.

ADVANTAGES OF PERFECT COMPETITION

1. In the long run, there is efficiency in production and full utilisation of factors of production. Every firm produces at the minimum point of the Average cost curve as shown in the figure below.



   OQo = Optimum out put
   At L, there is no excess capacity

2. In the longrun, consumers enjoy high standard of living because more commodities are produced and sold.

3. There is no wastage of funds in advertising which would lead to high costs and high prices.

4. There is high out put because of free entry of firms in the market.

5. Competition leads to quality improvement in all firms.

6. Resources are well utilised by efficient firms, inefficient (high cost) firms are pushed out of the market.

DISADVANTAGES OF PERFECT COMPETITION

1. Commodities produced are homogenous and therefore consumers cannot enjoy a variety of differentiated products.

2. In the longrun, expansion of the firm may be very difficult because there are no enough profits to "plough back".

3. Research may be impossible because the profit realised is not enough to cater for research activities.

4. Prices tend to be constant and demand is elastic. This limits sellers to carry out price discrimination.

5. There is a high risk of unemployment when inefficient firms are pushed out of the market.

6. Public utilities like water supply, roads, etc. may not survive in perfect competition. This calls for government intervention.

7. Assumptions of perfect competition are unrealistic and may be misleading and difficult to attain in the real situation.

MONOPOLY

Monopoly is a market situation where there is one seller of a product which has no close substitutes. Entry of new firms is restricted and there is no persuasive advertising. In pure monopoly, there is one firm which deals in a product that has no substitutes at all. In practice, there is no pure monopoly because there is no commodity which has no close substitutes at all. Monopoly is a market situation where there is one buyer of a commodity or a factor of production e.g. one employer.

FACTORS WHICH GIVE RISE TO MONOPOLY (the basis of monopoly)

1. Patent rights e.g. writers of books, where the law forbids other firms to deal in the commodity.

2. Ownership of strategic raw materials, usually under government control e.g. minerals.

3. Exclusive methods of production e.g. doctors.

4. Long distance among producer's where each producer monopolizes the market in his/her locality (spartial monopoly).

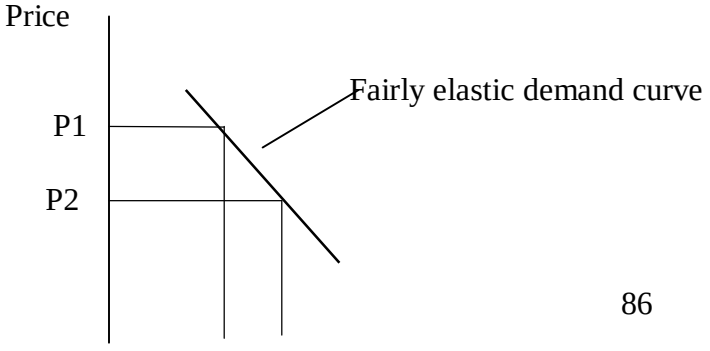
5. Advantages of large scale production which do not allow small competitors to compete successfully with large firms. Also where there is room for only one seller e.g. roads and railways in Uganda. Such undertakings are usually controlled by the government i.e. they are public utilities. In such cases, the market is said to have created natural monopolies.

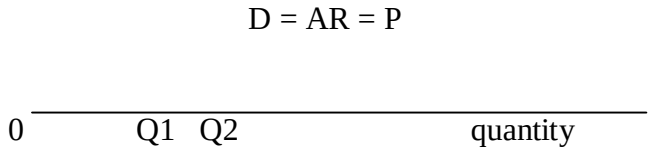
6. Protectionism. This is when trade barriers are imposed on the product to exclude foreign competitors. In such cases the home producer may become a monopolist.

7. Take overs and mergers. "Take over" is when one firm takes over the assets and organisation of another where as mergers are formed when firms combine their assets and organisations into one to achieve strong market position. Both situations may result into a monopolist firm.

8. Collective monopoly or collusive monopoly. This is where firms come together in a formal or informal agreement (cartel) to achieve monopoly power. Such firms can fix quotas (maximum out put each may put on the market). They may also set the price very low with the objective of preventing new entry of other firms. This is called limit pricing. An example of a monopolist firm in Uganda is Uganda railways corporation (URC) which handles railway transport.

THE DEMAND CURVE FOR A MONOPOLIST





The demand curve for a monopolist firm is fairly elastic. The seller can determine either price or quantity but not both i.e. if he/she fixes a high price (OP1), quantity demanded would be low (OQ1). If he/she supplies much of the commodity (O Q2), the price would be low (OP2). In such a situation the seller is a price maker because he/she can influence the price in the market.

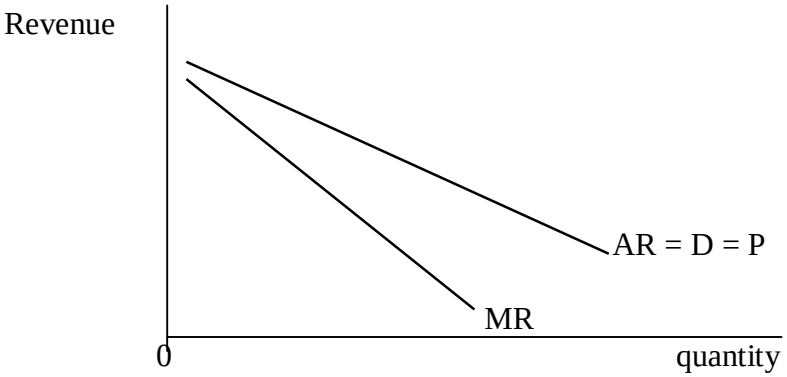
AVERAGE REVENUE AND MARGINAL REVENUE UNDER MONOPOLISTIC COMPETITION

Unlike perfect competition where MR and AR are equal, under monopoly, AR lies above MR. The reason is that since demand is downward sloping in order to sell an extra unit, the price must be decreased. The additional revenue therefore is less than the price at which that unit is sold.

In monopoly, AR falls as more units of output are produced and sold. MR is always less than AR.

Out put	Price (AR)	Total Revenue (TR)	Marginal Revenue (MR)
1	10	10	-
2	9	18	8
3	8	24	6
4	7	28	4
5	6	30	2
6	5	30	0
7	4	28	-2

Graphical representation



MARKET SITUATION FOR A MONOPOLIST

As in other firms, the monopolist maximises profit when MR = MC, at the highest level of out put.

<u>A diagram showing profit maximisation of the firm under monopoly</u>

In the figure, OP1 is the cost price per unit and OQe is the total quantity bought. Therefore Total cost = OP1 CQe OPe is the selling price per unit, with, output OQe, Total revenue = OPeAQe.
Profit = TR (OPeAQe) - TC (OP1 CQe) Qe = P1 Pe AC

Point (B) is equilibrium point where MC = MR.

The monopolist firm produces at excess capacity i.e. OQe is below the lowest point of the AC curve which is at point D. Since costs are still falling, the firm could still produce more out put up to OQ1. But in order to keep the price up, it produces less than optimum.

ADVANTAGES OF MONOPOLY

1. There is no duplication of services and this saves resources e.g. if there is one Hydroelectric power plant there may not be the need to set up another one in the same area.

2. Economies of scale can be enjoyed by the firm because it is capable of expanding using the abnormal profits earned.

3. There is a possibility of price discrimination (i.e. selling the same commodity at different prices) which benefits the low income earners.

4. Research can easily be carried out using the abnormal profits.

5. There is no wastage of resources in persuasive advertising which leads to increase in prices.

6. Public utilities like roads, telephone, etc. are easily controlled by the state as a monopolist.

7. “Infant” industries can grow up when they are monopolies and are protected from competition.

DISADVANTAGES OF MONOPOLY

1. Because there is no competition, the firm can become inefficient and produce low quality products.

2. Monopolist firms produce at excess capacity i.e. they under utilise their plants so as to produce less out put and sell at a high price.

3. Monopoly firms may charge higher prices than firms in perfect competition.

4. In case a monopolist stops producing, there would be shortage of the commodity.

5. Monopolist firms tend to exert pressure on the government and at times they can influence decision making because they are controllers of production.

MEASURES TO CONTROL MONOPOLY

Because of the above disadvantages of monopolies, the following methods can be used to control their activities.

1. The government can fix prices of commodities.
2. Taxation. The government can impose taxes on monopolist firms to tax away the abnormal profits. However, the monopolist can shift the burden of taxes on to the buyers in for of high prices.

3. Anti-monopoly (Anti trust) legislation i.e. laws imposed to control monopolies. Such laws can prohibit monopolisation, and collusion among firms to raise prices or inhibit competition.

4. Nationalisation of monopoly firms by the government.

5. Subsidization. New firms can be subsidized so that they compete with the monopolist firm.

6. Removing the basis of monopoly e.g. removing tariffs on imported goods.

PRICE DISCRIMINATION UNDER MONOPOLY

Price discrimination exists when a commodity is sold at different prices irrespective of the cost of production. Examples include different seats in a theatre or stadium, different grads in a hospital (grade A and Grade B), doctors services, etc.

DEGREES OF PRICE DISCRIMINATION

There are three degrees (types) of price discrimination

(a) **First degree or perfect discrimination**
This type exists if a monopolist is able to charge each consumer for his good the maximum price that the buyer would be willing to pay rather than go without the good. The monopolist is able to sell each unit of his goods the maximum price. At this degree of price discrimination all the consumers surplus is taken away by the seller.

(b) **Second degree price discrimination**
This is when a monopolist charges the consumers a lower price when he purchases larger quantity of the good conversely, a higher price is charged to a consumer who buys a smaller quantity. At this degree part of the consumers' surplus is taken away.

(c) **Third degree of price discrimination**
This is when the monopolist gets more revenue by separating his market into sub-markets and a different price is charged in each market.

CONDITIONS FOR PRICE DISCRIMINATION

1. The commodity must be sold by a monopolist.

2. Elasticity of demand should be different in different markets. A higher price should be charged in the market where elasticity of demand is low and where elasticity of demand is high, a lower price should be charged.

3. The cost of dividing the markets should be very low e.g. in cases of dumping, costs of transport should be low.
4. Buyers should not know how much is charged on others. This is possible especially where goods are sold on order.
5. It should be impossible for buyers to transfer the commodity from where the price is low to where the price is high. This is possible especially with services of doctors, teachers, etc.

NB Price discrimination may also be used to sell units of the same commodity at different prices to the same customer e.g. telephone charges high on 3 minutes and then low on other minutes.

ADVANTAGES OF PRICE DISCRIMINATION

1. It enables the poor to get essential services at low prices e.g. cheap houses to civil servants, doctors charging low prices on poor patients.

2. To the producers, it increases total revenue because out put sold increases.

3. It is one way in which the rich subsidize the poor thus a method of income distribution. The rich are charged highly on commodities while the poor are subsidized on the same commodities.

4. It increases sales and consumption e.g. for electricity, the first units, may be charged higher price than other extra units. Therefore, the more units of electricity you use the less charger you would pay for extra units.

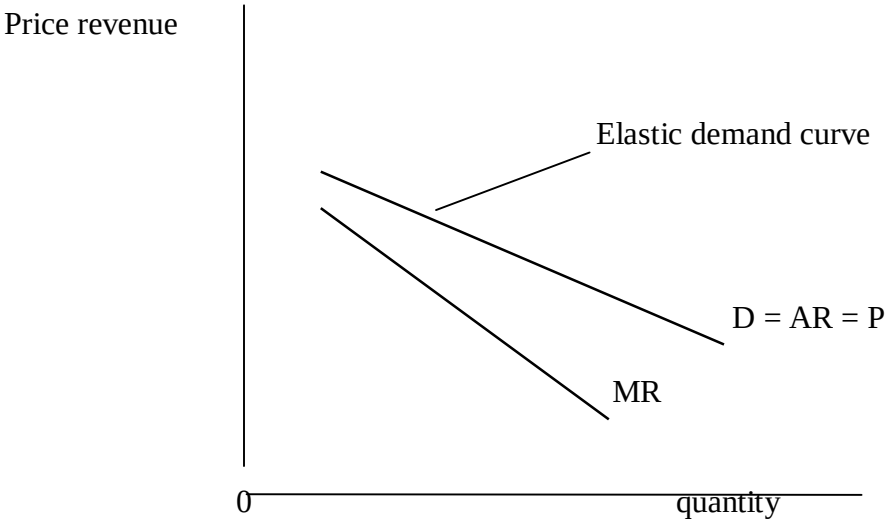
5. It helps producers to dispose off surplus commodities e.g. dumping.

MONOPOLISTIC COMPETITION

Monopolistic competition market structure has characteristics similar to that of perfect competition except that the commodity dealt within monopolistic competition is not homogeneous. Products are differentiated (but they are close substitutes). Product differentiation may be in form of packing, design, quality, branding, etc.

There is need for persuasive advertising in monopolistic competition. Because of product differentiation, the seller has some control over the market price. Examples are small restaurants, hair salons, shoe repairs, etc.

THE DEMAND CURVE OF A FIRM IN MONOPOLISTIC COMPETITION



The demand curve for a monopolistic competitor is more elastic than that of monopoly because of the presence of close substitutes in the former. MR is below the AR as in case of monopoly. The demand curve is downward sloping because each firm has monopoly power over its product and is not a price taker.

SHORT-RUN EQUILIBRIUM OF A FIRM IN MONOPOLISTIC COMPETITION

Profit maximization (equilibrium) for a monopolistic competitor in the short run is reached where MR = MC. At this (C) equilibrium quantity is OQe and equilibrium price is OPe. In the short-run, abnormal profit (P1PeAB) is earned. The firm produces at excess capacity (excess capacity is QeQ1) because it produces less output than the optimum (OQ1).

LONG - RUN EQUILIBRIUM OF A FIRM IN MONOPOLISTIC COMPETITION

From the figure we note the following:-

1. In the long run equilibrium is attained at point E1 where longrun marginal cost curve (LMC) = MR. Output OQe is produced and sold at price OPe, normal (zero) profit is earned by all firms. (Since P = AC).

2. Because of free entry of new firms, in the longrun the demand for the product is shared among more brands. Therefore, the demand curve would keep on shifting to the left until a point is reached where the demand curve is tangent tot he ATC (LAC) curve. At equilibrium, normal (zero) profit is earned and there is excess capacity, (OQ1, -OQe = Qe Q1) because the firms is producing out put less than the optimum (Lowest point of the AC curve). So production efficiency is not achieved under monopolistic competition. In order to maintain the market share, the seller has to advertise.

ADVANTAGES OF MONOPOLISTIC COMPETITION

1. Produce differentiated products that enables consumers to get a variety of products.

2. Firms compete to make improvement on the quality of products.

3. In case one firm collapses, substitute are available.

4. The price charged is lower than that of a monopolistic because of competition from substitutes.

DISADVANTAGES OF MONOPOLISTIC COMPETITION

1. There is under utilization of the plant in the short-run and in the long-run. There is excess capacity and output produced is lower than that produced by a firm in perfect competition.

2. In the long run, there is no profit to make improvements so the firms may not expand to enjoy economies of scale.

3. The price charged on buyer is higher than in perfect competition.

4. In the longrun, there are no profits to invest in research since the firm earns normal (zero) profits.

5. To maintain the market share, the seller has to advertise. This increases costs and the price.

OLIGOPOLY

This refers to a market structure within which firms are aware of the mutual interdependence of sales, production, investment and advertising plans. Hence manipulation by any firm of variables under its control is likely to evoke retaliation from competing firms. These features are commonly described to markets in which the number of sellers are few. Where such competition is between two firms, the market is called DUOPOLY.

CHARACTERISTICS OF OLIGOPOLY

Oligopoly is a market structure characterised by the following:-

1. Few, un equal, competing forms. Each firm, though faced with competition from other firms, has enough market and therefore cannot be a price taker.

2. Non-price competition e.g. advertising, quality of services, etc. If one firm reduces the price, others would do the same and all firms would end up losing.

3. Each firm is concerned with the activities of other firms so as to act accordingly e.g. it can reduce the price when others reduce the price.

4. In most cases there is product differentiation.

5. The demand curve under oligopoly is kinked. It is elastic above the kink and inelastic below the kink.

6. Different pricing behaviour take place like

- Imperfect collusion
- Perfect collusion
- Price administration

THE DEMAND CURVE, MR CURVE AND EQUILIBRIUM OF A FIRM IN OLIGOPOLY

The market situation of a firm in oligopoly is illustrated in the figure above.

The demand curve is ABD and marginal revenue curve is ACD MR. From the figure we note the following:-

1. The price and demand curve. The price (OP1) is administered by the biggest price firm or by the low cost firm. If a firm increases the price above OP1 it would lose its market. Therefore, the demand curve is fairly elastic above the administered price (OP1). If a firm reduces the price below OP1, other firms would do the same leaving the market for each firm constant. So the demand curve is less elastic below the administered price. When the 2 demand curves are combined, they make a kinked demand curve.

2. The marginal Revenue curve: Because of the 2 demand curves, the marginal Revenue (MR) curve also has 2 parts. The 2MR curves are separated by a gap (CD). When the firm increases the price above OP1, its market share would reduce thus a reduction in MR is large above OP1. When the firms reduces the price below OP1 its market share remains almost constant and therefore the gain in revenue (MR) is less below OP1.

3. Equilibrium; Equilibrium is attained at the point where MR = MC. The MC meets MR curve in the discontinuous gap (CD) and the position of MC in the gap does not affect equilibrium. At equilibrium, OQ1 is produced and sold at administered price OP1. The above analysis is on shortrun market situation of oligopoly.

In order to avoid under selling each other ("the price war"), firms may come to an agreement (a carter) where they fix quotas and at times fix the price to restrain competition such collusion makes oligopolists behave like a monopolist.

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Course Name : Statistics for Population and Health Professionals
Course Code : APDPS 103
Course level : level 1
Course Credit : 4 CU
Contact Hours : 60 Hrs

Course Description
The Course details different types of statistics and their meanings, techniques of measuring the central tendency, measures of variations, analyzing the difference between groups, analyzing the relationship among variables, exploring biostatistics, methods of epidemiological measures, mortality rate measures, calculating mortality rates, measures of associations and measures of public health impact. The Course also encompasses different forms of statistics, the appropriate methods of calculating the central tendency, understanding how to estimate various scales in determining range, use of variations and sequences, standard deviation and statistics related to cross tabulation.

Course objectives
· To equip students with analytical skills and statistical concepts useful in decision making.
· To improve their knowledge of describing and interpreting statistical records.
· To enable them get firm exposure to data collection, presentation, and analysis and interpretation for rational decisions on crucial matters.

Course Content
Introduction
· Definition of Statistics
· Different types of Statistics
· Understanding Sampling
· Matching
· Methods used to analyze individual variables, relationships amongst groups
Measures of Central Tendency
· Mean
· Median
· Mode
Measures of Variations
· Mean deviations
· Variance
· Standard deviations
Variance
· Definition of variance
· Forms of variance i.e continuous case, discrete case
· Approximating the variance of a function

· Distinguish between population and variance and sample variance
· Generalizations of variances

Standard deviation

· Definition of standard deviation
· Probability distribution or random variable
· Steps in calculating standard deviation
· Simplification of the formula
· Estimating population standard deviation

Analyzing difference between Groups

· T-Test
· Matched Pairs T-Test
· Analysis of Variance(ANOVA)
· Analysis of Co-Variance(ANCOVA)

Analyzing relationship among Variables

· Correlation
· Regression

Biostatistics

· Meaning of Biostatistics
· Measures of risk

Methods of interpreting epidemiologic Measures

· Ratio
· Proportion
· Incidence proportion
· Incidence rate
· Prevalence
· Mortality rate

Mortality Frequency Measures

· Mortality rate
· Crude mortality rate
· Cause-specific mortality rate
· Age-specific mortality rate
· Infant mortality rate
· Neonatal mortality rate
· Post neonatal mortality rate
· Maternal mortality rate
· Sex specific mortality rate

Calculating Mortality rates

· Cause-specific mortality rate
· Age-adjusted mortality rate
· Death-to-case ratio
· Case-fatality rate
· Proportionate mortality
· Years of potential life lost and its methods of calculations

Measures of Association

· Meaning of Measures of Association

· Examples of measure of association include; rate ratio, odds ratio, and proportionate mortality rate

Measures of Public Health Impact

· Attributable proportion
· Vaccine efficacy or vaccine effectiveness
· Two primary measures of mortality of morbidity which; incidence and prevalence
· Analyzing and interpreting data

Estimates of scale

· Standard deviation
· Interquartile range
· Range
· Mean difference
· Median absolute deviation
· Average absolute deviation
· Sources of statistical dispersion

Statistics related to cross tabulation

· Chi-square
· Contingency coefficient
· Cramer's V
· Lambda coefficient
· Phi coefficient
· Kendall tau

Statistical Inference

· Definition of statistical inference
· Exploratory data analysis
· Exploratory data Analysis Development(EDAD)

Skewness

· Definition of Skewness
· Forms of Skewness ie Sample Skewness, kurtosis
· Sample kurtosis
· Formulas for calculating kurtosis ie mean absolute error, interquartile range,

Mode of delivery Face to face lectures

Assessment

Course work 40%
Exams 60%
Total Mark 100%

COURSE NAME: STATISTICS FOR HEALTH PROFESSIONALS

Introduction

This module basically is designed to make us get exposed to statistics and understand statistics in depth including various types statistics and their importance's

Questions to ponder

a)Briefly explain the importance of statistics to the following people

Demographers

Health Service providers

b) Distinguish between descriptive statistics and inferential statistics

Statistics is a set of tools used to organise and analyse data. Data must either be numeric in origin or transformed by researchers into numbers. For instance, statistics could be used to analyze percentage scores English students receive on a grammar test: the percentage scores ranging from 0 to 100 are already in numeric form. Statistics could also be used to analyze grades on an essay by assigning numeric values to the letter grades, e.g., A=4, B=3, C=2, D=1, and F=0.

Employing statistics serves two purposes,

(1) description and (2) prediction. Statistics are used to describe the characteristics of groups. These characteristics are referred to as variables. Data is gathered and recorded for each variable. Descriptive statistics can then be used to reveal the distribution of the data in each variable.

Statistics is also frequently used for purposes of prediction. Prediction is based on the concept of generalisability: if enough data is compiled about a particular context (e.g., students studying writing in a specific set of classrooms), the patterns revealed through analysis of the data collected about that context can be generalized (or predicted to occur in) similar contexts. The prediction of what will happen in a similar context is probabilistic. That is, the researcher is not certain that the same things will happen in other contexts; instead, the researcher can only reasonably expect that the same things will happen.

Prediction is a method employed by individuals throughout daily life. For instance, if writing students begin class every day for the first half of the semester with a five-minute free writing exercise, then they will likely come to class the first day of the second half of the semester prepared to again free write for the first five minutes of class. The students will have made a prediction about the class content based on their previous experiences in the class: Because they began all previous class sessions with free writing, it would be probable that their

next class session will begin the same way. Statistics is used to perform the same function; the difference is that precise probabilities are determined in terms of the percentage chance that an outcome will occur, complete with a range of error. Prediction is a primary goal of inferential statistics.

Descriptive Statistics

Revealing Patterns Using Descriptive Statistics

Descriptive statistics, not surprisingly, "describe" data that have been collected. Commonly used descriptive statistics include frequency counts, ranges (high and low scores or values), means, modes, median scores, and standard deviations. Two concepts are essential to understanding descriptive statistics: variables and distributions. To read more about descriptive statistics, click on the items below:

- Variables
- Distributions

Variables

Statistics are used to explore numerical data (Levin, 1991). Numerical data are observations which are recorded in the form of numbers (Runyon, 1976). Numbers are variable in nature, which means that quantities vary according to certain factors. For examples, when analyzing the grades on student essays, scores will vary for reasons such as the writing ability of the student, the students' knowledge of the subject, and so on. In statistics, these reasons are called variables. Variables are divided into three basic categories:

- Nominal Variables
- Ordinal Variables
- Interval Variables

Distributions

A distribution is a graphic representation of data. The line formed by connecting data points is called a frequency distribution. This line may take many shapes. The single most important shape is that of the bell-shaped curve, which characterizes the distribution as "normal." A perfectly normal distribution is only a theoretical ideal. This ideal, however, is an essential ingredient in statistical decision-making (Levin, 1991). A perfectly normal distribution is a mathematical construct which carries with it certain mathematical properties helpful in describing the attributes of the distribution. Although frequency distribution based on actual data points seldom, if ever, completely matches a perfectly normal distribution, a frequency distribution often can approach such a normal curve.

The closer a frequency distribution resembles a normal curve, the more probable that the distribution maintains those same mathematical properties as the normal curve. This is an important factor in describing the characteristics of a frequency distribution. As a frequency distribution approaches a normal curve, generalizations about the data set from which the distribution was derived can be made with greater certainty. And it is this notion of generalisability upon which statistics is founded. It is important to remember that

not all frequency distributions approach a normal curve. Some are skewed. When a frequency distribution is skewed, the characteristics inherent to a normal curve no longer apply.

Inferential Statistics

Making Predictions Using Inferential Statistics

Inferential statistics are used to draw conclusions and make predictions based on the descriptions of data. In this section, we explore inferential statistics by using an extended example of experimental studies. Key concepts used in our discussion are probability, populations, and sampling. To read more about inferential statistics, click on the items below:

- Experiments
- Probability
- Matching
- Populatio
- Sampling

Experiments

A typical experimental study involves collecting data on the behaviours, attitudes, or actions of two or more groups and attempting to answer a research question (often called a hypothesis). Based on the analysis of the data, a researcher might then attempt to develop a causal model that can be populations.

A question that might be addressed through experimental research might be "Does grammar-based writing instruction produce better writers than process-based writing instruction?" Because it would be impossible and impractical to observe, interview, survey, etc. all first-year writing students and instructors in classes using one or the other of these instructional approaches, a researcher would study a sample or a subset of a population. Sampling or the creation of this subset of a population – is used by many researchers who desire to make sense of some phenomenon.

To analyse differences in the ability of student writers who are taught in each type of classroom, the researcher would compare the writing performance of the two groups of students. Two key concepts used to conduct the comparison are:

- Dependent Variables
- Independent Variables

Probability

Beginning researchers most often use the word probability to express a subjective judgment about the likelihood, or degree of certainty, that a particular event will occur. People say such things as: "It will probably rain tomorrow." "It is unlikely that we will win the ball game." It is possible to assign a number to the event being predicted, a number between 0 and 1, which represents degree of confidence that the event will occur. For example, a student might say that the likelihood an instructor will give an exam next week is about 90 percent, or .9. Where 100 percent, or 1.00, represents certainty, .9 would mean the student is almost certain

the instructor will give an exam. If the student assigned the number .6, the likelihood of an exam would be just slightly greater than the likelihood of no exam. A rating of 0 would indicate complete certainty that no exam would be given(Shoeninger, 1971).

The probability of a particular outcome or set of outcomes is called a p-value. In our discussion, a p- value will be symbolized by a p followed by parentheses enclosing a symbol of the outcome or set of outcomes. For example, p(X) should be read, "the probability of a given X scores" (Shoeninger). Thus p(exam) should be read, "the probability an instructor will give an exam next week."

Population

A Population is a group which is studied. In educational research, the population is usually a group of people. Researchers seldom are able to study every member of a population. Usually, they instead study a representative sample or subset of a population. Researchers then generalise their findings about the sample to the population as a whole.

Sampling

Sampling is performed so that a population under study can be reduced to a manageable size. This can be accomplished via random sampling, discussed below, or via matching.

Random sampling is a procedure used by researchers in which all samples of a particular size have an equal chance to be chosen for an observation, experiment, etc (Runyon and Haber, 1976). There is no predetermination as to which members are chosen for the sample. This type of sampling is done in order to minimise scientific biases and offers the greatest likelihood that a sample will indeed be representative of the larger population. The aim here is to make the sample as representative of the population as possible. Note that the closer a sample distribution approximates the population distribution, the more generalised the results of the sample study are to the population. Notions of probability apply here. Random sampling provides the greatest probability that the distribution of scores in a sample will closely approximate the distribution of scores in the overall population.

Matching

Matching is a method used by researchers to gain accurate and precise results of a study so that they may be applicable to a larger population. After a population has been examined and a sample has been chosen, a researcher must then consider variables, or extrinsic factors, that might affect the study. Matching methods apply when researchers are aware of extrinsic variables before conducting a study. Two methods used to match groups are:

- Precision Matching
- Frequency Distribution

Although, in theory, matching tends to produce valid conclusions, a rather obvious difficulty arises in finding subjects which are compatible. Researchers may even believe that experimental and control groups are identical when, in fact, a number of variables have

been overlooked. For these reasons, researchers tend to reject matching methods in favor of random sampling.

Methods

Statistics can be used to analyze individual variables, relationships among variables, and differences between groups. In this section, we explore a range of statistical methods for conducting these analyses.

Statistics can be used to analyze individual variables, relationships among variables, and differences between groups. To read more about statistical methods, click on the items below:

- Analysing Individual Variables
- Analysing Differences Between Groups
- Analysing Relationships Among Variables

Analysing Individual Variables

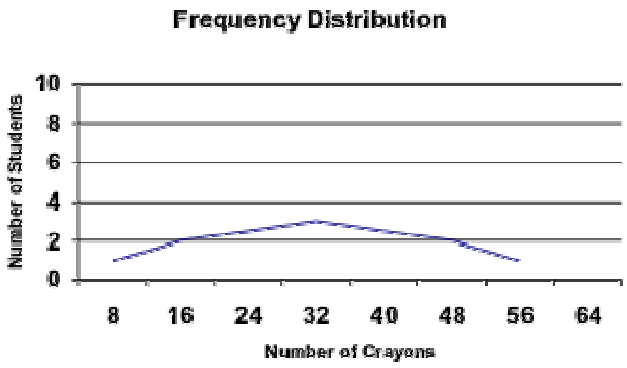
The statistical procedures used to analyse a single variable describing a group (such as a population or representative sample) involve measures of central tendency and measures of variation. To explore these measures, a researcher first needs to consider the distribution, or range of values of a particular variable in a population or sample. Normal distribution occurs if the distribution of a population is completely normal. When graphed, this type of distribution will look like a bell curve; it is symmetrical and most of the scores cluster toward the middle. Skewed Distribution simply means the distribution of a population is not normal. The scores might cluster toward the right or the left side of the curve, for instance. Or there might be two or more clusters of scores, so that the distribution looks like a series of hills.

Once frequency distributions have been determined, researchers can calculate measures of central tendency and measures of variation. Measures of central tendency indicate averages of the distribution, and measures of variation indicate the spread, or range, of the distribution (Hinkle, Wiersma and Jurs
198
8).

View More about Measures of Variation

Measures of Central Tendency

Central tendency is measured in three ways: mean, median and mode. The mean is simply the average score of a distribution. The median is the center, or middle score within a distribution. The mode is the most frequent score within a distribution. In a normal distribution, the mean, median and mode are identical.



Measures of Variation

Measures of variation determine the range of the distribution, relative to the measures of central tendency. Where the measures of central tendency are specific data points, measures of variation are lengths between various points within the distribution. Variation is measured in terms of range, mean deviation, variance, and standard deviation (Hinkle, Wiersma and Jurs 1988).

The range is the distance between the lowest data point and the highest data point. Deviation scores are the distances between each data point and the mean. Mean deviation is the average of the absolute values of the deviation scores; that is, mean deviation is the average distance between the mean and the data points. Closely related to the measure of mean deviation is the measure of variance.

Variance also indicates a relationship between the mean of a distribution and the data points; it is determined by averaging the sum of the squared deviations. Squaring the differences instead of taking the absolute values allows for greater flexibility in calculating further algebraic manipulations of the data. Another measure of variation is the standard deviation.

Standard deviation is the square root of the variance. This calculation is useful because it allows for the same flexibility as variance regarding further calculations and yet also expresses variation in the same units as the original measurements (Hinkle, Wiersma and Jurs 1988).

Analysing Differences between Groups

Statistical tests can be used to analyze differences in the scores of two or more groups. The following statistical tests are commonly used to analyze differences between groups:

- T-Test
- Matched Pairs T-Test
- Analysis of Variance (ANOVA) T-Tests

A t-test is used to determine if the scores of two groups differ on a single variable. A t-test is designed to test for the differences in mean scores. For instance, you could use a t-test to determine whether writing ability differs among students in two classrooms.

Note: A t-test is appropriate only when looking at paired data. It is useful in analyzing scores of two groups of participants on a particular variable or in analyzing scores of a single group of participants on two variables.

Matched-Pairs T-Tests

This type of t-test could be used to determine if the scores of the same participants in a study differ under different conditions. For instance, this sort of t-test could be used to determine if people write better essays after taking a writing class than they did before taking the writing class.

Note: A t-test is appropriate only when looking at paired data. It is useful in analyzing scores of two groups of participants on a particular variable or in analyzing scores of a single group of participants on two variables.

Analysis of Variance

The ANOVA (analysis of variance) is a statistical test which makes a single, overall decision as to whether a significant difference is present among three or more sample means (Levin 484). An ANOVA is similar to a t-test. However, the ANOVA can also test multiple groups to see if they differ on one or more variables. The ANOVA can be used to test between-groups and within-groups differences. There are two types of ANOVAs:

One-Way ANOVA: This tests a group or groups to determine if there are differences on a single set of scores. For instance, a one-way ANOVA could determine whether freshmen, sophomores, juniors, and seniors differed in their reading ability.

Multiple ANOVA (MANOVA): This tests a group or groups to determine if there are differences on two or more variables. For instance, a MANOVA could determine whether freshmen, sophomores, juniors, and seniors differed in reading ability and whether those differences were reflected by gender. In this case, a researcher could determine (1) whether reading ability differed across class levels, (2) whether reading ability differed across gender, and (3) whether there was an interaction between class level and gender.

Analysing Relationships among Variables

Statistical relationships between variables rely on notions of correlation and regression. These two concepts aim to describe the ways in which variables relate to one another:

- Correlation
- Regression

Correlation

Correlation tests are used to determine how strongly the scores of two variables are associated or correlated with each other. A researcher might want to know, for instance, whether a correlation exists between students' writing placement examination scores and their scores on a standardized test such as the ACT or SAT. Correlation is measured using values between +1.0 and -1.0. Correlations close to 0 indicate little or no relationship between two variables, while correlations close to +1.0 (or -1.0) indicate strong positive (or negative) relationships (Hayes et al. 554).

Correlation denotes positive or negative association between variables in a study. Two variables are positively associated when larger values of one tend to be accompanied by larger values of the other. The variables are negatively associated when larger values of one tend to be accompanied by smaller values of the other (Moore 208).

An example of a strong positive correlation would be the correlation between age and job experience. Typically, the longer people are alive, the more job experience they might have.

An example of a strong negative relationship might occur between the strength of people's party affiliations and their willingness to vote for a candidate from different parties. In many elections, Democrats are unlikely to vote for Republicans, and vice versa.

Regression

Regression analysis attempts to determine the best "fit" between two or more variables. The independent variable in a regression analysis is a continuous variable, and thus allows you to determine how one or more independent variables predict the values of a dependent variable. Simple Linear Regression is the simplest form of regression. Like a correlation, it determines the extent to which one independent variables predicts a dependent variable. You can think of a simple linear regression as a correlation line. Regression analysis provides you with more information than correlation does, however. It tells you how well the line "fits" the data. That is, it tells you how closely the line comes to all of your data points. The line in the figure indicates the regression line drawn to find the best fit among a set of data points. Each dot represents a person and the axes indicate the amount of job experience and the age of that person. The dotted lines indicate the distance from the regression line. A smaller total distance indicates a better fit. Some of the information provided in a regression analysis, as a result, indicates the slope of the regression line, the R value (or correlation), and the strength of the fit (an indication of the extent to which the line can account for variations among the data points).

Multiple Linear Regression allows one to determine how well multiple independent variables predict the value of a dependent variable. A researcher might examine, for instance, how well age and experience predict a person's salary. The interesting thing here is that one would no longer be dealing with a regression "line." Instead, since the study deals with three dimensions (age, experience, and salary), it would be dealing with a plane, that is, with a two-dimensional figure. If a fourth variable was added to the equations, one would be dealing with a three-dimensional figure, and so on.

Commentary

Misuses of Statistics

Statistics consists of tests used to analyze data. These tests provide an analytic framework within which researchers can pursue their research questions. This framework provides one way of working with observable information. Like other analytic frameworks, statistical tests can be misused, resulting in potential misinterpretation and misrepresentation. Researchers decide which research questions to ask, which groups to study, how those groups should be divided, which variables to focus upon, and how best to categorize and measure such variables. The point is that researchers retain the ability to manipulate any study even as they decide what to study and how to study it.

Potential Misuses:

- Manipulating scale to change the appearance of the distribution of data
- Eliminating high / low scores for more coherent presentation
- Inappropriately focusing on certain variables to the exclusion of other variables
- Presenting correlation as causation

Measures against Potential Misuses:

- Testing for reliability and validity
- Testing for statistical significance
- Critically reading statistics

Key Terms

Glossary of Key Terms

Accuracy	A term used in survey research to refer to the match between the target population and the sample.
ANCOVA (Analysis of Co-Variance)	Same method as ANOVA, but analyzes differences between dependent variables.
ANOVA (Analysis of Variance)	A method of statistical analysis broadly applicable to a number of research designs, used to determine differences among the means of two or more groups on a variable. The independent variables are usually nominal, and the dependent variable is usual an interval.
Apparency	Clear, understandable representation of the data

Bell curve	A frequency distribution statistics. Normal distribution is shaped like a bell.
Case Study	The collection and presentation of detailed information about a particular participant or small group, frequently including the accounts of subjects themselves.
Causal Model	A model which represents a causal relationship between two variables.
Causal Relationship	The relationship established that shows that an independent variable, and nothing else, causes a change in a dependent variable. Establishes, also, how much of a change is shown in the dependent variable.
Causality	The relation between cause and effect.
Central Tendency	These measures indicate the middle or center of a distribution.
Confirmability	Objectivity; the findings of the study could be confirmed by another person conducting the same study
Confidence Interval	The range around a numeric statistical value obtained from a sample, within which the actual, corresponding value for the population is likely to fall, at a given level of probability (Alreck,
Confidence Level	The specific probability of obtaining some result from a sample if it did not exist in the population as a whole, at or below which the relationship will be regarded as statistically significant (Alreck,
Confidence Limits	(Same as confidence interval, but is terminology used by Lauer and Asher.) "The range of scores or percentages within which a population percentage is likely to be found on variables that describe that population" (Lauer and Asher, 58). Confidence limits are expressed in a "plus or minus" fashion according to sample size, then corrected according to formulas based on variables connected to population size in relation to sample size and the relationship of the variable to the population size--the larger the sample, the
Confounding Variable	An unforeseen, and unaccounted-for variable that jeopardizes reliability and validity of an experiment's outcome.
Construct Validity	Seeks an agreement between a theoretical concept and a specific measuring device, such as observation.

Content Validity	The extent to which a measurement reflects the specific intended domain of content (Carmines & Zeller, 1991, p.20).
Context sensitivity	Awareness by a qualitative researcher of factors such as values and beliefs that influence cultural behaviors
Continuous Variable	A variable that may have fractional values, e.g., height, weight and time.
Control Group	A group in an experiment that receives not treatment in order to compare the treated group against a norm.
Convergent Validity	The general agreement among ratings, gathered independently of one another, where measures should be theoretically related.
Correlation	1) A common statistical analysis, usually abbreviated as r, that measures the degree of relationship between pairs of interval variables in a sample. The range of correlation is from -1.00 to zero to +1.00. 2) A non-cause and effect relationship between two variables.
Covariate	A product of the correlation of two related variables times their standard deviations. Used in true experiments to measure the difference of treatment between them.
Credibility	A researcher's ability to demonstrate that the object of a study is accurately identified and described, based on the way in which the study was conducted
Criterion Related Validity	Used to demonstrate the accuracy of a measuring procedure by comparing it with another procedure which has been demonstrated to be valid; also referred to as instrumental validitv.
Data	Recorded observations, usually in numeric or textual form
Deductive	A form of reasoning in which conclusions are formulated about particulars from general or universal premises
Dependability	Being able to account for changes in the design of the study and the changing conditions surrounding what was studied.
Dependent Variable	A variable that receives stimulus and measured for the effect the treatment has had upon it.
Design flexibility	A quality of an observational study that allows researchers to pursue inquiries on new topics or questions that emerge from initial research

Deviation	The distance between the mean and a particular data point in a given distribution.
Discourse Community	A community of scholars and researchers in a given field who respond to and communicate to each other through published articles in the community's journals and presentations at conventions. All members of the discourse community adhere to certain conventions for the presentation of their theories and research.
Discrete Variable	A variable that is measured solely in whole units, e.g., gender and siblings
Discriminate Validity	The lack of a relationship among measures which theoretically should not be related.
Distribution	The range of values of a particular variable.
Dynamic systems	Qualitative observational research is not concerned with having straight-forward, right or wrong answers. Change in a study is common because the researcher is not concerned with finding only one answer.
Electronic Text	A "paper" or linear text that has been essentially "copied" into an electronic medium.
Empathic neutrality	A quality of qualitative researchers who strive to be non-judgmental when compiling findings
Empirical Research	"...the process of developing systematized knowledge gained from observations that are formulated to support insights and generalizations about the phenomena under study" (Lauer and Asher, 1988, p. 7)
Equivalency Reliability	The extent to which two items measure identical concepts at an identical level of difficulty.
Ethnography	Ethnographies study groups and/or cultures over a period of time. The goal of this type of research is to comprehend the particular group/culture through observer immersion into the culture or group. Research is completed through various methods, which are similar to those of case studies, but since the researcher is immersed within the group for an extended period of time more detailed information is usually

Ethno methodology	A form of ethnography that studies activities of group members to see how they make sense of their surroundings
Existence or Frequency	This is a key question in the coding process. The researcher must decide if he/she is going to count a concept only once, for existence, no matter how many times it appears, or if he/she will count it each time it occurs. For example, "damn" could be counted once, even though it appears 50 times, or it could be counted all 50 times. The latter measurement may be interested in how many
Experiment	Experimental Research A researcher working within this methodology creates an environment in which to observe and interpret the results of a research question. A key element in experimental research is that participants in a study are randomly assigned to groups. In an attempt to create a causal model (i.e., to discover the causal origin of a particular phenomenon), groups are treated differently and measurements are conducted to determine if different
External Validity	The extent to which the results of a study are generalisable or transferable. See also validity
Face Validity	How a measure or procedure appears.
Factor Analysis	A statistical test that explores relationships among data. The test explores which variables in a data set are most related to each other. In a carefully constructed survey, for example, factor analysis can yield information on patterns of responses, not simply data on a single response. Larger tendencies may then be interpreted, indicating behaviour trends rather than simply responses to specific questions.
Generalisability	The extent to which research findings and conclusions from a study conducted on a sample population can be applied to the population at large.
Grounded theory	Practice of developing other theories that emerge from observing a group. Theories are grounded in the group's observable experiences, but researchers add their own insight into why those experiences exist.
Holistic perspective	Taking almost every action or communication of the whole phenomenon of a certain community or culture into account in research
Hypertext	A non sequential text composed of links and nodes

Hypothesis	A tentative explanation based on theory to predict a causal relationship between variables.
Independent Variable	A variable that is part of the situation that exist from which originates the stimulus given to a dependent variable. Includes treatment, state of variable, such as age, size, weight, etc.
Inductive	A form of reasoning in which a generalized conclusion is formulated from particular instances
Inductive analysis	A form of analysis based on inductive reasoning; a researcher using inductive analysis starts with answers, but forms questions throughout the research process.
Internal Consistency	The extent to which all questions or items assess the same characteristic, skill, or quality.
Internal Validity	(1) The rigor with which the study was conducted (e.g., the study's design, the care taken to conduct measurements, and decisions concerning what was and wasn't measured) and (2) the extent to which the designers of a study have taken into account alternative explanations for any causal relationships they explore (Huitt, 1998). In studies that do not explore causal relationships, only the first of these definitions should be considered when assessing internal validity. See
Interrater Reliability	The extent to which two or more individuals agree. It addresses the consistency of the implementation of a rating system.
Interval Variable	A variable in which both order of data points and distance between data points can be determined, e.g., percentage scores and distances
Interviews	A research tool in which a researcher asks questions of participants; interviews are often audio- or video-taped for later transcription and analysis.
Irrelevant Information	One must decide what to do with the information in the text that is not coded. One's options include either deleting or skipping over unwanted material, or viewing all information as relevant and important and using it to re-examine, reassess and perhaps even alter the one's coding scheme.
Kinesics	Kinesic analysis examines what is communicated through body movement

Level of Analysis	Chosen by determining which word, set of words, or phrases will constitute a concept. According to Carley, 100-500 concepts is generally sufficient when coding for a specific topic, but this number of course varies on a case by case basis.
Level of Generalization	A researcher must decide whether concepts are to be coded exactly as they appear, or if they can be recorded in some altered or collapsed form. Using Horton as an example again, she could code profanity individually and code "damn" and "dammit" as two separate concepts. Or, by generalizing their meaning, i.e. they both express the same idea, she could group them together as one item, i.e.
Level of Implication	One must determine whether to code simply for explicit appearances of concepts, or for implied concepts, as well. For example, consider a hypothetical piece of text about skiing, written by an expert. The expert might refer several times to "???," as well as various other kinds of turns. One must decide whether to code "???" as an entity in and of itself, or, if coding for "turn" references in general, to code "???" as implicitly meaning "turn." Thus, by determining that the meaning "turn" is implicit in the words "???," anytime the words "???" or "turn" appear in the text, they
Link	In hypertext, a pointer from one node to another
Matched T-Test	A statistical test used to compare two sets of scores for the same subject. A matched pairs T-test can be used to determine if the scores of the same participants in a study differ under different conditions. For instance, this sort of t-test could be used to determine if people write better essays after taking a writing class than they did before taking the
Matching	Process of corresponding variables in experimental groups equally feature for feature.
Mean	The average score within a distribution.
Mean Deviation	A measure of variation that indicates the average deviation of scores in a distribution from the mean: It is determined by averaging the absolute values of the
Median	The centre score in a distribution.

Mental Models	A group or network of interrelated concepts that reflect conscious or subconscious perceptions of reality. These internal mental networks of meaning are constructed as people draw inferences and gather information about the world.
Mode	The most frequent score in a distribution.
Multi-Modal Methods	A research approach that employs a variety of methods; see also triangulation
Narrative Inquiry	A qualitative research approach based on a researcher's narrative account of the investigation, not to be confused with a narrative examined by the researcher as data
Naturalistic Inquiry	Observational research of a group in its natural setting
Node	In hypertext, each unit of information, connected by links
Nominal Variable	A variable determined by categories which cannot be ordered, e.g., gender and colour
Normal distribution	A normal frequency distribution representing the probability that a majority of randomly selected members of a population will fall within the middle of the distribution. Represented by the bell curve.
Ordinal Variable	A variable in which the order of data points can be determined but not the distance between data points, e.g., letter grades
Parameter	A coefficient or value for the population that corresponds to a particular statistic from a sample and is often inferred from the sample.
Phenomenology	A qualitative research approach concerned with understanding certain group behaviours from that group's point of view
Population	The target group under investigation, as in all students enrolled in first-year composition courses taught in traditional classrooms. The population is the entire set under consideration. Samples are drawn from populations.
Precision	In survey research, the tightness of the confidence limits.

Pre-defined or Interactive Concept Choice	One must determine whether to code only from a pre-defined set of concepts and categories, or if one will develop some or all of these during the coding process. For example, using a predefined set, Horton would code only for profane language. But, if Horton coded interactively, she may have decided to half-way through the process that the text warranted coding for profane gestures, as well.
Probability	The chance that a phenomenon has a of occurring randomly. As a statistical measure, it shown as p (the "p" factor).
Qualitative Research	Empirical research in which the researcher explores relationships using textual, rather than quantitative data. Case study, observation, and ethnography are considered forms of qualitative research. Results are not usually considered generalizable, but are often transferable.
Quantitative Research	Empirical research in which the researcher explores relationships using numeric data. Survey is generally considered a form of quantitative research. Results can often be generalized, though this is not always the case.
Quasi-experiment	Similar to true experiments. Have subjects, treatment, etc., but uses nonrandomized groups. Incorporates interpretation and transferability in order to compensate for lack of control of variables.
Quixotic Reliability	Refers to the situation where a single manner of observation consistently, yet erroneously, yields the same result.
Random sampling	Process used in research to draw a sample of a population strictly by chance, yielding no discernible pattern beyond chance. Random sampling can be accomplished by first numbering the population, then selecting the sample according to a table of random numbers or using a random-number computer generator. The sample is said to be random because there is no regular or discernible pattern or order. Random sample selection is used under the assumption that sufficiently large samples assigned randomly will exhibit a distribution comparable to that of the population from
Randomization	Used to allocate subjects to experimental and control groups. The subjects are initially considered not unequal because they were randomly selected.
Range	The difference between the highest and lowest scores in a distribution.

Reliability	The extent to which a measure, procedure or instrument yields the same result on repeated trials.
Response Rate	In survey research, the actual percentage of questionnaires completed and returned.
Rhetorical Inquiry	"entails...1) identifying a motivational concern, 2) posing questions, 3) engaging in a heuristic search (which in composition studies has often occurred by probing other fields), 4) creating a new theory or hypotheses, and 5) justifying the theory" (Lauer and Asher, 1988, p.
Rigor	Degree to which research methods are scrupulously and meticulously carried out in order to recognize important influences occurring in a experiment.
Sampling Error	The degree to which the results from the sample deviate from those that would be obtained from the entire population, because of random error in the selection of respondent and the corresponding reduction in reliability (Alreck, 454).
Sampling Frame	A listing that should include all those in the population to be sampled and exclude all those who are not in the population (Alreck, 454).
Sample	The population researched in a particular study. Usually, attempts are made to select a "sample population" that is considered representative of groups of people to whom results will be generalized or transferred. In studies that use inferential statistics to analyze results or which are designed to be generalisable, sample size is critical--generally the larger the number in the sample, the higher the likelihood of a representative distribution of the population.
Selective Reduction	The central idea of content analysis. Text is reduced to categories consisting of a word, set of words or phrases, on which the researcher can focus. Specific words or patterns are indicative of the research question and determine levels of analysis and generalization.
Serial Effect	In survey research, a situation where questions may "lead" participant responses through establishing a certain tone early in the questionnaire. The serial effect may accrue as several questions establish a pattern of response in the participant, biasing results.
Short-term observation	Studies that list or present findings of short-term qualitative study based on recorded observation

Skewed Distribution	Any distribution which is not normal, that is not symmetrical along the x-axis
Stability Reliability	The agreement of measuring instruments over time.
Standard Deviation	A term used in statistical analysis. A measure of variation that indicates the typical distance between the scores of a distribution and the mean; it is determined by taking the square root of the average of the squared deviations in a given distribution. It can be used to indicate the proportion of data within certain ranges of scale values when the distribution conforms closely to the normal curve.
Standard Error (S.E.) of the Mean	A term used in statistical analysis. A computed value based on the size of the sample and the standard deviation of the distribution, indicating the range within which the mean of the population is likely to be from the mean of the sample at a given level of probability (Alreck, 456).
Survey	A research tool that includes at least one question which is either open-ended or close-ended and employs an oral or written method for asking these questions. The goal of a survey is to gain specific information about either a specific group or a representative sample of a particular group. Results are typically used to understand the attitudes, beliefs,
Synchronic Reliability	The similarity of observations within the same time frame; it is not about the similarity of things observed.
T-Test	A statistical test. A t-test is used to determine if the scores of two groups differ on a single variable. For instance, to determine whether writing ability differs among students in two classrooms, a t-test could be used.
Thick Description	A rich and extensive set of details concerning methodology and context provided in a research report.
Transferability	The ability to apply the results of research in one context to another similar context. Also, the extent to which a study invites readers to make connections between elements of the study and their own experiences.

Translation Rules

If one decides to generalize concepts during coding, then one must develop a set of rules by which less general concepts will be translated into more general ones. This doesn't involve simple generalization, for example, as with "damn" and "dammit," but requires one to determine, from a given set of concepts, what concepts are missing. When dealing with the idea of profanity, one must decide what to do with the concept "dang it," which is generally thought to

	distinction, i.e. make this implicit concept explicit, and then code for the frequency of its occurrence. This decision results in the construction of a translation rule, which instructs the researcher to code for the concept "dang it" in a
Treatment	The stimulus given to a dependent variable.
Triangulation	The use of a combination of research methods in a study. An example of triangulation would be a study that incorporated surveys, interviews, and observations. See also multi-modal methods
Unique case orientation	A perspective adopted by many researchers conducting qualitative observational studies; researchers adopting this orientation remember every study is special and deserves in-depth attention. This is especially necessary for doing cultural
Validity	The degree to which a study accurately reflects or assesses the specific concept that the researcher is attempting to measure. A method can be reliable, consistently measuring the same thing, but not valid. See also internal validity and external validity
Variable	Observable characteristics that vary among individuals. See also ordinal variable, nominal variable, interval variable, continuous variable, discrete variable, dependent variable, independent variable.
Variance	A measure of variation within a distribution, determined by averaging the squared deviations from the
Variation	The dispersion of data points around the mean of a distribution.
Verisimilitude	Having the semblance of truth; in research, it refers to the probability that the research findings are consistent with occurrences in the "real world."

Biostatistics

Biostatistics involves the theory and application of statistical science to analyze public health problems and to further biomedical research. The faculty includes leaders in the development of statistical methods for clinical trials and observational studies, studies on the environment, and genomics / genetics. The department's research in statistical methods and interdisciplinary collaborations provide many opportunities for student participation.

Current departmental research on statistical and computing methods for observational studies and clinical trials includes survival analysis, missing-data problems, and causal inference. Other areas of investigation are environmental research (methods for longitudinal studies, analyses with incomplete data, and meta-analysis); statistical aspects of the study of AIDS and cancer; quantitative problems in health-risk analysis, technology assessment, and clinical decision making; statistical methodology in psychiatric research and in genetic studies; Bayesian statistics; statistical computing; statistical genetics and computational biology; and collaborative research activities with biomedical scientists in other Harvard-affiliated institutions.

Measures of Risk

This Lesson describes the measures of central location and spread, which are useful for summarizing continuous variables. However, many variables used by field epidemiologists are categorical variables, some of which have only two categories — exposed yes/no, test positive/negative, case/control, and so on. These variables have to be summarized with frequency measures such as ratios, proportions, and rates. Incidence, prevalence, and mortality rates are three frequency measures that are used to characterize the occurrence of health events in a population.

Objectives

At the end of this module, you will be able to:

• Calculate and interpret the following epidemiologic measures:

– Ratio

– Proportion

– Incidence proportion (attack rate)

– Incidence rate

– Prevalence

– Mortality rate

• Choose and apply the appropriate measures of association and measures of public health impact

Frequency Measures

A measure of central location provides a single value that summarizes an entire distribution of data. In contrast, a frequency measure characterizes only part of the distribution. Frequency measures compare one part of the distribution to another part of the distribution, or to the entire distribution. Common frequency measures are ratios, proportions, and rates. All three frequency measures have the same basic form: numerator denominator $\times 10^n$

Recall that:

$10^0 = 1$ (anything raised to the 0 power equals 1)

$10^1 = 10$ (anything raised to the 1st power is the value itself)

$10^2 = 10 \times 10 = 100$

$10^3 = 10 \times 10 \times 10 = 1{,}000$

So the fraction of (numerator / denominator) can be multiplied by 1, 10, 100, 1000, and so on. This multiplier varies by measure and will be addressed in each section.

Ratio:

A ratio is the relative magnitude of two quantities or a comparison of any two values. It is calculated by dividing one interval- or ratio-scale variable by the other. The numerator and denominator need not be related. Therefore, one could compare apples with oranges or apples with number of physician visits.

Method for calculating a ratio

Number or rate of events, items, persons, etc. in one group

Number or rate of events, items, persons, etc. in another group

After the numerator is divided by the denominator, the result is often expressed as the result "to one" or written as the result ":1."

Note that in certain ratios, the numerator and denominator are different categories of the same variable, such as males and females, or persons 20–29 years and 30–39 years of age. In other ratios, the numerator and denominator are completely different variables, such as the number of hospitals in a city and the size of the population living in that city.
EXAMPLE: Calculating a Ratio — Different Categories of Same Variable

Between 1971 and 1975, as part of the National Health and Nutrition Examination Survey (NHANES),

7,381 persons ages 40–77 years were enrolled in a follow-up study.1 At the time of enrollment, each study participant was classified as having or not having diabetes. During 1982–1984, enrollees were documented either to have died or were still alive. The results are summarized as follows.

	Original Enrollment (1971–1975)	Dead at Follow-Up (1982–1984)
Diabetic men	189	100
Nondiabetic men	3,151	811
Diabetic women	218	72
Nondiabetic women	3,823	511

Of the men enrolled in the NHANES follow-up study, 3,151 were nondiabetic and 189 were diabetic. Calculate the ratio of non-diabetic to diabetic men.

Ratio = 3,151 / 189 x 1 = 16.7:1

Properties and uses of ratios:

• Ratios are common descriptive measures, used in all fields. In epidemiology, ratios are used as both descriptive measures and as analytic tools. As a descriptive measure, ratios can describe the male-to- female ratio of participants in a study, or the ratio of controls to cases (e.g., two controls per case). As an analytic tool, ratios can be calculated for occurrence of illness, injury, or death between two groups. These ratio measures, including risk ratio (relative risk), rate ratio, and odds ratio, are described later in this lesson.

• As noted previously, the numerators and denominators of a ratio can be related or unrelated. In other words, you are free to use a ratio to compare the number of males in a population with the number of females, or to compare the number of residents in a population with the number of hospitals or dollars spent on over-the-counter medicines.

• Usually, the values of both the numerator and denominator of a ratio are divided by the value of one or the other so that either the numerator or the denominator equals 1.0. So the ratio of non-diabetics to diabetics cited in the previous example is more likely to be reported as 16.7:1 than 3,151:189.

EXAMPLES: Calculating Ratios for Different Variables

Example A: A city of 4,000,000 persons has 500 clinics. Calculate the ratio of clinics per person.

500 / 4,000,000 x 10n = 0.000125 clinics per person To get a more easily understood result, you could set 10n = 104 = 10,000. Then the ratio becomes:

0.000125 x 10,000 = 1.25 clinics per 10,000 persons
You could also divide each value by 1.25, and express this ratio as 1 clinic for every 8,000 persons. Example B: Delaware's infant mortality rate in 2001 was 10.7 per 1,000 live births.2 New Hampshire's infant mortality rate in 2001 was 3.8 per 1,000 live births. Calculate the ratio of the infant mortality rate in Delaware to that in New Hampshire.

10.7 / 3.8 x 1 = 2.8:1

Thus, Delaware's infant mortality rate was 2.8 times as high as New Hampshire's infant mortality rate in 2001.

A commonly used epidemiologic ratio: death-to-case ratio:

Death-to-case ratio is the number of deaths attributed to a particular disease during a specified period divided by the number of new cases of that disease identified during the same period. It is used as a measure of the severity of illness: the death-to-case ratio for rabies is close to 1 (that is, almost everyone who develops rabies dies from it), whereas the death-to-case ratio for the common cold is close to 0.

For example, in the United States in 2002, a total of 15,075 new cases of tuberculosis were reported.3 During the same year, 802 deaths were attributed to tuberculosis. The tuberculosis death-tocase ratio for
2002 can be calculated as 802 / 15,075. Dividing both numerator and denominator by the numerator yields 1 death per 18.8 new cases. Dividing both numerator and denominator by the denominator (and multiplying by 10n = 100) yields 5.3 deaths per 100 new cases. Both expressions are correct.

Note that, presumably, many of those who died had initially contracted tuberculosis years earlier. Thus many of the 802 in the numerator are not among the 15,075 in the denominator. Therefore, the death-to- case ratio is a ratio, but not a proportion.

Proportion:

A proportion is the comparison of a part to the whole. It is a type of ratio in which the numerator is included in the denominator. You might use a proportion to describe what fraction of clinic patients tested positive for HIV, or what percentage of the population is younger than 25 years of age. A proportion may be expressed as a decimal, a fraction, or a percentage.

Method for calculating a proportion
Number of persons or events with a particular characteristic

Total number of persons or events, of which the numerator is a subset x 10n

For a proportion, 10n is usually 100 (or n=2) and is often expressed as a percentage.

EXAMPLE: Calculating a Proportion

Example A: Calculate the proportion of men in the NHANES follow-up study who were diabetics. Numerator = 189 diabetic men
Denominator = Total number of men = 189 + 3,151 = 3,340

Proportion = (189 / 3,340) x 100 = 5.66%

Example B: Calculate the proportion of deaths among men. Numerator
= deaths in men
= 100 deaths in diabetic men + 811 deaths in nondiabetic men

= 911 deaths in men

Notice that the numerator (911 deaths in men) is a subset of the
denominator. Denominator = all deaths
= 911 deaths in men + 72 deaths in diabetic women + 511 deaths in nondiabetic women

= 1,494 deaths

Proportion = 911 / 1,494 = 60.98% = 61%

Your Turn: What proportion of all study participants were men? (Answer = 45.25%)

Properties and uses of proportions:

• Proportions are common descriptive measures used in all fields. In epidemiology, proportions are used most often as descriptive measures. For example, one could calculate the proportion of persons enrolled in a study among all those eligible ("participation rate"), the proportion of children in a village vaccinated against measles, or the proportion of persons who developed illness among all passengers of a cruise ship.

• Proportions are also used to describe the amount of disease that can be attributed to a particular exposure. For example, on the basis of studies of smoking and lung cancer, public health officials have

estimated that greater than 90% of the lung cancer cases that occur are attributable to cigarette smoking.

• In a proportion, the numerator must be included in the denominator. Thus, the number of apples divided by the number of oranges is not a proportion, but the number of apples divided by the total number of fruits of all kinds is a proportion. Remember, the numerator is always a subset of the denominator.

• A proportion can be expressed as a fraction, a decimal, or a percentage. The statements "one fifth of the residents became ill" and "twenty percent of the residents became ill" are equivalent.

• Proportions can easily be converted to ratios. If the numerator is the number of women (179) who attended a clinic and the denominator is all the clinic attendees (341), the proportion of clinic attendees who are women is 179 / 341, or 52% (a little more than half). To convert to a ratio, subtract the numerator from the denominator to get the number of clinic patients who are not women, i.e., the number of men (341 – 179 = 162 men.)Thus, ratio of women to men could be calculated from the proportion as:

Ratio = 179 / (341 – 179) x 1

= 179 / 162

= 1.1 to 1 female-to-male ratio

Conversely, if a ratio's numerator and denominator together make up a whole population, the ratio can be converted to a proportion. You would add the ratio's numerator and denominator to form the denominator of the proportion, as illustrated in the NHANES follow-up study examples (provided earlier in this lesson).

A specific type of epidemiologic proportion: proportionatemortality:

Proportionate mortality is the proportion of deaths in a specified population during a period of time that are attributable to different causes. Each cause is expressed as a percentage of all deaths, and the sum of the causes adds up to 100%. These proportions are not rates because the denominator is all deaths, not the size of the population in which the deaths occurred.

Rate:

In epidemiology, a rate is a measure of the frequency with which an event occurs in a defined population over a specified period of time. Because rates put disease frequency in the perspective of the size of the population, rates are particularly useful for comparing disease frequency in different locations, at different times, or among different groups of persons with potentially different sized populations; that is, a rate is a measure of risk.

To a non-epidemiologist, rate means how fast something is happening or going. The speedometer of a car indicates the car's speed or rate of travel in miles or kilometers per hour. This rate is always reported per some unit of time. Some epidemiologists restrict use of the term rate to similar measures that are expressed per unit of time. For these epidemiologists, a rate describes how quickly disease occurs in a population, for example, 70 new cases of breast cancer per 1,000 women per year. This measure conveys a sense of the speed with which disease occurs in a population, and seems to imply that this pattern has occurred and will continue to occur for the foreseeable future. This rate is an incidence rate, described in the next section.

Other epidemiologists use the term rate more loosely, referring to proportions with case counts in the numerator and size of population in the denominator as rates. Thus, an attack rate is the proportion of the population that develops illness during an outbreak. For example, 20 of 130 persons developed diarrhea after attending a picnic. (An alternative and more accurate phrase for attack rate is incidence proportion.) A prevalence rate is the proportion of the population that has a health condition at a point in time. For example, 70 influenza case-patients in March 2005 reported in County A. A case-fatality rate is the proportion of persons with the disease who die from it. Forexample, one death due to meningitis among County A's population. All of these measures are proportions, and none is expressed per units of time. Therefore, these measures are not considered "true" rates by some, although use of the terminology is widespread.

Incidence refers to the occurrence of new cases of disease or injury in a population over a specified period of time. Although some epidemiologists use incidence to mean the number of new cases in a community, others use incidence to mean the number of new cases per unit of population. Two types of incidence are commonly used — incidence proportion and incidence rate.

Incidence proportion or risk:

Incidence proportion is the proportion of an initially disease-free population that develops disease, becomes injured, or dies during a specified (usually limited) period of time. Synonyms include attack rate, risk, probability of getting disease, and cumulative incidence. Incidence proportion is a proportion because the persons in the numerator, those who develop disease, are all included in the denominator (the entire population).

Method for calculating incidence proportion (risk)

Number of new cases of disease or injury during specified period

Size of population at start of period

EXAMPLES: Calculating Incidence Proportion (Risk)

Example A: In the study of diabetics, 100 of the 189 diabetic men died during the 13-year follow-up period. Calculate the risk of death for these men.

Numerator = 100 deaths among the diabetic men

Denominator = 189 diabetic men

10n = 102 = 100

Risk = (100 / 189) x 100 = 52.9%

Example B: In an outbreak of gastroenteritis among attendees of a corporate picnic, 99 persons ate potato salad, 30 of whom developed gastroenteritis. Calculate the risk of illness among persons who ate potato salad.

Numerator = 30 persons who ate potato salad and developed gastroenteritis

Denominator = 99 persons who ate potato salad

10n = 102 = 100

Risk = "Food-specific attack rate" = (30 / 99) x 100 = 0.303 x 100 = 30.3%

Properties and uses of incidence proportions:

• Incidence proportion is a measure of the risk of disease or the probability of developing the disease during the specified period. As a measure of incidence, it includes only new cases of disease in the numerator. The denominator is the number of persons in the population at the start of the observation period. Because all of the persons with new cases of disease (numerator) are also represented in the denominator, a risk is also a proportion.

• In the outbreak setting, the term attack rate is often used as a synonym for risk. It is the risk of getting the disease during a specified period, such as the duration of an outbreak. A variety of attack rates can be calculated.

Overall attack rate is the total number of new cases divided by the total population.

A food-specific attack rate is the number of persons who ate a specified food and became ill divided by the total number of persons who ate that food, as illustrated in the previous potato salad example.

A secondary attack rate is sometimes calculated to document the difference between community transmission of illness versus transmission of illness in a household, barracks, or other closed population. It is calculated as:

Number of cases among contacts of primary cases

Total number of contacts x 10n

Often, the total number of contacts in the denominator is calculated as the total population in the households of the primary cases, minus the number of primary cases. For a secondary attack rate, 10n usually is 100%.

EXAMPLE: Calculating Secondary Attack Rates

Consider an outbreak of shigellosis in which 18 persons in 18 different households all became ill. If the population of the community was 1,000, then the overall attack rate was 18 / 1,000 x 100% = 1.8%. One incubation period later, 17 persons in the same households as these "primary" cases developed shigellosis. If the 18 households included 86 persons, calculate the secondary attack rate.

Secondary attack rate = (17 / (86 – 18)) x 100% = (17 / 68) x 100% = 25.0%

Incidence rate or person-time rate:

Incidence rate or person-time rate is a measure of incidence that incorporates time directly into the denominator. A person-time rate is generally calculated from a long-term cohort follow-up study, wherein enrollees are followed over time and the occurrence of new cases of disease is documented. Typically, each person is observed from an established starting time until one of four "end points" is reached: onset of disease, death, migration out of the study ("lost to follow-up"), or the end of the study. Similar to the incidence proportion, the numerator of the incidence rate is the number of new cases identified during the period of observation. However, the denominator differs. The denominator is the sum of the time each person was observed, totaled for all persons. This denominator represents the total time the population was at risk of and being watched for disease. Thus, the incidence rate is the ratio of the number of cases to the total time the population is at risk of disease.

Method for calculating incidence rate

Number of new cases of disease or injury during specified period

Time each person was observed, totaled for all persons

In a long-term follow-up study of morbidity, each study participant may be followed or observed for several years. One person followed for 5 years without developing disease is said to contribute 5 person-years of follow-up.

What about a person followed for one year before being lost to follow-up at year 2? Many researchers assume that persons lost to follow-up were, on average, disease-free for half the year, and thus contribute ½ year to the denominator. Therefore, the person followed for one year before being lost to follow-up contributes 1.5 person-years. The same assumption is made for participants diagnosed with the disease at the year 2 examination — some may have developed illness in month 1, and others in months 2 through 12. So, on average, they developed illness halfway through the year. As a result, persons diagnosed with the disease contribute ½ year of follow-up during the year of diagnosis.

The denominator of the person-time rate is the sum of all of the person-years for each study participant. So, someone lost to follow-up in year 3, and someone diagnosed with the disease in year 3, each contributes 2.5 years of disease-free follow-up to the denominator.

Properties and uses of incidence rates:

• An incidence rate describes how quickly disease occurs in a population. It is based on person-time, so it has some advantages over an incidence proportion. Because person-time is calculated for each subject, it can accommodate persons coming into and leaving the study. As noted in the previous example, the denominator accounts for study participants who are lost to follow-up or who die during the study period. In addition, it allows enrollees to enter the study at different times. In the NHANES follow-up study, some participants were enrolled in 1971, others in 1972, 1973, 1974, and 1975.

• Person-time has one important drawback. Person-time assumes that the probability of disease during the study period is constant, so that 10 persons followed for one year equals one person followed for 10 years. Because the risk of many chronic diseases increases with age, this assumption is often not valid.

• Long-term cohort studies of the type described here are not very common. However, epidemiologists far more commonly calculate incidence rates based on a numerator of cases observed or reported, and a denominator based on the mid-year population. This type of incident rate turns out to be comparable to a person-time rate.

• Finally, if you report the incidence rate of, say, the heart disease study as 2.5 per 1,000 person-years, epidemiologists might understand, but most others will not. Person-time is epidemiologic jargon. To convert this jargon to something understandable, simply replace "person-years" with "persons per year." Reporting the results as 2.5 new cases of heart disease per 1,000 persons per year sounds like English rather than jargon. It also conveys the sense of the incidence rate as a dynamic process, the speed at which new cases of disease occur in the population.

EXAMPLES: Calculating Incidence Rates

Example A: Investigators enrolled 2,100 women in a study and followed them annually for four years to determine the incidence rate of heart disease. After one year, none had a new diagnosis of heart disease, but 100 had been lost to follow-up. After two years, one had a new diagnosis of heart disease, and another 99 had been lost to follow-up. After three years, another seven had new diagnoses of heart disease, and 793 had been lost to follow-up. After four years, another 8 had new diagnoses with heart disease, and 392 more had been lost to follow-up. The study results could also be described as follows: No heart disease was diagnosed at the first year. Heart disease was diagnosed in one woman at the second year, in seven women at the third year, and in eight women at the fourth year of follow-up. One hundred women were lost to follow-up by the first year, another 99 were lost to followup after two years, another 793 were lost to follow-up after three years, and another 392 women were lost to followup after 4 years, leaving 700 women who were followed for four years and remained disease free.

Calculate the incidence rate of heart disease among this cohort. Assume that persons with new diagnoses of heart disease and those lost to follow-up were disease-free for half the year, and thus contribute ½ year to the denominator.

Numerator = number of new cases of heart disease

= 0 + 1 + 7 + 8 = 16

Denominator = person-years of observation

= (2,000 + ½ x 100) + (1,900 + ½ x 1 + ½ x 99) + (1,100 + ½ x 7 + ½ x 793)
+ (700 + ½ x 8 + ½ x 392)
= 6,400 person-years of follow-up or
Denominator = person-years of observation

= (1 x 1.5) + (7 x 2.5) + (8 x 3.5) + (100 x 0.5) + (99 x 1.5) + (793 x 2.5)
+ (392 x 3.5) + (700 x 4)
= 6,400 person-years of follow-up

Person-time rate = Number of new cases of disease or injury during specified period

Time each person was observed, totaled for all persons

= 16 / 6,400

= .0025 cases per person-year

= 2.5 cases per 1,000 person-years

In contrast, the incidence proportion can be calculated as 16 / 2,100 = 7.6 cases per 1,000 population during the four-year period, or an average of 1.9 cases per 1,000 per year (7.6 divided by 4 years). The incidence proportion underestimates the true rate because it ignores persons lost to follow-up, and assumes that they remained diseasefree for all four years.

Example B: The diabetes follow-up study included 218 diabetic women and 3,823 nondiabetic women. By the end of the study, 72 of the diabetic women and 511 of the nondiabetic women had died. The diabetic women were observed for a total of 1,862 person-years; the nondiabetic women were observed for a total of 36,653 person-years.

Calculate the incidence rates of death for the diabetic and non-diabetic women. For diabetic women, numerator = 72 and denominator = 1,862
Person-time rate = 72 / 1,862

= 0.0386 deaths per person-year

= 38.6 deaths per 1,000 person-years

For nondiabetic women, numerator = 511 and denominator = 36,653

Person-time rate = 511 / 36,653 = 0.0139 deaths per person-year

= 13.9 deaths per 1,000 person-years

Prevalence:

Prevalence, sometimes referred to as prevalence rate, is the proportion of persons in a population who have a particular disease or attribute at a specified point in time or over a specified period of time. Prevalence differs from incidence in that prevalence includes all cases, both new and preexisting, in the population at the specified time, whereas incidence is limited to new cases only.

Point prevalence refers to the prevalence measured at a particular point in time. It is the proportion of persons with a particular disease or attribute on a particular date.

Period prevalence refers to prevalence measured over an interval of time. It is the proportion of persons with a particular disease or attribute at any time during the interval.

Method for calculating prevalence of disease

All new and pre-existing cases during a given time period

Population during the same time period x 10n

Method for calculating prevalence of an attribute

Persons having a particular attribute during a given time period

Population during the same time period x 10n

The value of 10n is usually 1 or 100 for common attributes. The value of 10n might be 1,000, 100,000, or even 1,000,000 for rare attributes and for most diseases.

EXAMPLE: Calculating Prevalence

In a survey of 1,150 women who gave birth in Maine in 2000, a total of 468 reported taking a multivitamin at least 4 times a week during the month before becoming pregnant. Calculate the prevalence of frequent multivitamin use in this group.

Numerator = 468 multivitamin users

Denominator = 1,150 women

Prevalence = (468 / 1,150) x 100 = 0.407 x 100 = 40.7%

Properties and uses of prevalence:

• Prevalence and incidence are frequently confused. Prevalence refers to proportion of persons who have a condition at or during a particular time period, whereas incidence refers to the proportion or rate of persons who develop a condition during a particular time period. So prevalence and incidence are similar, but prevalence includes new and pre-existing cases whereas incidence includes new cases only. The key difference is in their numerators.

Numerator of incidence = new cases that occurred during a given time period

Numerator of prevalence = all cases present during a given time period

• The numerator of an incidence proportion or rate consists only of persons whose illness began during the specified interval.

The numerator for prevalence includes all persons ill from a specified cause during the specified interval regardless of when the illness began. It includes not only new cases, but also preexisting cases representing persons who remained ill during some portion of the specified interval.

• Prevalence is based on both incidence and duration of illness. High prevalence of a disease within a population might reflect high incidence or prolonged survival without cure or both. Conversely, low prevalence might indicate low incidence, a rapidly fatal process, or rapid recovery.

• Prevalence rather than incidence is often measured for chronic diseases such as diabetes or osteoarthritis which have long duration and dates of onset that are difficult to pinpoint.

EXAMPLES: Incidence versus Prevalence

10 new cases of illness over about 15 months in a population of 20 persons whereby each horizontal line represents one person, The down arrow indicates the date of onset of illness. The solid line represents the duration of illness. The up arrow and the cross represent the date of recovery and date of death, respectively.

Example A: Calculate the incidence rate from October 1, 2004, to September 30, 2005, using the midpoint population (population alive on April 1, 2005) as the denominator. Express the rate per 100 population. Incidence rate numerator = number of new cases between October 1 and September 30

= 4 (the other 6 all had onsets before October 1, and are not
included) Incidence rate denominator = April 1 population
= 18 (persons 2 and 8 died before
April 1) Incidence rate = (4 / 18) x 100
= 22 new cases per 100 population

Example B: Calculate the point prevalence on April 1, 2005. Point prevalence is the number of persons ill on the date divided by the population on that date. On April 1, seven persons (persons 1, 4, 5, 7, 9, and 10) were ill.

Point prevalence = (7 / 18) x 100 = 38.89%

Mortality Frequency Measure

Mortality rate

A mortality rate is a measure of the frequency of occurrence of death in a defined population during a specified interval. Morbidity and mortality measures are often the same mathematically; it's just a matter of what you choose to measure, illness or death. The formula for the mortality of a defined population, over a specified period of time, is:

Deaths occurring during a given time period

Size of the population among which the deaths occurred x 10n

When mortality rates are based on vital statistics (e.g., counts of death certificates), the denominator most commonly used is the size of the population at the middle of the time period. In the United States, values of 1,000 and 100,000 are both used for 10n for most types of mortality rates. Table 3.4 summarizes the formulas of frequently used mortality measures.

Crude mortality rate (crude death rate):

The crude mortality rate is the mortality rate from all causes of death for a population. In the United States in 2003, a total of 2,419,921 deaths occurred. The estimated population was 290,809,777. The crude mortality rate in 2003 was, therefore,

(2,419,921 / 290,809,777) x 100,000, or 832.1 deaths per 100,000 population.

Cause-specific mortality rate:

The cause-specific mortality rate is the mortality rate from a specified cause for a population. The numerator is the number of deaths attributed to a specific cause. The denominator remains the size of the population at the midpoint of the time period. The fraction is usually expressed per 100,000 population. In the United States in 2003, a total of 108,256 deaths were attributed to accidents (unintentional injuries), yielding a cause-specific mortality rate of 37.2 per 100,000 population.8

Age-specific mortality rate:

An age-specific mortality rate is a mortality rate limited to a particular age group. The numerator is the number of deaths in that age group; the denominator is the number of persons in that age group in the population. In the United States in 2003, a total of

130,761 deaths occurred among persons aged 25-44 years, or an age-specific mortality rate of 153.0 per 100,000 25–44 year olds. Some specific types of age-specific mortality rates are neonatal, postneonatal, and infant mortality rates, as described in the following sections.

Infant mortality rate:

The infant mortality rate is perhaps the most commonly used measure for comparing health status among nations. It is calculated as follows:

Number of deaths among children < 1 year of age reported during a given time period

Number of live births reported during the same time period x 1,000

The infant mortality rate is generally calculated on an annual basis.

It is a widely used measure of health status because it reflects the health of the mother and infant during pregnancy and the year thereafter. The health of the mother and infant, in turn, reflects a wide variety of factors, including access to prenatal care, prevalence of prenatal maternal health behaviors (such as alcohol or tobacco use and proper nutrition during pregnancy, etc.), postnatal care and behaviors (including childhood immunizations and proper nutrition), sanitation, and infection control.

Is the infant mortality rate a ratio? Yes. Is it a proportion? No, because some of the deaths in the numerator were among children born the previous year. Consider the infant mortality rate in 2003.

That year, 28,025 infants died and 4,089,950 children were born, for an infant mortality rate of 6.951 per 1,000.8 Undoubtedly, some of the deaths in 2003 occurred among children born in 2002, butthe denominator includes only children born in 2003.

Is the infant mortality rate truly a rate? No, because the denominator is not the size of the mid-year population of children < 1 year of age in 2003. In fact, the age-specific death rate for children < 1 year of age for 2003 was 694.7 per 100,000.8

Obviously the infant mortality rate and the age-specific death rate for infants are very similar (695.1 versus 694.7 per 100,000) and close enough for most purposes. They are not exactly the same, however, because the estimated number of infants residing in the

United States on July 1, 2003 was slightly larger than the number of children born in the United States in 2002, presumably because of immigration.

Neonatal mortality rate:

The neonatal period covers birth up to but not including 28 days. The numerator of the neonatal mortality rate therefore is the number of deaths among children under 28 days of age during a given time period. The denominator of the neonatal mortality rate, like that of the infant mortality rate, is the number of live

births reported during the same time period. The neonatal mortality rate is usually expressed per 1,000 live births. In 2003, the neonatal mortality rate in the United States was 4.7 per 1,000 live births.8

Postneonatal mortality rate:

The postneonatal period is defined as the period from 28 days of age up to but not including 1 year of age. The numerator of the postneonatal mortality rate therefore is the number of deaths among children from 28 days up to but not including 1 year of age during a given time period. The denominator is the number of live births reported during the same time period. The postneonatal mortality rate is usually expressed per 1,000 live births. In 2003, the postneonatal mortality rate in the United States was 2.3 per 1,000 live births

Maternal mortality rate:

The maternal mortality rate is really a ratio used to measure mortality associated with pregnancy. The numerator is the number of deaths during a given time period among women while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. The denominator is the number of live births reported during the same time period. Maternal mortality rate is usually expressed per 100,000 live births. In 2003, the U.S. maternal mortality rate was 8.9 per 100,000 live births.

Sex-specific mortality rate:

A sex-specific mortality rate is a mortality rate among either males or females. Both numerator and denominator are limited to the one sex.

Race-specific mortality rate:

A race-specific mortality rate is a mortality rate related to a specified racial group. Both numerator and denominator are limited to the specified race.

Combinations of specific mortality rates:

Mortality rates can be further stratified by combinations of cause, age, sex, and/or race. For example, in 2002, the death rate from diseases of the heart among women ages 45–54 years was 50.6 per

100,000.9 The death rate from diseases of the heart among men in the same age group was 138.4 per 100,000, or more than 2.5 times as high as the comparable rate for women. These rates are a cause-, age-, and sex-specific rates, because they refer to one cause (diseases of the heart), one age group (45–54 years), and one sex (female or male).

EXAMPLE: Calculating Mortality Rates

The number of deaths from all causes and from accidents (unintentional injuries) by age group in the United States in 2002. Review the following rates. Determine what to call each one, then calculate it using the data provided. a. Unintentional-injury-specific mortality rate for the entire population

This is a cause-specific mortality rate.

Rate = number of unintentional injury deaths in the entire population x 100,000 estimated midyear population

= (106,742 / 288,357,000) x 100,000

= 37.0 unintentional-injury-related deaths per 100,000 population b. All-cause mortality rate for 25–34 year olds
This is an age-specific mortality rate.

Rate = number of deaths from all causes among 25–34 year olds x 100,000 estimated midyear population of 25–34 year olds

= (41,355 / 39,928,000) x 100,000

= 103.6 deaths per 100,000 25–34 year olds c. All-cause mortality among males
This is a sex-specific mortality rate.

Rate = number of deaths from all causes among males x 100,000 estimated midyear population of males

= (1,199,264 / 141,656,000) x 100,000

= 846.6 deaths per 100,000 males

d. Unintentional-injury-specific mortality among 25- to 34-year-old males

This is a cause-specific, age-specific, and sex-specific mortality rate

Rate = number of unintentional injury deaths among 25–34 year old males x 100,000 estimated midyear population of 25–34 year old males

= (9,635 / 20,203,000) x 100,000

= 47.7 unintentional-injury-related deaths per 100,000 25–34 year olds

Age-adjusted mortality rate: a mortality rate statistically modified to eliminate the effect of different age distributions in the different populations. Mortality rates can be used to compare the rates in one area with the rates in another area, or to compare rates over time. However, because mortality rates obviously increase with age, a higher mortality rate among one population than among another might simply reflect the fact that the first population is older than the second.

Consider that the mortality rates in 2002 for the states of Alaska and Florida were 472.2 and 1,005.7 per 100,000, respectively. Should everyone from Florida move to Alaska to reduce their risk of death? No, the reason that Alaska's mortality rate is so much lower than Florida's is that Alaska's population is considerably younger. Indeed, for seven age groups, the age-specific mortality rates in Alaska are actually higher than Florida's.

To eliminate the distortion caused by different underlying age distributions in different populations, statistical techniques are used to adjust or standardize the rates among the populations to be compared. These techniques take a weighted average of the agespecific mortality rates, and eliminate the effect of different age distributions among the different populations. Mortality rates computed with these techniques are age-adjusted or age-standardized mortality rates. Alaska's 2002 age-adjusted mortality rate (794.1 per 100,000) was higher than Florida's (787.8 per 100,000), which is not surprising given that 7 of 13 agespecific mortality rates were higher in Alaska than Florida.

Death-to-case ratio:

The death-to-case ratio is the number of deaths attributed to a particular disease during a specified time period divided by the number of new cases of that disease identified during the same time period. The death-to-case ratio is a ratio but not necessarily a proportion, because some of the deaths that are counted in the numerator might have occurred among persons who developed disease in an earlier period, and are therefore not counted in the denominator.

EXAMPLE: Calculating Death-to-Case Ratios
Between 1940 and 1949, a total of 143,497 incident cases of diphtheria were reported. During the same decade, 11,228 deaths were attributed to diphtheria. Calculate the death-to-case ratio.

Death-to-case ratio = 11,228 / 143,497 x 1 = 0.0783 or

= 11,228 / 143,497 x 100 = 7.83 per 100

Case-fatality rate:

The case-fatality rate is the proportion of persons with a particular condition (cases) who die from that condition. It is a measure of the severity of the condition. The formula is:

Number of cause-specific deaths among the incident cases

Number of incident cases x 10n

The case-fatality rate is a proportion, so the numerator is restricted to deaths among people included in the denominator. The time periods for the numerator and the denominator do not need to be the same; the denominator could be cases of HIV/AIDS diagnosed during the calendar year 1990, and the numerator, deaths among those diagnosed with HIV in 1990, could be from 1990 to the present.

EXAMPLE: Calculating Case-Fatality Rates

In an epidemic of hepatitis A traced to green onions from a restaurant, 555 cases were identified. Three of the casepatients died as a result of their infections. Calculate the case-fatality rate.

Case-fatality rate = (3 / 555) x 100 = 0.5%

The case-fatality rate is a proportion, not a true rate. As a result, some epidemiologists prefer the term case-fatality ratio. The concept behind the case-fatality rate and the death-to-case ratio is similar, but the formulations are different. The death-tocase ratio is simply the number of cause-specific deaths that occurred during a specified time divided by the number of new cases of that disease that occurred during the same time. The deaths included in the numerator of the death-to-case ratio are not restricted to the new cases in the denominator; in fact, for many diseases, the deaths are among persons whose onset of disease was years earlier. In contrast, in the case-fatality rate, the deaths included in the numerator are restricted to the cases in the denominator.

Proportionate mortality:

Proportionate mortality describes the proportion of deaths in a specified population over a period of time attributable to different causes. Each cause is expressed as a percentage of all deaths, and the sum of the causes must add to 100%. These proportions are not mortality rates, because the denominator is all deaths rather than the population in which the deaths occurred.

Method for calculating proportionate mortality

For a specified population over a specified period,

Deaths caused by a particular cause

Deaths from all causes x 100

Sometimes, particularly in occupational epidemiology, proportionate mortality is used to compare deaths in a population of interest (say, a workplace) with the proportionate mortality in the broader population. This comparison of two proportionate mortalities is called a proportionate mortality ratio, or PMR for short. A PMR greater than 1.0 indicates that a particular cause accounts for a greater proportion of deaths in the population of interest than you might expect. For example, construction workers may be more likely to die of injuries than the general population. However, PMRs can be misleading, because they are not based on mortality rates. A low cause-specific mortality rate in the population of interest can elevate the proportionate mortalities for all of the other causes, because they must add up to 100%. Those workers with a high injury-related proportionate mortality very likely have lower proportionate mortalities for chronic or disabling conditions that keep people out of the workforce. In other words, people who work are more likely to be healthier than the population as a whole — this is known as the healthy worker effect.

Years of potential life lost:

Years of potential life lost (YPLL) is one measure of the impact of premature mortality on a population. Additional measures incorporate disability and other measures of quality of life. YPLL is calculated as the sum of the differences between a predetermined end point and the ages of death for those who died before that end point. The two most commonly used end points are age 65 years and average life expectancy.

The use of YPLL is affected by this calculation, which implies a value system in which more weight is given to a death when it occurs at an earlier age. Thus, deaths at older ages are "devalued." However, the YPLL before age 65 (YPLL65) places much more emphasis on deaths at early ages than does YPLL based on remaining life expectancy (YPLLLE). In 2000, the remaining life expectancy was 21.6 years for a 60- year-old, 11.3 years for a 70- year-old, and 8.6 for an 80-year-old. YPLL65 is based on the fewer than 30% of deaths that occur among persons younger than 65. In contrast, YPLL for life expectancy (YPLLLE) is based on deaths among persons of all ages, so it more closely resembles crude mortality rates. YPLL rates can be used to compare YPLL among populations of different sizes. Because different populations may also have different age distributions, YPLL rates are usually age-adjusted to eliminate the effect of differing age distributions.

Method for calculating YPLL from a line listing:

Step 1. Decide on end point (65 years, average life expectancy, or other). Step 2. Exclude records of all persons who died at or after the end point.

Step 3. For each person who died before the end point, calculate that person's YPLL by subtracting the age at death from the end point. YPLLindividual = end point – age at death

Step 4. Sum the individual YPLLs. YPLL = . YPLLindividual

Method for calculating YPLL from a frequency:

Step 1. Ensure that age groups break at the identified end point

(e.g., 65 years). Eliminate all age groups older than the endpoint.

Step 2. For each age group younger than the end point, identify the midpoint of the age group, where midpoint = age group's youngest age in years + oldest age + 12

Step 3. For each age group younger than the end point, identify that age group's YPLL by subtracting the midpoint from the end point.

Step 4. Calculate age-specific YPLL by multiplying the age group's YPLL times the number of persons in that age group.

Step 5. Sum the age-specific YPLL's.

The YPLL rate represents years of potential life lost per 1,000 population below the end-point age, such as 65 years. YPLL rates should be used to compare premature mortality in different populations, because YPLL does not take into account differences in population sizes.

Natality (Birth) Measures

Natality measures are population-based measures of birth. These measures are used primarily by persons working in the field of maternal and child health. Table 3.11 includes some of the commonly used measures of natality.

Measures of Association

The key to epidemiologic analysis is comparison. Occasionally you might observe an incidence rate among a population that seems high and wonder whether it is actually higher than what should be expected based on, say, the incidence rates in other communities. Or, you might observe that, among a group of casepatients in an outbreak, several report having eaten at a particular restaurant. Is the restaurant just a popular one, or have more casepatients eaten there than would be expected? The way to address that concern is by comparing the observed group with another group that represents the expected level.

A measure of association quantifies the relationship between exposure and disease among the two groups. Exposure is used loosely to mean not only exposure to foods,

mosquitoes, a partner with a sexually transmissible disease, or a toxic waste dump, but also inherent characteristics of persons (for example, age, race, sex), biologic characteristics (immune status), acquired characteristics (marital status), activities (occupation, leisure activities), or conditions under which they live (socioeconomic status or access to medical care). The measures of association described in the following section compare disease occurrence among one group with disease occurrence in another group. Examples of measures of association include risk ratio (relative risk), rate ratio, odds ratio, and proportionate mortality ratio.

Risk ratio:

A risk ratio (RR), also called relative risk, compares the risk of a health event (disease, injury, risk factor, or death) among one group with the risk among another group. It does so by dividing the risk (incidence proportion, attack rate) in group 1 by the risk (incidence proportion, attack rate) in group 2 . The two groups are typically differentiated by such demographic factors as sex (e.g., males versus females) or by exposure to a suspected risk factor (e.g., did or did not eat potato salad). Often, the group of primary interest is labeled the exposed group, and the comparison group is labeled the unexposed group.

Method for Calculating risk ratio:

The formula for risk ratio (RR) is:

Risk of disease (incidence proportion, attack rate) in group of primary interest

Risk of disease (incidence proportion, attack rate) in comparison group

A risk ratio of 1.0 indicates identical risk among the two groups. A risk ratio greater than 1.0 indicates an increased risk for the group in the numerator, usually the exposed group. A risk ratio less than 1.0 indicates a decreased risk for the exposed group, indicating that perhaps exposure actually protects against disease occurrence.

EXAMPLES: Calculating Risk Ratios

Example A: In an outbreak of tuberculosis among prison inmates in South Carolina in 1999, 28 of 157 inmates residing on the East wing of the dormitory developed tuberculosis, compared with 4 of 137 inmates residing on the West wing. These data are summarized in the two-by-two table so called because it has two rows for the exposure and two columns for the outcome. Here is the general format and notation.

Example B: In an outbreak of varicella (chickenpox) in Oregon in 2002, varicella was diagnosed in 18 of 152 vaccinated children compared with 3 of 7 unvaccinated children. Calculate the risk ratio.

Rate ratio:

A rate ratio compares the incidence rates, person-time rates, or mortality rates of two groups. As with the risk ratio, the two groups are typically differentiated by demographic factors or by exposure to a suspected causative agent. The rate for the group of primary interest is divided by the rate for the comparison group.

$$\text{Rate ratio} = \frac{\text{Rate for group of primary interest}}{\text{Rate for comparison group}}$$

The interpretation of the value of a rate ratio is similar to that of the risk ratio. That is, a rate ratio of 1.0 indicates equal rates in the two groups, a rate ratio greater than 1.0 indicates an increased risk for the group in the numerator, and a rate ratio less than 1.0 indicates a decreased risk for the group in the numerator.

EXAMPLE: Calculating Rate Ratios

Public health officials were called to investigate a perceived increase in visits to ships' infirmaries for acute respiratory illness (ARI) by passengers of cruise ships in Alaska in 1998.13 The officials compared passenger visits to ship infirmaries for ARI during May–August 1998 with the same period in 1997. They recorded 11.6 visits for ARI per

1,000 tourists per week in 1998, compared with 5.3 visits per 1,000 tourists per week in 1997. Calculate the rate ratio.

Rate ratio = 11.6 / 5.3 = 2.2

Passengers on cruise ships in Alaska during May–August 1998 were more than twice as likely to visit their ships' infirmaries for ARI than were passengers in 1997. (Note: Of 58 viral isolates identified from nasal cultures from passengers, most were influenza A, making this the largest summertime influenza outbreak in North America.)

Odds ratio:

An odds ratio (OR) is another measure of association that quantifies the relationship between an exposure with two categories and health outcome. The odds ratio is calculated as a c Odds ratio = (b)(d) = ad / bc where

a = number of persons exposed and with disease

b = number of persons exposed but without disease c = number of persons unexposed but with disease

d = number of persons unexposed: and without disease a+c = total number of persons with disease (case-patients) b+d = total number of persons without disease (controls)

The odds ratio is sometimes called the cross-product ratio because the numerator is based on multiplying the value in cell "a" times the value in cell "d," whereas the denominator is the product of cell "b" and cell "c." A line from cell "a" to cell "d" (for the numerator) and another from cell "b" to cell "c" (for the denominator) creates an x or cross on the two-by-two table.

EXAMPLE: Calculating Odds Ratios

Use the data provided to calculate the risk and odds ratios.

1. Risk ratio

5.0 / 1.0 = 5.0

2. Odds ratio

(100 x 7,920) / (1,900 x 80) = 5.2

Notice that the odds ratio of 5.2 is close to the risk ratio of 5.0. That is one of the attractive features of the odds ratio — when the health outcome is uncommon, the odds ratio provides a reasonable approximation of the risk ratio.

Another attractive feature is that the odds ratio can be calculated with data from a case-control study, whereas neither a risk ratio nor a rate ratio can be calculated.

In a case-control study, investigators enroll a group of case-patients (distributed in cells a and c of the two-by-two table), and a group of non-cases or controls (distributed in cells b and d).

The odds ratio is the measure of choice in a case-control study.

A case-control study is based on enrolling a group of persons with disease ("case-patients") and a comparable group without disease ("controls"). The number of persons in the control group is usually decided by the investigator. Often, the size of the population from which the case-patients came is not known. As a result, risks, rates, risk ratios or rate ratios cannot be calculated from the typical case-control study. However, you can calculate an odds ratio and interpret it as an approximation of the risk ratio, particularly when the disease is uncommon in the population.

Measures of Public Health Impact

A measure of public health impact is used to place the association between an exposure and an outcome into a meaningful public health context. Whereas a measure of association quantifies the relationship between exposure and disease, and thus begins to provide insight into causal relationships, measures of public health impact reflect the burden that an exposure contributes to the frequency of disease in the population. Two measures of public health impact often used are the attributable proportion and efficacy or effectiveness.

Attributable proportion:

The attributable proportion, also known as the attributable risk percent, is a measure of the public health impact of a causative factor. The calculation of this measure assumes that the occurrence of disease in the unexposed group represents the baseline or expected risk for that disease. It further assumes that if the risk of disease in the exposed group is higher than the risk in the unexposed group, the difference can be attributed to the exposure. Thus, the attributable proportion is the amount of disease in the exposed group attributable to the exposure. It represents the expected reduction in disease if the exposure could be removed (or never existed). Appropriate use of attributable proportion depends on a single risk factor being responsible for a condition. When multiple risk factors may interact (e.g., physical activity and age or health status), this measure may not be appropriate.

Method for calculating attributable proportion

Attributable proportion is calculated as follows: Risk for exposed group – risk for unexposed group Risk for exposed group x 100%

Attributable proportion can be calculated for rates in the same way.

EXAMPLE: Calculating Attributable Proportion

In another study of smoking and lung cancer, the lung cancer mortality rate among nonsmokers was 0.07 per 1,000 persons per year. The lung cancer mortality rate among persons who smoked 1–14 cigarettes per day was 0.57 lung cancer deaths per 1,000 persons per year. Calculate the attributable proportion.

Attributable proportion = (0.57 – 0.07) / 0.57 x 100% = 87.7%

Given the proven causal relationship between cigarette smoking and lung cancer, and assuming that the groups are comparable in all other ways, one could say that about 88% of the lung cancer among smokers of 1–14 cigarettes per day might be attributable to their smoking. The remaining 12% of the lung cancer cases in this group would have occurred anyway.

Vaccine efficacy or vaccine effectiveness:

Vaccine efficacy and vaccine effectiveness measure the proportionate reduction in cases among vaccinated persons. Vaccine efficacy is used when a study is carried out under ideal conditions, for example, during a clinical trial. Vaccine effectiveness is used when a study is carried out under typical field (that is, less than perfectly controlled) conditions. Vaccine efficacy / effectiveness (VE) is measured by calculating the risk of disease among vaccinated and unvaccinated persons and determining the percentage reduction in risk of disease among vaccinated persons relative to unvaccinated persons. The greater the percentage reduction of illness in the vaccinated group, the greater the vaccine efficacy / effectiveness. The basic formula is written as:

Risk among unvaccinated group – risk among vaccinated group

Risk among unvaccinated group

OR: 1 – risk ratio

In the first formula, the numerator (risk among unvaccinated – risk among vaccinated) is sometimes called the risk difference or excess risk. Vaccine efficacy / effectiveness is interpreted as the proportionate reduction in disease among the vaccinated group. So a VE of 90% indicates a 90% reduction in disease occurrence among the vaccinated group, or a 90% reduction from the number of cases you would expect if they have not been vaccinated.

EXAMPLE: Calculating Vaccine Effectiveness

Calculate the vaccine effectiveness from the varicella data in Table 3.13. VE = (42.9 – 11.8) / 42.9 = 31.1 / 42.9 = 72%
Alternatively, VE = 1 – RR = 1 – 0.28 = 72%

So, the vaccinated group experienced 72% fewer varicella cases than they would have if they had not been vaccinated.

Summary

Because many of the variables encountered in field epidemiology are nominal-scale variables, frequency measures are used quite commonly in epidemiology. Frequency measures include ratios, proportions, and rates. Ratios and proportions are useful for describing the characteristics of populations. Proportions and rates are used for quantifying morbidity and mortality. These measures allow epidemiologists to infer risk among different groups, detect groups at high risk, and develop hypotheses about causes — that is, why these groups might be at increased risk.

The two primary measures of morbidity are incidence and prevalence.

- Incidence rates reflect the occurrence of new disease in a population.

- Prevalence reflects the presence of disease in a population.

A variety of mortality rates describe deaths among specific groups, particularly by age or sex or by cause. The hallmark of epidemiologic analysis is comparison, such as comparison of observed amount of disease in a population with the expected amount of disease. The comparisons can be quantified by using such measures of association as risk ratios, rate ratios, and odds ratios. These measures provide evidence regarding causal relationships between exposures and disease. Measures of public health impact place the association between an exposure and a disease in a public health context. Two such measures are the attributable proportion and vaccine efficacy.

Analyzing and Interpreting Data

After morbidity, mortality, and other relevant data about a health problem have been gathered and compiled, the data should be analyzed by time, place, and person. Different types of data are used for surveillance, and different types of analyses might be needed for each. For example, data on individual cases of disease are analyzed differently than data aggregated from multiple records; data received as text must be sorted, categorized, and coded for statistical analysis; and data from surveys might need to be weighted to produce valid estimates for sampled populations.

For analysis of the majority of surveillance data, descriptive methods are usually appropriate. The display of frequencies (counts) or rates of the health problem in simple tables and graphs, as discussed in Lesson 4, is the most common method of analyzing data for surveillance. Rates are useful — and frequently preferred — for comparing occurrence of disease for different geographic areas or periods because they take into account the size of the opulation from which the cases arose. One critical step before calculating a rate is constructing a denominator from appropriate population data. For state- or countywide rates, general population data are used. These data are available from the U.S. Census Bureau or from a state planning agency.

For other calculations, the population at risk can dictate an alternative denominator. For example, an infant mortality rate uses the number of live-born infants; rates of surgical wound infections in a hospital nrequires the number of such procedures performed. In addition to calculating \ frequencies and rates, more sophisticated methods (e.g., space-time cluster analysis, time series analysis, or computer mapping) can be applied. To determine whether the incidence or prevalence of a health problem has increased, data must be compared either over time or across areas. The selection of data for comparison depends on the health problem under surveillance and what is known about its typical temporal and geographic patterns of occurrence.

For example, data for diseases that indicate a seasonal pattern (e.g., influenza and mosquito-borne diseases) are usually compared with data for the corresponding season from past years. Data for diseases without a seasonal pattern are commonly compared with data for previous weeks, months, or years, depending on the nature of the disease. Surveillance for chronic diseases typically requiresdata covering multiple years. Data for acute infectious diseases might only require data covering weeks or months, although data extending over multiple years can also be helpful in the analysis of the natural history of disease. Data from one geographic area are sometimes compared with data from another area. For example, data from a county might be compared with data from adjacent counties or with data from the state. We now describe common methods for, and provide examples of, the analysis of data by time, place, and person

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Course Name : Computer Theory and Applications
Course Code : APDPS 104
Course level : Level 1
Credit Units : 4 CU
Contact Hours : 60 Hrs

Course Description
The Course deals with the introduction, background and significance of computers, computer hardware and software, networking and the internet, the various computer devices and their applications such as operating systems, input/output devices etc, to students. The Course explains some practical applications such as Ms Word, Ms excel, Power point and their presentation and browsing the internet. It provides prior knowledge to computer language program which can be helpful at further stages of Computer studies.

Course objectives
· To help students attain basic knowledge of the computer
· To help students to become familiar with the use of internet and browse the World Wide Web through routine practice.
· To enable students develop foundational skills for information technology.

Course content
Introduction to computers
· Information management
· Why were office systems less beneficial than computerized systems
· Why computers are better than people
· Limitations of computers
· Effects of office automation on business
· Definition of computers
· Characteristics of computers
· Types of computers

Hard ware concepts
· The processor and its elements
· Manual input devices that include keyboard, web camera, the monitor, mouse
· Automatic input devices that include modems, magnetic ink character recognition, optical mark reading, magnetic stripe cards
· Output devices that include VDU, speakers, printers,
· Storage devices that include; hard disks, floppy disks, Flash disks, tape storage

Networks and data communications

· Configurations that include; centralized, decentralized and distributed processing as well as key features of distributed processing
· Networks that include: Local Area Network(LANs), Wide Area Networks(WANs),Metropolitan Area Network(MAN), storage Area Networks
· Client-server computing
· Data communication that include; oral, paper and electronic data communication
· Data transmission equipment that include; coaxial cables, modems, multiplexers

Software Concepts
· Definition of software
· Operating system
· Functions of an operating system
· Windows, MS-DOS, features of windows 95, features of windows 98
· Application software and packages
· Examples of word processing programs
· Spread sheets
· Examples of spread sheets

Personal Information Managers (PIM)
· Importance of PIM
· Examples of PIMs
· Integrated packages
· Utility programs
· Viruses
· Types of viruses and how they are transmitted

Programming Languages
· Low level language i.e Machine code, assembly
· High level language
· Advantages of high-level languages over low-level language

Mode of delivery, Face to face lectures

Assessment
Course work 40%
Exams 60%
Total Mark 100%

CHAPTER ONE

1:0 ATTRIBUTES TO INFORMATION

Everything that we do, either in our personal life or as part of the activities of work depends on information. Therefore, information is a key resource for success of most of the companies and organisations.
Information refers to facts or knowledge about something, which could be important for decision-making.

1:1 INFORMATION MANAGEMENT

Like any other resource, i.e. machines, money, etc. Information must be controlled and organised. It should be managed (collected, organised and controlled). Information management is accomplished by the factors considered below:

i) Identifying current and future information needs
Information is always needed for current decisions e.g. current sales performance, and any likely future changes e.g. need for future expansion.

ii) Identifying Information Sources
In order to make good decisions, the information used must be collected from proper sources e.g. if the company sales are affected by weather, then reliable information about weather should be collected from Meteorological Department.

iii) Collecting the Information
Some information may easily be collected using any simple means, but other information may only be got after using wise tactics or a series of procedures e.g. a profit for the month, or year.

iv) Storing the Information
Information collected should always be stored securely and accessibly to enable future use and reference.

v) Ensuring that information is communicated to the right person who needs it
Always information should only be communicated to people who need it and kept away from those who don't deserve it.

1:2 DEFINITIONS

Data
These are the raw materials for information. Any thing that the computer can work with, either numbers of any kind, texts, facts, etc.

Information

This refers to processed data. Items that have been re-arranged so as to give the user a meaning, which could be vital for decision-making.

Qualities of good information
Good information has a number of specific qualities for which accurate is a useful mnemonic (symbol).

Accurate
Information should obviously be accurate because using incorrect information could have serious and damaging consequences.

Consistency
Especially in accountancy, information should always be consistent e.g. if the March report of slow paying students is prepared on the basis that slow paying students are those who have not paid within 60 days, but the August report considers students who have not paid within 30 days, then is not valid to compare the two reports.

Clarity
The information should always be clear to the user. If the user can't understand the information, then he certainly can't use it properly.

Reliability
Information must be trusted by the managers who are expected to use it. An information source may therefore play a great role here.

Communication
Information should always be communicated to the right person.

Channel of communication
Depending on the type of information being communicated and to person(s) for whom it is intended, a proper channel should always be used.

Volume and brevity
Information should be brief, so long as this does not mean that it is incomplete or inaccurate. Huge volumes of information may be hard to absorb even if all of it is relevant.

Timing
Information should always be delivered in time, as information delivered shortly after a decision is already taken is always useless however relevant and accurate it is.

Cost
The benefits to be achieved from the information should out way the costs involved in obtaining and communicating it to the people concerned. This may either be in the short or long run.

Question:
What is information? What are the main qualities of good information?

1:3 TECHNOLOGY FOR INFORMATION

Information handling and processing in offices has been made easy due to enormous development in office machines and computers.
However on the other hand the manual systems exist along side computerised systems.

Why manual office systems are less beneficial than computerised systems.

- Labour productivity is usually lower, particularly in routine and operational applications.
- Processing is slower where large volumes of data need to be dealt with.
- Risks of errors are greater, especially in repetitive work like payroll calculations.
- Information is generally less accessible.
- It is difficult to make corrections or alterations.
- Quality of output is less consistent and not as high as well-designed computer output.

Why computers are better than people

- For storing information
- It's more accurate than humans
- It works faster than humans
- Its automatic i.e. carries out many operations without human input
- It is diligent i.e. works for long hours without getting tired
- It's used for entertainment
- It's used for communication e.g. email, Internet
- It's used for data base management i.e handling large volumes of information (data)
- It's used for computations

LIMITATIONS OF COMPUTERS

- Less flexible than humans
- Have to be explicitly "told" what to do
- If an unanticipated situation arises, PCs can produce erroneous results
- Have no potential to work out a solution

1:4 OFFICE AUTOMATION

This is majorly composed of word processing, spreadsheets, databases, telephone and fax (facsimile) and networks.

Effects of office automation on businesses

Office automation has an enormous effect on business in a variety of ways:

- **Routine processing**

The processing of routine data can be done in bigger volumes, at greater speed and with greater accuracy than with non-automated - manual system.

- **The paperless office**

There might be less paper in the office (but not necessarily so) with more data processing done by keyboard. Data storage done electronically other than using papers.

♦ **Management information**
This is likely to change both in nature and quality, as more information will easily be available and accessible, through information analysis done easily and so on.

♦ **Organisation structure**
This may change, as the PCs are likely to be locally controlled in an office or branch, creating a shift to decentralisation.

♦ **Customer Service**
This can improve especially if the customers can call an organisation and the feedback the staff give to callers is from the organisation's on-line data base.

1:5 HOME WORKING

Advances in communication technology have, for some tasks, reduced the need for the actual presence of an individual in the office. This is particularly time for tasks involving computers**.**

The advantages of home working for an organisation involve the following:

a) Cost saving on space
Rental changes are a little high and if some employees can do their work from home, then this will reduce on the space occupied and thus the rental fees.

b) A larger pool of labour
More applicants are expected especially for clerical positions, especially from people who are committed else where and office time tables may collide.

c) Freelance employees
This category of employees will be good for the organisation as there will be no sick pay, holiday pays and salaries especially when there is no sufficient work.

The advantages to the individual
♦ No time wasted commuting to the office.
♦ The work can be organised flexibly around the individual's domestic commitments.
♦ Jobs that require concentration may sometimes be done better at home without the office disruptions.

Disadvantages
To the Organisation
The major disadvantages to the organisation are normally lack of control as managers will have no close supervision of the workers.

To the Individual

♦ **Isolation**
If just forced to work from home, this may cause barriers to social life experienced in offices.

♦ **Intrusions**
A home worker is vulnerable to home interruptions e.g. a kid or members of the family who may forget that the individual is home working.

♦ **Adequate Space**
It may not be always possible to obtain a quiet space at home in which to work.

♦Freelance home workers normally have fewer rights compared to office stationed workers.

Question:
Today home working is booming in employment sector, what do you think has led to this and what advantages does the organisation get from this kind of trend?

1:6 IT AND ACCOUNTING (ACCOUNTING PACKAGES)

Years back, accounting records were only prepared manually, developments in information recording technology has however advanced and now the same accounting records can be made using computers e.g. ledgers, trial balances,

profit and loss accounts, balance sheets, etc. The only difference is that these various books of accounts have TO be count invisible and can only be called out.

The advantages of accounting packages compared with a manual system are as follows:
♦Non-specialists can use the packages.
♦A large amount of data can be processed very quickly.
♦Computerised systems are more accurate than manual.
♦Double entry is automatic

If you enter the details of an invoice the system automatically updates the sales account, the VAT account, the debtor's ledger control account and the memorandum of sales ledger account. There is no need to enter the information four times.

♦Integration; all ledgers and records can be linked up.
♦Easy information analysis in terms of trial balance or a debtors' schedule.

Disadvantages
The advantages of computerised accounting systems far out weight the disadvantages, particularly for large businesses. However, the following may be identified as possible disadvantages.

♦The initial time and costs the system, training personnel and so on.

♦The need for security checks to make sure that unauthorised personnel do not gain access to data files.
♦The necessity to develop a system of coding and checking.

♦Lack of audit trail. It is not always easy to see where a mistake has been made.
♦Possible resistance on the part of staff to the introduction of the system.

Types of accounting packages

The most widely used packages are as follows:
Small business (1-10 people)
♦Sage Line 100 or Line 50
♦Quick books
♦Tas books

Small to medium (10-30 people)
♦Sage Sovereign
♦Pegasus opera
♦Exact
♦Multisoft prestige

Medium - sized businesses (30-200 people)
♦ Sun-accounts
♦Tetra chameleon
♦Scala
♦Dynamics

Large business (200 - 2000 people)
♦Coda
♦JBA

Very large businesses
♦SAP
♦Oracle
♦Dun & Brad Street

CHAPTER TWO
HARD WARE CONCEPTS

2:0 INTRODUCTION
Under this chapter, we shall look at the following:
♦ Computer components
♦Characteristics of a computer
♦The Processor

♦Other peripherals
♦ Manual input devices
♦Automatic input devices
♦Output devices
♦ Storage devices

2:1 COMPUTER COMPONENTS

Hardware – these are the physical parts of the computer e.g the mouse, monitor, and keyboard

Software – these are the invisible components of the computer. They are the programs and instructions, which run the computer

User- should be trained personnel

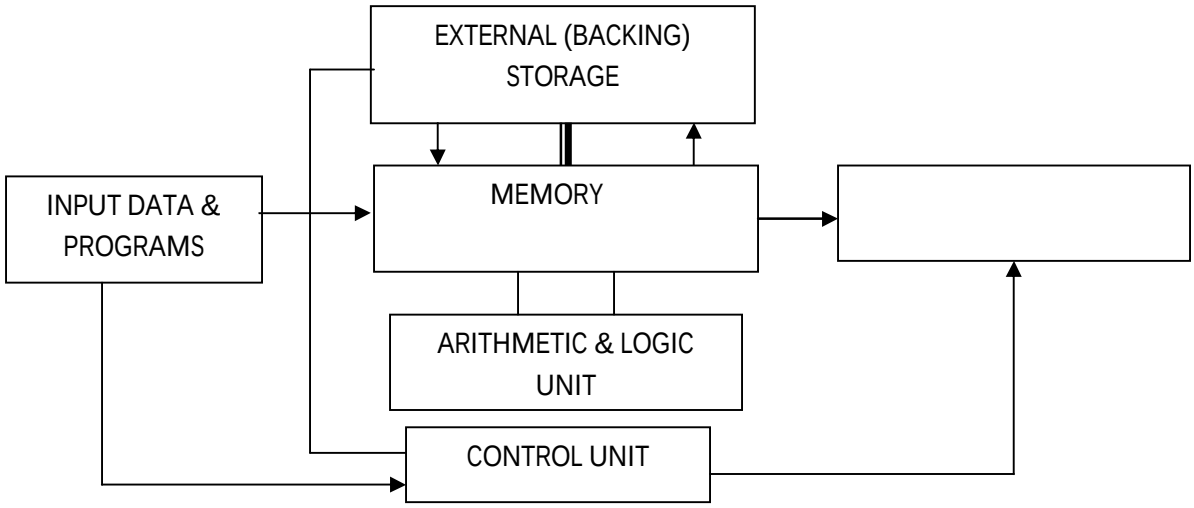
2:2 COMPUTERS

Definition:

A computer is a device, which will accept input data, process it according to programmed logical and arithmetic rules, store and out put the results. A computer is therefore a mixture of physical things like keyboards, mice, screens, circuits and cables (hard ware) and intangible arithmetic and logic (software). Hardware means, the various physical components (tangible) as opposed to the non-tangible software elements.

CHARACTERISTICS OF COMPUTERS (Assignment)

♦Machine
♦Processing
♦Versatile- performs multiple functions easily
♦Electronic
♦Automation
♦Storage- stores a lot of information in a very small space
♦Accuracy
♦Compatibility
♦Consistency



Types of Computers

These are categorised by size and output

By Output

i) Digital
ii) Analogue

By Size

i) Super computers
ii) Main frame computers (at times called enterprise servers)
iii) Mini computers, now often called mid-range computers
iv) Micro-computers, now commonly called PCs.

We shall group (iii) and (iv) as 'Small business computers'.

Super Computers

A super computer is used to process very large amounts of data very quickly. They are particularly useful for occasions where high volumes of calculations need to be performed, for example in meteorological or astronomical applications.

Main frames

A main frame computer system is one that has at its heart a very powerful central computer, linked by cable or telecommunications to hundreds or thousands of terminals, and capable of accepting simultaneous input from all of them.

- Other characteristics include:
- Has centralised service departments
- Handles multi-level output
- Very high processing speed
- Have disk drives like magnetic tapes
- Very large size therefore handles big tasks and can support many users
- Stores vast amount of data
- Industrial use
- Expensive but slightly smaller than super computers
- Support services for data preparation, control and programming

Medium and small business computers

Mini computers

A mini computer is a computer whose size, speed and capabilities lie some where between those of a main frame and a PC.

Characteristics

- Smaller than mainframe computers
- Have smaller storage capacity and are slower
- Linked to other computer workstations
- Handles multi-level output
- Are large in size
- Disk drives include tape drives

♦Environmental control is not necessary
♦Limited output and input peripherals

Personal Computers
The 'personal computers' (or 'micro computers') are the most common computers available in most of the businesses and even in homes.
Characteristics
♦Small for personal use.
♦Low output
♦Operated in desks
♦Most common computers in business
♦Handles relatively big tasks
♦Have fairly good processing speed
♦Have limited input and output devices
♦Compilers and interpreters are permanently stored in hardware as ROM
♦They are often linked together in a network to enable sharing of information between users.

File servers
A file server is more powerful than the average desktop PC and it is dedicated to providing additional services for users of networked PCs.

A very big net work may use a 'main frame' as its server, and indeed main frames are beginning to be refereed to as 'enterprise servers'.

Portables
The original portable computers were heavy, weighing around five kilograms, and could only run from the mains electricity supply. Subsequent developments allow true portability.

i)The Laptop. Powered either from the electricity supply or using a rechargeable battery. It uses 3½" disks, CD - ROMS, liquid crystal or gas plasma screen and is fully compatible with desktop PCs.

ii) The notebook is about the size of an A4 pad of paper. Some portables are now marketed as 'sub-note books'.
iii)The pocket computer or hand held, may or may not be compatible with a true PC.

Much as PCs (portables) may be very popular because of their easy way of transportation and occupation of smaller space in offices, they have some draw backs;

i) Key board ergonomics
   The keys are too small, or too close together for easy, quick typing.
ii) Battery power
   They normally don't last for long periods.

A typical PC specification may involve the following:

♦Intel 233 mttz pentium 11 processor 33. 6 kpbs internal fax modem.
♦64 MB FAST EDO RAM (expandable to 512 MB)
♦6.4GB hard disk drive, 15" SVGA colour monitor LR, NI up to 1024 x 768 energy star compliant.

Advantages
♦Easy to transport
♦Occupy small spaces in offices

2:3 THE PROCESSOR

The processor is the 'brain' of the computer.

Definition
A processor is the collection of circuitry and registers that performs the processing in a particular computer and provides that computer with its specific characteristics.

The processor (sometimes referred to as central processing unit (or CPU) is divided into three areas.

♦The Arithmetic and Logic Unit, (ALU)
♦The Control Unit,
♦The Main Store or Memory (RAM & ROM)

In modern computer systems the processing unit may have all its elements - arithmetic and logic unit, control unit and the input/output interfall on a single 'chip'.

Definition
A chip is a small piece of silicon upon which is etched an integrated circuit, which consists of transistors and their interconnecting patterns on an extremely small scale.

The chip is mounted on a carrier unit which is 'plugged' on to a circuit board called the mother board with other chips, each within their own functions such as sound (a 'sound card') and video (a 'video card').

Arithmetic and Logic Unit (ALU)
The ALU is the part of central processor where the arithmetic and logic operations are carried out. These include arithmetic (e.g. adding and multiplying) and logical functions such as comparison, movement of data, etc.

Control Unit
The control unit receives program instructions, one at a time, from the main store and decodes them.
♦It then sends out control signals to the peripheral devices.

♦Registers are paths that connect the ALU to the main memory
♦Data buses are wires connecting the micro processor to the memory through which data flows
♦An address is a pattern of channels that identify a unique storage location
♦Toner is an electronically charged dry ink substance used in printers

Memory
The computer processing is normally much faster if the computer has the information it needs readily to hand.
The computer's memory is also known as main store, internal store or immediate access storage. The memory will hold the following.

i) Programs, the control unit cuts on program instructions that are held in the store; these program instructions include the operating systems.
ii) Some input data. A small area of internal store is needed to take in temporarily the data that will be processed next.
iii) A working area. The computer will need an area of store to hold data that is currently being processed or is used for processing other data.
iv) Some output data. A small area of store is needed to hold temporarily the data or information that is ready for output to an output device.
Each individual storage element in the computer's memory consists of a simple circuit which can be switched on or off. These two states can be conveniently expressed by the numbers 1 and 0 respectively.

Each 1 or 0 is a bit.
Bits are grouped together in groups of eight to form bytes.
A byte may be used to represent a character for example, a letter, a number, or any other symbol. The characters formed can be grouped together to form words or figures, etc.

Since a byte has 8 bits, there are 2^8, or 256, different combinations of 1s and 0s, which is sufficient to cover numeric digits, upper and lower case alphabets, punctuation marks and other symbols.

The processing capacity of a computer is in part dictated by the capacity of its memory.
Capacity is calculated in kilo bytes (1kb = 2^{10} (1024), (megabytes = 2^{20} bytes), and gigabytes (2^{30}) or Kb, Mb and Gb.

Port
This is a socket in the CPU into which peripherals can be connected

Expansion Slot
These are access slots to where computer cards can be fixed on a CPU during upgrading

Types of Memory
There are basically two types of memory i.e. RAM and ROM.

RAM: (Random Access Memory)
This is the memory that is directly available to the processing unit. It holds the data and programs in current use. Data can be written on to or read from Random Access Memory.

RAM is 'volatile'. This means that the contents of the memory are erased when the computer's power is switched off.

Memory Cache

Primary cache
This is a small capacity but extremely fast memory chip which save a second copy of the pieces of data most recently read from or written to main memory. When the cache is full, older entries are 'flushed out' to make room for new ones. Primary cache is often part of the same chip as the CPU.

Secondary cache
This is a larger, slower cache between the primary cache and the main memory.
The principal here is that if a piece of data is accessed once it is highly likely that it will be accessed again soon after words, and so keeping it readily to hand will speed up processing.

ROM (Read Only Memory)
This is a memory chip into which fixed data is written permanently at the time of its manufacture. New data cannot be written into the memory, and so the data on the memory is unchangeable and irremovable.

ROM is 'non-volatile' memory, which means that its contents do not disappear when the computer, power source is switched off.
A computer's start-up program, known as a 'boot strap' program, is always held in a form of a ROM. 'Booting up' means running this program.

When you turn on a PC you will usually see a reference to BIOS (Basic Input/Output System). This is part of the ROM chip containing all the programs needed to control the key board, screen disk drives and so on.

2:4 OTHER PERIPHERALS

♦ **Uninterrupted Power Supply (UPS)**
It stabilises the power thus enabling the user to save his/her work before the power supply is completely terminated. Hence it's called a stabiliser.

2:5 MANUAL INPUT DEVICES
These are input devices, which are quite labour - intensive. They include the following:

Keyboard

This is a board of keys, which includes the alphabet, numbers (0-9) and some basic punctuation, together with other keys. It is used to enter data into the computer's main memory. It resembles a typewriter except for some keys like the function keys (F1, F2 etc), control keys, alter keys, escape keys etc. It mainly has three parts:

- The alphabetical keypad – these include letter keys A-Z
- The functional keypad – (F1-F12)
- The numeric keypad - (0-9)

There are 2 types of keyboards:

Standard Keyboard	**Enhanced Keyboard**
♦Older style	♦Latest style and most common
♦Has 10 function keys on the left hand side of the keyboard	♦Has 12 function keys at the top of the keyboard
♦Cursor keypad is on the right and is used for numeric entry	♦Has shift, control and alt keys on both sides of the space bar

The Function Keys

F1 – is used for help
F2 – is used for page setup / programming
F3 – is used for page break down or break up
F4 – is used for moving a group of words from one position to the other
F5 – is used for password
F6 – is used to replace a word
F7 – is used for exiting / closing the screen
F8 – is used for sizing the appearance of the screen
F9 – is used for envelope set up
F11 – is used for highlighting the appearance of the screen

Other Keys

Caps lock- is used for writing capital letters
Shift keys- used to obtain the uppercase character of a button
Enter Key – used for creating spaces between lines. They also move the cursor to the next line. It also executes commands
Back space key – is used to erase letter by letter at any cursor point. A cursor is a blinking feature that indicates a point of insertion i.e the point where the next character will appear
Space bar – it creates space between words
Delete key – it deletes error at cursor point
Insert key – it is used to insert a missing letter in a group of words
Home keys – it is used to take the cursor back home
End key- it takes the cursor either at the end of the line or end of the document
Page up/down – takes the cursor at the upper or down page
Tab key – it is used for making paragraphs
Arrow keys – are used for moving through the document
/ Forward slash
\ Back slash

: Full colon
* Asterisk
. Period
; Semicolon
? Query
, comma

Web Camera
It enables the user to take photographs and view the other person online

The VDU (Visual Display Unit) – the Monitor
This can be used in conjunction with a keyboard to display text to allow the operator to carry out a visual check on what she has keyed in.
It can also be used to give messages to the operator, and the operator can respond to messages by keying in new instructions. The monitor gives a soft copy of the data held by the computer. It's both an input and output device.
Types of VDUs
- Coloured screens which display information in various colours
- Monochrome screens which display in black and white
- Graphic screens which display information in graphs

Mouse
This is often used in conjunction with a keyboard, particularly in windows - based systems. It may be used in place of a keyboard. It's used with windows programs to provide additional flexibility to the user
Even joysticks and track balls may also be used as the mice.

Parts of a mouse
- Left- for clicking
- Right- for popping
- Middle- moving up and down the document

2:6 AUTOMATIC INPUT DEVICES
These include the following:

Modems
When the modem converts analogue signals to digital signals during data transmission, is said to be an input device.

Magnetic ink character recognition (MICR)
MICR is the recognition by a machine of special formatted characters printed in magnetic ink. This is done using ink, which contains metallic powder and special typewriters.

Optical character recognition and scanners
OCR is a method of input involving a machine that is able to read characters by optical detection of the shape of those characters. Optical (or laser) scanners can read printed

documents by recognising the characters, convert them into machine code and record them.

The advantage of OCR over MICR is that the OCR can read any ordinary typed or printed text provided the quality of the input document is satisfactory.

The disadvantage however, evolves around the distinction between O and 0, then 1 and I which is a bit hard.

Optical Mark Reading (OMR)
This is normally used for numeric characters. Values are denoted by a line or cross in an appropriate box, whose position represents a value, on a pre-printed source document (or card). The card or sheet is then read by a device which senses the mark in each box and translates it into machine code.

An example would be a multiple choice question paper.

Bar Coding and Electronic Point of Sale (EPOS)
A bar code reader is a device, which reads bear codes, which are groups of marks which, by their spacing and thickness, indicate specific codes or values. Normally used in super markets.
EPOS devices use bar coding and act both as cash registers and as terminals connected to a main computer.

This enables the computer to produce useful management information such as;
- Sales details and analysis
- Stock control information

And all this very quickly

Magnetic Stripe Cards
These can be used at the door entrances where the card is passed over the reader which senses the information to the computer to open the door if the holder of the card is supposed to enter. They are also used in banks by Automated Teller Machines (ATM).

Voice recognition
A computer soft ware has been developed that can convert speech into computer sensible form. The input device needed here is Microphone. The available software currently require the user to speak very slowly, dictating one word at a time - but this all can at best be 90% accurate.

Question
a) What is the major distinction between ROM and RAM.
b) Briefly describe 8 (eight) input devices to computers.

2:7 OUTPUT DEVICES

These are devices that communicate the results of processing from the computer to the user. This could be a process or just an instruction. They include the following:

Visual Display Unit (VDU)
As out put devices, these can usually be used where there is no requirement for a permanent out put and when the volume of the out put is small. E.g. in cases of a single enquiry or current balance on account.

Speakers
These tend to output audio stored information e.g. at the airport, the computer through loud speakers may pass announcements to passengers, or you can listen to your favourite music from the computer using its speakers, etc.

Modem
This acts as an output device when the digital signals are converted into analogue signals so as to be transmitted over a telephone line.

Printers
This is a device that prints texts, graphics or images on paper producing hard copy (hard copy refers to a document on the paper as distinct from that one of the screen).

Classification of Printers
Printers can be classified as:
- Impact printers
- Non- impact printers

IMPACT PRINTERS

These mechanically strike the paper during the printing. The print elements i.e. hammer, ribbon and ink strike the paper to deposit the characters on it after relieving signals from the computer's central processing unit. Impact printers are comparatively noisy and slow.

Examples include:
Dot matrix printer- the characters it prints consist of series of dots arranged in a pattern to form the characters.
Daisy wheel – The printing mechanism involves a wheel on which available characters are located. In the course of printing, the wheel rotates as it impacts the required characters onto the paper.

NON - IMPACT PRINTERS
Here with these printers, the paper is not mechanically struck, but the printing is quickly done with the print elements like laser beams, heat, ink to produce hard copies.

Examples of these include:

Laser printers, Inkjet printers, Epson printers etc.

Differences between impact and non impact printers

♦ Non-impact printers are fast compared to the slow impact printers.
♦ Impact printers use inked ribbons yet non-impact printers use thermo or electrostatic principles.
♦ Impact printers are cheap yet non-impact printers are expensive due to the technology used to make them.

♦ Impact printers are generally noisy while non-impact printers are quite quiet.

Another classification of printers would be based on single print output i.e., character, and line or page printers.

Character printers print character-by-character - hence comparatively slow.

Line printers print an entire line at a time - hence comparatively fast and more expensive than character printers but less costly than page printers.
Page printers print the whole page at a go thus the fastest and most expensive printers.

A character can be, a number, letter, symbol, etc.

Plotters

These are devices that produce hard copy of complex drawings such as graphs, engineering, drawings, maps, curves, etc.

2:8 STORAGE DEVICES

These are items/devices that can be used to store Data or Information for subsequent use. They include the following:-

Disks

This is a device that aids in reading and writing information to and from a secondary storage device. They are the predominant form of backing storage medium nowadays because they offer direct access to data, an extremely important feature.

Data is held on a number of circular, concentric tracts on the surfaces of the disk, and is read or written by rotating the disk past read/write heads, which can write data from the CPU's memory on to disk, or can read data from the disk for input to the CPU's memory. he mechanism that causes the disk to rotate is called a disk drive.

The Disk Drive

This is the media where computer programme files reside e.g. hard disk, floppy disk, CD-Roms, magnetic tapes etc

Hard disks

A modern business PC invariably has an internal storage medium, but external disks may be used too. Everything stored by a user on the computer is stored on the hard disk. Internal storage medium. Stores most computer applications. Capacity usually 100MB. Designed with letters – C to S. Hard disks are metallic storage device on which data and information are magnetically stored on round metallic platters. Hard disk of different storage capacities are available e.g. those of 40 MB, 2GB, 4GB, 10GB, etc.

There are also removable disk packs which can be used for back-ups, mass storage or for moving files between computers.

Examples include;

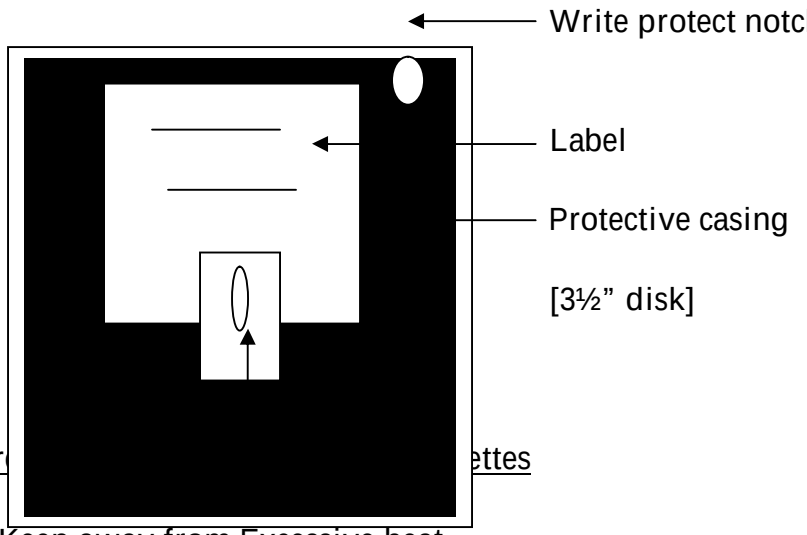
- IDE (Integrated Drive Electronics)
- Zip drive
- Jaz drive, etc.

Floppy disks

Computer data or information can be stored externally on floppy disks.

A floppy is a flat circular plastic platter held permanently in a plastic case. A normal average floppy disk is about 3½". This can hold up to 1.44 Mb of data.

Diagram



Pr ettes

-
- Keep away from Excessive heat
- Keep away from Moisture
- Keep away from dust
- Avoid throwing about
- Write protect to combat viruses

Differences between floppy disks and hard disks

- Floppies area flexible yet hard disks are permanently fixed though a few of them (hard disks) can be moved.
- Floppies are plastic yet hard disks are metallic.
- Hard disks store more information that floppies
- Floppies have lower reading capacity than hard disks.

Compact Disk-Read Only Memory (CD-Rom) Drives
External storage medium. Storage capacity is more than the floppy disk, hard drive. Designed with letters D to E

Flash Disks
More storage capacity than CDs. Holds about 178 floppy disks or 120 MB. Has high data transfer speed and compatible to operating systems like Windows XP. 2000

Tape Storage
Tape cartridge is another but now less commonly used storage device. It is not any different from audio or video cassette tape except that some are larger than normal audio cassettes.
Like any audio or video cassette, data has to be recorded along the length of the computer tape and so it is more difficult to access. It is not usually possible to read from and then write on to a single piece of tape. Reading and writing are separate operations using separate heads and so two drives are necessary for the two operations. Tape store more data than floppies. Fast tapes which can be used to create a back-up file quickly are known as tape streamers.

File update on tape storage facility is in a such way that, the changes are made on the current tape and get recorded on a completely new tape. This means that every time a change or update is to be made a completely new tape is made from the previous tape containing the most recent updates. This is what we call the grandfather - father - son relationship.

Its main advantages as far as data back-up is concerned is that should the son get lost or messed up in any way, t hen the most recently updated tape, before the son, i.e. father is obtained and changes that occurred since the production of the son are done to the father to come up with another sons - replacing the lost one.

CD-ROMS (Compact Disk - Read Only Memory)
These are small silvery disks that are read by the CD-ROM drive using a laser. They are called read-only because you can't change the data on them. Your computer can only read and copy the data on them.

Most soft ware these days are purchased on CD ROM, CD ROMs have massive libraries of data, vast collection of stereo sound chips, high colour graphics all of which take up a lot of storage space.

DVDs (Digital Video Disks) ROM
These are almost like CD-ROMs only that DVDs have more storage capacity (5 GB) with excellent access speeds, internet - based technologies which promise three - dimensional worlds, CD-quality sound and video.

Question

a) Of what advantage are the external storage systems.
b) Briefly describe 4 (four) external devices you know.

CHAPTER THREE

NETWORKS AND DATA COMMUNICATIONS

3:0 Introduction

Under this Chapter we shall look at the following;

- Configuration
- LANS, WANS, MAN and client-server computing
- Data communication

3:1 CONFIGURATIONS

The term configuration refers to the way in which computers are linked together.

- At one extreme an organisation may have just a single 'stand-alone' computer that can only be used by one person at a time.
- At another extreme, an organisation may have hundreds or thousands of computers, all able to be used simultaneously and to communicate with each other.

Centralised Processing

Centralised processing means having all the data/information processing done in a central place such as a computer centre at head office. Data will be collected at 'remote' (i.e. geographically separate) offices and other locations and sent in to the central location.

At the central location there will be:

- A central computer, probably a large main frame
- Central files, containing all the files needed for the system.

Decentralised Processing

Decentralised processing means having the data/information processing carried out at several different locations, away from the 'centre' or 'head office'. Each region, department or office will have its own processing systems, and so:

- There will be several different and unconnected computers in the various offices;
- Each computer will operate with its own programs and its own files.

Multi-user and distributed systems

In practice, information systems do not have to be entirely centralised or entirely decentralised, and a suitable mixture of centralisation and decentralisation is now normally used.

i)Local offices can have their own local systems, perhaps on PC, and also input some data to a centralised processing system.

ii)Computer systems can be networked, and there might be:

- ♦A multi-user system; or
- ♦A 'distributed' data processing system

Multi-user Systems

With a multi-user system there is a central computer with a number of terminals connected to it. The terminals are dumb terminals, which means that they do not include a CPU and so cannot do independent data processing.

A dumb terminal is that terminal which has no capacity for data processing.

Note:

An intelligent terminal however, is that terminal that can carry out data processing on its own without relying on the central computer.

♦The terminals in a multi-user system might be sighted in the same room or building as the central computer, or may be geographically distant from the central computer, connected by an external data link.

Definition

Remote Access

This describes access to a central computer installation from a terminal, which is physically distant.

Remote Job Entry

This is used to describe a method of processing in which the computer user inputs his data to the computer from a remote terminal.

Distributed Processing

A distributed system is a combination of processing hardware located at a central place, e.g. a main frame computer with other, usually smaller computers located at various sites with in the organisation.

The central and dispersed computers are linked by a communication network.

A typical system might consist of a mainframe computer, linked to local mini-computers, linked to desktop PCs as intelligent terminals (see NB above), and to a range of peripheral equipment.

Key features of distributed processing include:

a) Computers distributed or spread over a wide geographical area.
b) A computer can access the information files of other computers in the system.
c) The ability for computers within the system to process data 'jointly' or 'interactively'.
d) Processing is either carried out centrally, or at dispersed locations.
e) Files are held either centrally, or at dispersed locations.
f) Authority is decentralised as processing can be performed autonomously by local computers.

g) End- users of computing facilities are given responsibility for, and control over their own data.

3:2 NET WORKS

A network is an interconnected collection of autonomous processors. With a network there is no single central computer.

There are two main types of network, a local area network (LAN) and a wide area network (WAN). The key idea of a network is that users need equal access to resources such as data, but they do not necessarily have to have equal computing power.

LANS, WANS and client-server computing.

LANS (Local Area Networks)

Definitions:

A LAN is a network of computers located in a single building or on a single site. The parts of the network are linked by computer cable rather than via telecommunications lines.

WANS (Wide Area Network)

These are networks on a number of sites, perhaps on a wide geographical scale.
WANS often use mini computers or main frames as the 'pump's that keep the data messages circulating; where as shorter-distance LANs normally use PCs for this task.

Differences between WANs and LANs

1. A WAN covers a greater geographical area unlike a LAN usually limited to a single building or site.
2. WANs will send larger computers as file servers.
3. WANs will send data over telecommunication links while LAN will use a cable.
4. WANs are normally larger than LANs and have more terminals linked to the network.
5. A 'WAN' can link two or more LANs using gateways.

Metropolitan Area Network (MAN)

This connects computers in a municipality

Storage Area Network (SAN)

These are computers connected by use of unique characters e.g. passwords

Definition

A gateway is a device that is used to connect two networks of a similar type.

Client - server Computing

As the name suggests, client server computing describes the relationship between the devices in the network.

Client
A client is a machine which requests a service e.g. a PC running a Spreadsheet programme which it requests from a storage machine (the sever).
A server on the other hand, is a machine dedicated to providing a particular function or service requested by client. Servers include; files servers, print services e-mail and fax servers.

Types of file servers:

Low end file server
This is used in a network of about six people or users running a couple of software applications and a database.

Mid range file server
This might support 20 to 30 users.

High end file server
Is used in a large dependent network of about 50-100 users, handling transactions, processing and an accounting system.

Network Operating System
This is a set of programmes responsible for the smooth running of a network.
When computers and other devices are linked/connected to form a network, they won't have the characteristics of networked computers (like sharing of data) unless the network operating system is installed.
It has the following functions;
- ♦ It establishes the link between the nodes of the network.
- ♦ It monitors the operations of a network.
- ♦ It controls the recovery process when the system or part of it breaks down.

Examples of network operating systems include:-
Novell network, Windows NT, UNiX, etc.

Advantages of Client Server Computing

1. Greater resilience
Processing is spread over several computers. So client server systems are more resilient. Should one computer/server breakdown; other locations can carry on the processing.

2. Sharing programmes and data files
This can be shared by all the PCs on the network. With stand alone PCs, each will have its own data files and might be unnecessary duplication of data.

3. Sharing of data
Each PC in a network can do the same work, providing flexibility in sharing workloads. In a peak period, two or more people can share the work without having to leave their own desks.

4. Sharing peripherals

In some cases, say LAN, five PCs might share a single on-line printer where as if there were a stand alone PC, each might be given its own separate printer. Computer sharing of peripherals is significantly of benefit especially where resources are scarce or expensive**.**

5. Compatibility

Client-server systems are more likely than centralised systems to have windows interfaces, making it easier to move information between applications e.g. spreadsheets and accounting programs.

Disadvantages of client-server computing

Main frames are better than client-server computing at dealing with large volumes of transactions.

It is easier to control and maintain a system centrally. Client-server computing does not favour data security compared to centralised systems.

Each location may need its own expert network administrator to keep things running smoothly. This creates unnecessary duplication of skills and over manning.

3:3 NETWORK TOPOLOGY

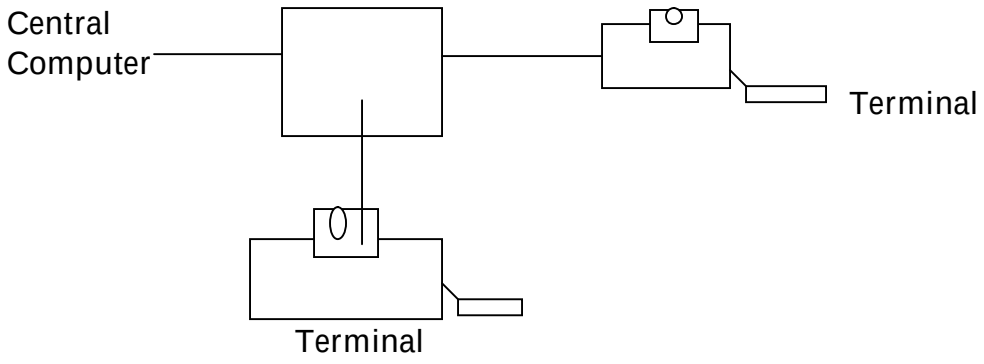
This means the physical arrangement of nodes in a network.

A node

This is any device connected to a network. It can be a computer, or a peripheral device such as a printer.

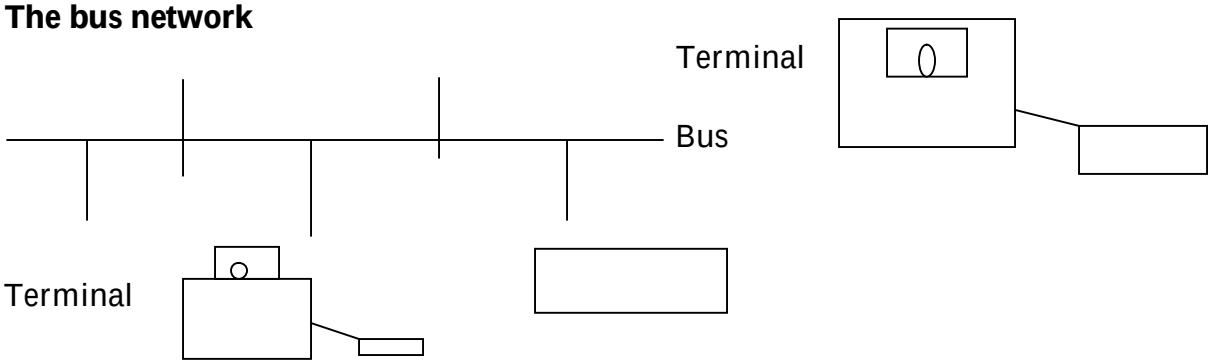
There are several LAN topologies including; the ring network, star network, bus network and Hierarchical network.

Star Network



A number of small computers or peripheral devices are linked to a central unit. The central unit may be a host computer or a file server. A host computer is a large centralised computer, usually a mini computer or a main frame. This topology is common for linking several micro computers to a main frame.

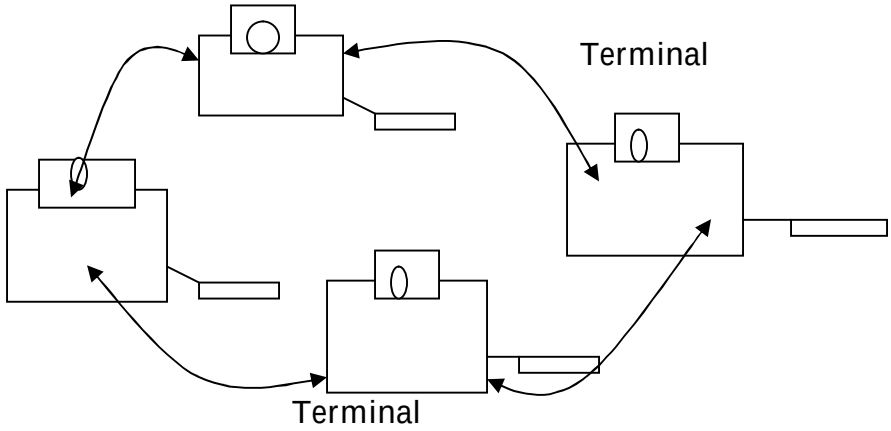
The bus network



In the bus network, each device handles its own communication control. There is usually no host computer or file server. A file server is a large capacity hard disk storage device and it basically stores data and programs.

All communication in a bus network travel along a common cable called a bus. As it passes along the bus, the information is examined by each device on the network to see if its intended for it. This topology is suitable where a few micro computer are to be linked.

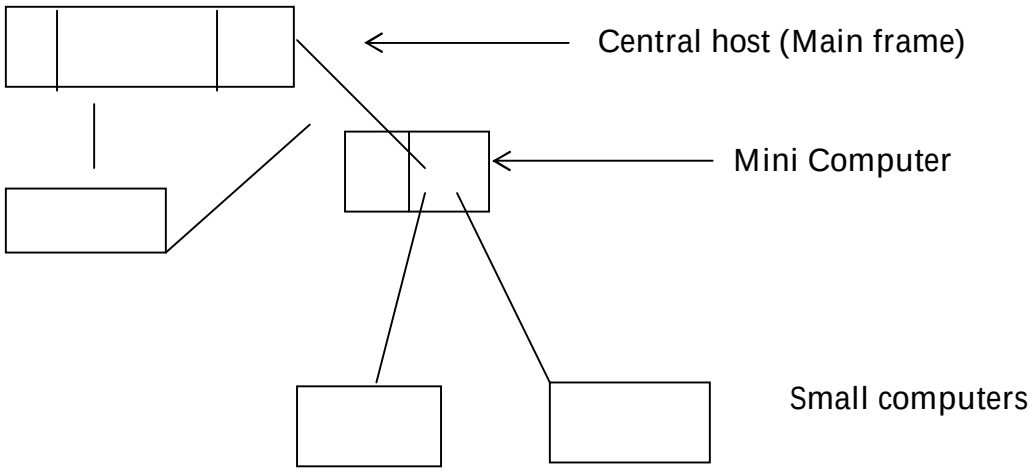
The Ring Network



Each node is connected to two (2) others forming a ring.

Messages are passed around the ring until they reach the correct destinations. This is the least frequently used topology.

Hierarchical (Hybrid) Network



A hierarchical network consists of several computers linked to a central host computer just like a star network. However, these other computers are also hosts to other smaller computers or peripheral devices.

The host at the top of the hierarchy could be mainframe computers, then the last level micro computers.

This topology is useful in centralised processing in organisations e.g. different departments within an organisation may have individual micro computers connected to departmental mini computers, the mini computers in turn may be connected to the organisation's main frame which contains data and programmes accessible to all.

3:4 DATA COMMUNICATION

There are three methods of data communication:
1. Oral communication
2. Paper communication
3. Electronic data communication

Oral Communication
This may occur in a face-to-face situation or by telephone.
It may involve one calling the other on phone asking for particular information, which may be given verbally on the phone.

Paper Communication
Paper-based communication involves the use of internal memoranda, computer print outs and monthly accounting reports.

E.g. copies of despatch notes raised might be sent to the relevant department to be physically matched with customer's order, so that invoices can be raised.

This method means that there is a permanent 'hard copy' record of each transaction. This method may be cheaper that electronic communication, as data communications links do not need to be set up.

The disadvantages are that there may be delay in the delivery of information, particularly between sites. Also the necessity for data transcription increases the risk of error.

Electronic communication
Here information is exchanged via computers, enhancing the amount and quality of information communicated.
Details of despatches of goods from stock might be automatically passed to the sales ledger or accounting sub-system by the ware housing or stock control sub-system so that invoices can be processed.

Advantages of Electronic Communication
Speed is guaranteed since the transmission is almost instant.
Accuracy is always good since there is some kind of automation.
This method eliminates much of human processing.

Data Transmission Equipment

a) Coaxial Cables
A coaxial cable consists of one central conductor, which is surrounded with an insulator and then with the other conductor. In this way, the outer conductor prevents interference from reaching the inner coax cables are used for high-speed network data links. Also used for TVs signals e.g. Aerials.

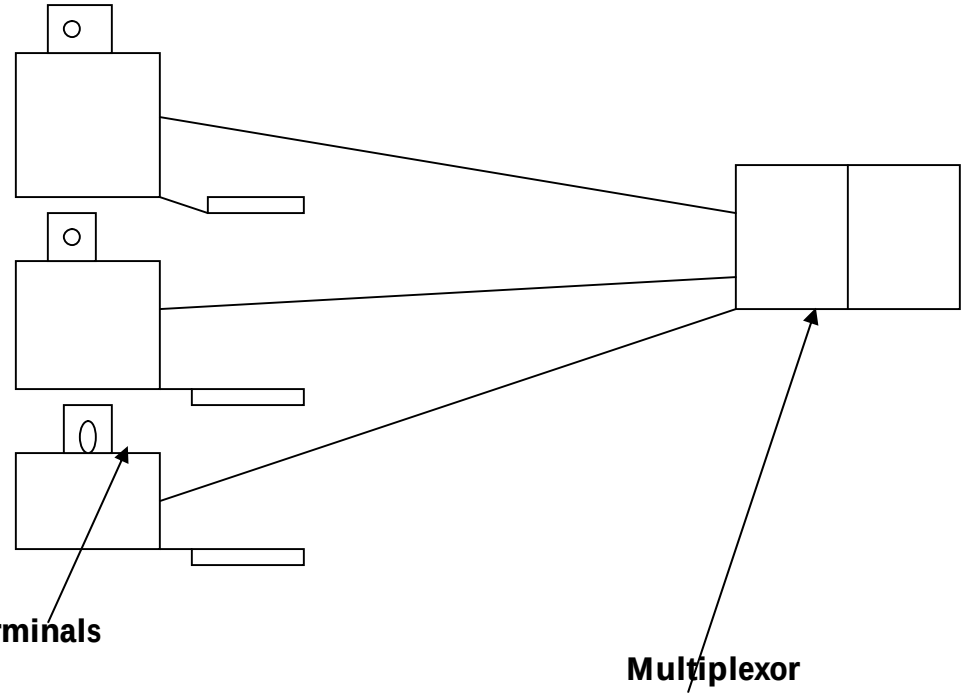
b) Modems
For data transmission through the existing 'analogue' telephone network to be possible, there has to be a device at each end of the telephone line that can convert (Modulate) the data from digital form to analogue form, and (Demodulate) from analogue form to digital form, depending on whether the data is being sent out or received along the telephone line.

This conversion is done by devices called modems. There must be a modem at each end of the telephone line. Digital means 'of digits or numbers'. And is in coded (binary) form.

c) Multiplexors (Concentrators)
These are devices, which are used to send data from several sources down a single line at the same time.

Multiplexing involves combining or merging signals. It accepts signals from several communicating devices and directs transmission to and from a computer along a single carrier channel.

It codes data in a special way so that it can be sorted out at it destination.



It saves line charges as only one telephone line will be required to connect several computers.
Terminology key terms

Band Width
The amount of data that can be sent down a telecommunications line is in part determined by the bandwidth.

Definition:
Bandwidth is the range of frequencies that the channel can carry. Frequencies are measured in cycles per second, or in Hertz. The wider the band width, the greater the number of messages that a channel can carry at any particular time.

Band Rate
This is a measure of the speed of transmission and roughly equates to number of bits per second.

Interfaces
The point of interaction between the computer and the user, principally in terms of using a display screen for in put and retrieval of information. The two principals forms of interface are often described as Graphical user interface.

Protocols
This is an agreed set of operational procedures governing the format of data being transferred, and the signals initiating, controlling and terminating the transfer.

This helps in cases of data transmission errors, which can get detected, and also take steps to recover the lost data.

Question;

1. a) What is a computer?
   b) List and briefly describe the major components of a computer.

CHAPTER FOUR

SOFTWARE CONCEPTS

4:0 Introduction

Under this Chapter we shall look at the following:-

- Operating system
- Application programs
- Utility programs
- Programming languages

Definitions

Software refers to the programmes that tell the computer what to do. Soft ware is by far the most valuable asset of a computer user.

A program is a set of instructions that a computer follows in order to produce the desired results or effects. There are 3 (three) categories of soft ware (programs):

i) The operating software;
ii) The programming languages and language translators
iii) The application software

4:1 OPERATING SYSTEM

Also referred to as the executive program

Definition:

This is a program or suite of programs, which provide the bridge between application software (such as word processing packages, spread sheets or accounting packages) and the hardware.
An operating system controls the action of other programs, which are said to run under it - under its control. It looks after such actions as disk access.

NB: All application soft ware is designed to run under a specific operating system.

Functions of an operating system

1. It checks the initial set up of the computer once it has booted - up or started via the BIOS.

(BIOS) Basic Input Output System is that module forming the part of an operating system, which controls the input and output of data to peripherals i.e., a disk, key board, monitor, mouse, etc. At times it can be stored on ROM.

2. It checks whether the hardware including peripheral devices i.e. printers, are functioning properly.
3. It calls up program files and data files from disk storage into memory.
4. Opening and closing of files, checking of file labels etc.
5. Maintenance of directories or folders in storage. A directory is a file storage.
6. Controlling input and output devices including interaction with the user information executed one by one.
7. Controlling system security e.g. monitoring the use of passwords. Ask for a password before anything is done.
8. Handling of interruptions e.g. machine failure and error reporting.
9. Managing multitasking

Multi tasking is an action which allows the computer to appear to be running several programs simultaneously e.g. sending a document you have completed for typing on a printer while working on another document and at the same time listening to your favourite tracts on CD.

Multitasking needs a suitable operating systems and sufficient memory to hold all programs and the data to be processed by each program. The main problem with multitasking is ensuring that programs don't interfere with each other. This is done by restricting the way the CPU gains access to programs.

PCs operating systems include, MS-DOS (Microsoft Disk Operating System), MS Windows 3.X, MS - Windows 95, 98, 2000, OS/2 by IBM Co., Windows NT, UNIX, Net-ware. These are all version of operating system.

4:2 WINDOWS

Early incarnations of windows, culminating in Windows 3.1 and Windows for Work groups 3.11, were not genuine operating systems in their own right, but were really an operating environment for an older Microsoft system called MS-DOS.

MS-DOS, very hostile to beginners, had all application programs run under it.

In 1993, Microsoft launched Windows N.T, a complete operating system for networks, then Windows 95, 98 and 2000.

Features of Windows 95

Features of Windows 95 include the following:-

a) A 'desktop', from which everything in the system branches out. Disk drives, folders (directories) applications and files can be placed on the desktop.

b) A 'task bar' which is always on top and which includes a start button and buttons representing every open application.
c) Long file names are supported.
d) There is a recycle bin for easy deletion of files.
e) Easy integration with widely used networking software is possible.
f) Multitasking is available (see definition above).

Windows '98
Features of Windows 98
a) It is easier to use
User interface enhancements include easier navigation, such as single-click launching of Applications, icon highlighting, forward/backward buttons, and an easy to customise start menu.

b) Greater reliability
More refinements and upgrades were made to Windows 95 and include;
♦ An internet-base resource site
♦ Testing user's hard disk and fixing problems automatic
♦ Enhanced back up and restore function

c) It is faster
The application loading, system start up, and shut down time are faster.

d) Web integration
There are a variety of features designed to enhance internet access and use of Internet facilities.

e) It is more entertaining with its better graphics and video capabilities and better support for games, hard ware such as joysticks. Later versions can even allow people to use digital video disks (DVDs), digital television and even watch normal TV programs on their PCs.

4:3 APPLICATION SOFTWARE

This consists of programs, which carry out a task for the user as opposed to programs which control the workings of a computer.

Whenever a computer is being used, it will be under the control of an application program, e.g. controlling stock, word processing, preparing accounts, etc.

Application Packages
These are ready-made programs written to perform a particular job.

a) Off- the-shelf application packages
These are ready-made packages distributed or sold by software vendors or

manufacturers.

b) Tailor made application packages

These are programs made at the customers' request encompassing customers' desires. The customer normally gives a programmer his specifications and what he wants the program to do. The programmer studies the specification compares them with the available off-the-shelf packages and if there is none that can satisfy the customer needs, then he can write a new program for the customer.

General Purpose Package

These are off-the-shelf programs that can be needed for processing of a general type though the computer user can employ the package to a variety of users of his own choice.

Spreadsheets and Word processors are examples.

Application Suites

An application suite or soft ware suite is a collection of top-of the line application program from the same vendor.

A typical software suite will often include:-

a) A Word processor - word processing program
b) Spread sheet
c) Data base
d) Presentation graphics
e) Personal information manager

Examples of application suites

- Microsoft office
- Lotus Smart Suite
- Novell Perfect office
- Corel Draw (for graphics)

Microsoft Office	Lotus Smart Suite	Novell Perfect Office
1. Ms-Word	Word Pro	Word Perfect 6
2. Ms- Excel	Lotus 1-2-3	Presentation
3. Access	Approach	
4. Ms - Power Point	Freelance graphics	
5. Ms - Outlook	Lotus Organiser	

Word Processors: (Word Processing Programs)

A word processor makes your writing efforts look good. Master pages of a novel, grocery lists, etc. With the right paper you can use a word processor to create file folders, labels, brochures, business cards, greeting cards, letter heads etc. all types of professional documents i.e. letters, memorandum, invoices, etc.

Examples of Word processing programs,

- Word perfect for Windows
- Ms-word
- Word Pro
- Word Star, etc.

Spread Sheets

A spreadsheet program is much like a bookkeeper ledger sheet with rows and columns. You can use spreadsheets programs for all kinds of instant calculations such as finding the amount of interest you will pay on a loan.

You can change and update information instantly, correct mistakes without erasing and even process charts or graphics showing statistics within no time.

You use a spreadsheet program where you want columns and rows of numbers, financial calculations etc.

Examples of Spreadsheet programs

- Lotus 1-2-3
- Microsoft Excel
- Quattro Pro
- Consolidation

Data Base Programs

These help in management of lists of data with great ease e.g. a list of clients' addresses, items in stock, etc.

Examples of Data base programs include:

- Dbase IV
- Parodox for Windows
- Ms - Access
- Ms - Fox Pro
- Approach
- Oracle etc.

Presentation Graphic Programs

These kind of programs can help to come up with quality drawings.

They can also enable you create printed reports; handouts or notes to be used while you are speaking.

Enable you to create a self-running slide show-cartoons, that can play on any computer.

Enable you to create slides for business presentation including texts, graphs or clip art images e.g. a company logo.

Examples of presentation graphic programs

- Ms- Power point

♦Freelance graphics
♦ Presentations
♦ Havard graphics
♦Adobe persuasion
♦Corel presents

4:4 PERSONAL INFORMATION MANAGERS (PIM)

These help you keep track of appointments, to list things you have to do and information on your contacts.

PIMs can do the following:
♦List all phone calls you need to make in a day
♦Check co-workers schedules, conflicts and automatically set up meetings that every one can attend
♦Prioritise your daily tasks so that the most important work gets done first
♦Track completed work so that you can tell some one exactly when you finished a certain report
♦Let you check your workload for a day, week or month at a glance

Examples of PIMs include:
♦ Ms-Outlook
♦Lotus organiser
♦Schedule +
♦Act!, etc.

4:5 INTEGRATED PACKAGES

An integrated package is a single program that modules such things as word processing, spread sheets, graphics, data base management and communications.

Accounting programs usually comprise modules integrated to form a large compile system or program. There may be a module for each of the sales ledger system, the purchase ledger, nominal ledger, trial balance, etc.

Popular integrated packages include:
♦Ms Works
♦Claris works
♦ Geo work pro

4:6 UTILITY PROGRAMS

These are programs or set of programs that enhance the work of an operating system.
Utility programs i.e. Norton's utilities can recover data, manipulate files, re-organise data on disks, check for and fix errors on disks, etc.

Vaccines and a virus guards are also utility programs intended to protect virus infection.

VIRUSES

A virus is a piece of soft ware which infects programs and data and possibly damages them, and which replicates itself.

Viruses need an opportunity to spread. The programmers of viruses therefore place viruses in the kind of software, which is most likely to be copied. This includes;

a) Free soft ware (e.g. from the internet)
b) Pirated software (cheaper than original versions)
c) Games software (wide appeal)

Types of Viruses

Trojans

A Trojan is a program that while visibly performing one function, it secretly carries out another e.g. as you can play a game, it secretly destroys data or files. Trojans don't copy themselves on target disks.

Worms

This normally survives by copying and replicating itself inside the computer system it has entered without necessarily altering that system.

Bombs (Logic and time bombs)

Time bombs

These are normally released at given dates in a year, say fools day, etc.

Logic bombs

These are normally triggered by certain events e.g. a disk utilised up to a certain percentage.

Identification of Viruses

Some viruses are detected before they do any damage while others are identified when they are activated.

Viruses may be controlled in the following ways;

1. Use of virus guards

These guard against virus infections. Unfortunately, new powerful viruses can attack and break through some virus guards.

2. Use of anti-virus software e.g. Doctor Solomon's took kit.

These are programs used to clear viruses from a system. They must always be upgraded to deal with new virus.

3. Organisations must have procedures to guard against the introduction of unauthorised software to their system.
4. Organisations, as a matter of routine, should ensure that any disk received from outside is virus free before the data on the disk is down loaded.
5. Firewalls
6. Any irregularities in a widely used program must be rectified as they come to light.

Transmission of Viruses

Viruses are transmitted in a number of ways

- Using infected disks in non-infected computers.
- Buying software from non certified vendors can result in buying infected software.
- Buying software, which are not well tested-say from the Internet.
- Getting connected to an infected network.

4:7 PROGRAMMING LANGUAGES

Computer programs are normally manufactured / written using programming languages. There are two recognised levels of programming languages.

- Low level language
- High-level language

a) Low Level Languages

(i) Machine Code (first generation language)

This program is as old as the computer itself. It was the 1st language used to Program Computers and indeed is the only language the computer recognises and understands.

Instructions in machine language are written or coded as Os and Is (Binary digits). Every program must be written in machine codes before the computer can do any thing with it. These languages are so hard to learn and complicated that is why the assembly language was subsequently developed.

(ii) Assembly Language (second generation language)

These are also machine specific, but the tasks of learning and writing the language is made easier than with machine language because they are written in 'symbolic' form.

Instead of using machine code, the programmer is able to use easily learned and understood operation mnemonics e.g. ADD, SUB and MULT.

b) High-level Languages

To over-come the low level language difficulty of machine dependency, high-Level languages were developed. Such programming languages, with an extensive vocabulary of words and symbols, are used to instruct a computer to carry out the necessary procedures, regardless of the type of machine being

used.

Advantages of high-level languages over low-level languages include:

♦The productivity of programmers is improved as program writing can take place in a very short time compared with low-level language.
♦The programs developed can be used on any types of computers without getting re-written.
♦They speed up testing and error correction.
♦ High - level languages are easier to understand and use.

A) Third generation languages
These are problems oriented programming languages, which have been created to deal with particular types of data processing problems. They include:

a) COBOL - is used for business data processing.
b) BASIC - Beginner al purpose symbolic instruction code) - designed for beginners, particularly on microcomputers.
c) FORTRAN is a scientific language
d) Pascal suitable for structured programming.
e) C- An advanced language originally used for programming in the UNIX, now also used to develop windows programs.

Other programming languages include C++, ALGOL, APL, PILOT, SNOBOL, etc.

Compilers and Interpreters
The high - level language program has to be translated into machine code before it can be used. This is done by **compiler programs**, by turning a source program into an object program.

An interpreter does the same sort of job as a compiler, but in a different way.
It takes a program written in a high level program language and executes it, statement by statement (i.e. instruction by instruction) directly during the running of the program.

B) Fourth Generation Language (4GL)
These are languages intended to help computer users or programmers develop their own application programs more quickly and cheaply.

♦A 4GL requires fewer lines of code to write and develop a program than a 3 G Language.
♦ A 4GL, by using a menu system for example, allows users to specify what they require, rather than describe the procedures by which these requirements are met.
The detail is done by the 4GL software.

LIST OF ABBREVIATIONS

ABBREVIATION	ABBREVIATION IN FULL
4.GL	Fourth Generation Language
ALU	Arithmetic Logic Unit
AOL	America on Line
AS II	America National Standard Code for Inform date Interchange
ATM	Automated Teller Machine
BASIC	Beginners All Purpose Symbolic Codes
BIOS	Basic Input – Output System
BIT	Binary Digit
BTM	Business Teller Machine
CD	Compact Disk
CIS	Computer Information System
CLS	Clear Screen
COBOL	Common Business Oriented Language
CPU	Central Processing Unit
CU	Control Unit
DBMS	Database Management System
DDL	Data Definition Language
DEEP BLUE	Computers are modern computers that are an IBM computer programmed to play Chess with the world class champion, Garry Kasorok. Programmed to make 1 million moves in a second, which defected the world chess champion in the world.
DEL	Delete
Dir	Directory
Disk Drives	Media where computer programme files reside e.g., Hard disks, floppy Disks, CD-ROM, Magnetic tapes etc.
DML	Data Manipulation Language
DOS	Disk Operating System
DPC	Desktop Personal Computer
Drives	External storage medium storage capacity more than floppy and less then hard disk drive, designed with letters D…E.
DTP	Desk top Publishing
DVD	Digital Video Disk
E-mail	Electronic Mail
EMF	Electronic Magnetic Fields
EPOS	Electronic Point of Scale
EWN	Enterprise Wide Network – Any Private Network connects all of organization CPS no matter what they run or where they are located.
Expansion Slots	are access slots on the C.P.U where new computer cards can be fixed when upgrading (expanding) a computer. When adding another floppy drive, adding a CD ROM Drive a higher memory chip.

Floppy Disks Drives.	External storage medium, less storage capacity than Hard disks drive designed with letters
FORTAN	Formula Transaction
GB	Byte
GUI	Graphical User Interface - medium through user interacts with a CP
Hard Disk Drive	Internal Storage mechanism stores most computer applications. Capacity 100MB designed work letters
HLL	High Level Language
IBM	International Business Machine
ILL	Intermediate Level Language
INTERNET	International Network
IRR	Internal Rate of Return
ISP	Internet Service Provider – Provides Internet to users who register at 15 P using other dial to dedicated access.
IT	Information Technology
KB	Kilo Bytes
KIPS	Kilo Instructions Per Second - its Speed
KISS	Keep it small Simple
LAN	Local Area Network
LLL	Low Level Language
MAN	Metropolitan Area Net - Work
MB	Mega Byte
MICR	Magnetic Ink Character Recognition
MIPS	Millions Instructions per Second
MODEM	Modulation Demolecular
MS DOS	Micro Soft Disk Operating System
Ms Excel	Micro soft Excel
MULT	Multiply
NPV	Net Present Value
NT	Net Work
OCR	Optical character Recognition
OS	Operating System
OUR	Optical Work Reading
PC	Personal Computer
PIN	Personal Identification Number
Ports	Are connections (sockets) on the C.P.U which a computer components (Device) like a printer, mouse, modern etc. Can be connected.
RAM	Random Access Memory
ROM	Read only Memory
SAN	Storage Area Network
SDLC	System Development Life Cycle
SSDM	Special Standard System Development management maintenance
SSM	Special Standard System Management / maintenance

SQL	Structured Query Language
SUB	Subtract
TCP/IP	Transmission Control Protocol/internet Protocol system used to transfer information from one computer to another.
UPS	Uninterrupted Power Supply
URL	Uniform Resource Locater
VAN	Value Added Network
VDU	Visual Display Unit
W.W.W	World Wide Website
Web Server	Software that delivers web pages and contains of web sites.

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Course Name : Sociology and Population
Course Code : APDPS 105
Course level : Level 1
Credit Units : 4 CU
Contact Hours : 60 Hrs

Course Description
The Course details concepts used in sociology as related to population studies, history of anthropology and population, its controversies, major discussions about population like focusing on various cultures, ethical considerations in population studies, further description of culture, its meaning, its relevance to the current cultural development, ethnography in the context of population studies plus its appropriate tools used for data collection.

Course Objectives
· To help students find out the science behind socialization amongst people in the urban areas.
· To help students appreciate different cultures, beliefs, values that are integrated with in an urban setting besides those in rural areas.
· To expose students to wide knowledge of cultures their weaknesses, strengths and backgrounds.
· To help them grasp complex skills in carrying out research with in different cultures.
· To help students learn how to respect different cultures, values and beliefs that they may encounter during interactions with people from diverse backgrounds.
· To ensure provision of adequate analysis to students of how to experiment several research tools used in ethnography to collect data from the field.

Course Content
Introduction
· Meaning of Social Anthropology
· A brief overview of the Discipline
· Basic trends in Anthropology
· History of anthropology
· Controversies about the history of anthropology
Major Discussions about Anthropology
· Focus on other cultures
· Substantive focus and practice
· Specializations
· Ethical considerations
Cultural Anthropology

· Meaning of Cultural Anthropology
· A brief history of Cultural Anthropology
· Relevance and Implications of Cultural Anthropology

Ethnography

· Definition of Ethnography
· Evaluating Ethnography
· Data Collections Methods
· Differences across disciplines
· Ethics in Ethnography
· The ethnographic self

Cultural Relativism

· Meaning of Cultural relativism
· Epistemological origins of Cultural relativism
· A methodological and heuristic device

Mode of delivery Face to face lectures

Assessment

Course work 40%

Exams 60%

Total Mark 100%

Introduction

Anthropology has its intellectual origins in both the natural sciences, and the humanities. Its basic questions concern, "What defines *Homo sapiens*?" "Who are the ancestors of modern *Homo sapiens*?" "What are our physical traits?" "How do we behave?" "Why are there variations and differences among different groups of humans?" "How has the evolutionary past of *Homo sapiens* influenced its social organization and culture?" and so forth.

While specific modern anthropologists have a tendency to specialize in technical subfields, their data and ideas are routinely synthesized into larger works about the scope and progress of our species.

The term "anthropology" refers in common parlance most often to Cultural Anthropology, the study of the culture, beliefs, and practices of living people. In American universities, however, the department of Anthropology often includes three or four subfields, including cultural anthropology, archaeology, biological anthropology and linguistic anthropology. However, in universities in the United Kingdom, and much of Europe, these fields are frequently housed in separate departments.[4]

A brief overview of the discipline

One traditional approach to simplifying such a vast enterprise has been to divide anthropology into four fields, each with its own further branches: biological or physical anthropology, cultural anthropology, archaeology and anthropological linguistics.

Briefly put, biological or physical anthropology includes the study of human evolution, human evolutionary biology, population genetics, our nearest biological relatives, classification of ancient hominids, paleontology of humans, distribution human alleles, blood types and the human genome project. Primatology studies our nearest non-human relatives (human beings are primates), and some primatologists use field observation methods, written up in a manner quite similar to ethnography.[5]

Biological anthropology is used by other fields to shed light on how a particular folk got to where they are, how frequently they've encountered and married outsiders, whether a particular group is protein-deprived, and to understand the brain processes involved in the production of language. Other related fields or subfields include paleoanthropology, anthropometrics, nutritional anthropology, and forensic anthropology.

Cultural anthropology is often based on ethnography, a kind of writing used throughout anthropology to present data on a particular people or folk (from the Greek, *ethnos*/Εθνος), often based on participant observation research. Ethnology involves the systematic comparison of different cultures. Cultural anthropology is also called socio-cultural anthropology or social anthropology (especially in Great Britain). In some European countries, cultural anthropology is known as ethnology (a term coined and defined by Adam F. Kollár in 1783). The study of kinship and social organization is a central focus of cultural anthropology, as kinship is a human universal. Cultural anthropology also covers: economic and political organization, law and conflict resolution, patterns of consumption and exchange, material culture, technology, infrastructure, gender relations, ethnicity, childrearing and socialization, religion, myth, symbols, worldview, sports, music, nutrition, recreation, games, food, festivals, and language, which is also the object of study in linguistics. Note the way in which some of these topics overlap with topics in the other subfields.

Archaeology is the study of human material culture, including both artifacts (older pieces of human culture) carefully gathered *in situ*, museum pieces and modern garbage.[7] Archaeologists work closely with biological anthropologists, art historians, physics laboratories (for dating), and museums. They are charged with preserving the results of their excavations and are often found in museums. Typically, archaeologists are associated with "digs," or excavation of layers of ancient sites.

Archaeologists subdivide time into cultural periods based on long-lasting artifacts: for example the Paleolithic, the Neolithic, the Bronze Age, which are further subdivided according to artifact traditions and culture region, such as the Oldowan or the Gravettian. In this way, archaeologists provide a vast reference of the places human beings have traveled over the past 200,000 years, their ways of making a living, and their demographics. Archaeologists also investigate nutrition, symbolization, art, systems of writing, and other physical remnants of human cultural activity.

Linguistics is the study of language. Linguistic anthropology (also called anthropological linguistics) seeks to understand the processes of human communications, verbal and non-verbal, variation in language across time and space, the social uses of language, and the

relationship between language and culture. It is the branch of anthropology that brings linguistic methods to bear on anthropological problems, linking the analysis of linguistic forms and processes to the interpretation of sociocultural processes. Linguistic anthropologists often draw on related fields including anthropological linguistics, sociolinguistics, pragmatics, cognitive linguistics, semiotics, discourse analysis, and narrative analysis.[8]

This field is divided into its own subfields: descriptive linguistics the construction of grammars and lexicons for unstudied languages; historical linguistics, including the reconstruction of past languages, from which our current languages have descended; ethnolinguistics, the study of the relationship between language and culture, and sociolinguistics, the study of the social functions of language. Anthropological linguistics is also concerned with the evolution of the parts of the brain that deal with language.[9]

Because anthropology developed from so many different enterprises (see History of Anthropology), including but not limited to fossil-hunting, exploring, documentary film-making, paleontology, primatology, antiquity dealings and curatorship, philology, etymology, genetics, regional analysis, ethnology, history, philosophy and religious studies,[10][11] it is difficult to characterize the entire field in a brief article, although attempts to write histories of the entire field have been made.[12]

On the one hand this has led to instability in many American anthropology departments, resulting in the division or reorganization of subfields (e.g. at Stanford, Duke, and most recently at Harvar). However, seen in a positive light, anthropology is one of the few place in many American universities where humanities, social, and natural sciences are forced to confront one another. As such, anthropology has also been central in the development of several new (late 20th century) interdisciplinary fields such as cognitive neuroscience, global studies, and various ethnic studies.

Basic trends in anthropology

The goal of anthropology is to provide a holistic account of humans and human nature. Since anthropology arose as a science in Western societies that were complex and industrial, a major trend within anthropology has been a methodological drive to study peoples in societies with more simple social organization, sometimes called "primitive" in anthropological literature, but without any connotation of "inferior."[14] Today, most anthropologists use terms such as "less complex" societies or refer to specific modes of subsistence or production, such as "hunter-gatherer" or "forager" or "simple farmer" to refer to humans living in non-industrial, non-Western cultures, such people or folk (*ethnos*) remaining of great interest within anthropology.

The quest for holism leads most anthropologists to study a particular folk or people in detail, using biogenetic, archaeological, and linguistic data alongside direct observation of contemporary customs. In the 1990s and 2000s, calls for clarification of what constitutes a culture, of how an observer knows where his or her own culture ends and another begins, and other crucial topics in writing anthropology were heard. It is possible to view all

human cultures as part of one large, evolving global culture. These dynamic relationships, between what can be observed on the ground, as opposed to what can be observed by compiling many local observations remain fundamental in any kind of anthropology, whether cultural, biological, linguistic or archaeological.

Anthropologists are interested in both human variation and in the possibility of human universals (behaviors, ideas or concepts shared by virtually all human cultures) They use many different methods of study, but modern population genetics, participant observation and other techniques often take anthropologists "into the field" which means traveling to a community in its own setting, to do something called "fieldwork." On the biological or physical side, human measurements, genetic samples, nutritional data may be gathered and published as articles or monographs. Due to the interest in variation, anthropologists are drawn to the study of human extremes, aberrations and other unusual circumstances, such as headhunting, whirling dervishes, whether there were real [[*Homo floresienses*|Hobbit people]], snake handling, and glossolalia (speaking in tongues), just to list a few.

At the same time, anthropologists urge, as part of their quest for scientific objectivity, cultural relativism, which has an influence on all the subfields of anthropology. This is the notion that particular cultures should not be judged by one culture's values or viewpoints, but that all cultures should be viewed as relative to each other. There should be no notions, in good anthropology, of one culture being better or worse than another culture.[19]

Ethical commitments in anthropology include noticing and documenting genocide, infanticide, racism, mutilation including especially circumcision and subincision, and torture. Topics like racism, slavery or human sacrifice, therefore, attract anthropological attention and theories ranging from nutritional deficiencies[20] to genes[21] to acculturation have been proposed, not to mention theories of acculturation, colonialism and many others as root causes of man's inhumanity to man. To illustrate the depth of an anthropological approach, one can take just one of these topics, such as "racism" and find thousands of anthropological references, stretching across all the subfields (and subfields of subfields).[22]

In addition to dividing up their project by theoretical emphasis, anthropologists typically divide the world up into relevant time periods and geographic regions. Human time on Earth is divided up into relevant cultural traditions based on material, such as the Paleolithic and the Neolithic, of particular use in archaeology. Further cultural subdivisions according to tool types, such as Olduwan or Mousterian or Levallois help archaeologists and other anthropologists in understanding major trends in the human past. Anthropologists and geographers share approaches to Culture regions as well, since mapping cultures is central to both sciences. By making comparisons across cultural traditions (time-based) and cultural regions (space-based), anthropologists have developed various kinds of comparative method, a central part of their science.

Contemporary anthropology is an established science with academic departments at most universities and colleges. The single largest organization of Anthropologists is the American Anthropological Association, which was founded in 1903.[23] Membership is made up of Anthropologists from around the globe.[24] Hundreds of other organizations exist in the various subfields of anthropology, sometimes divided up by nation or region, and many anthropologists work with collaborators in other disciplines, such as geology, physics, zoology, paleontology, anatomy, music theory, art history, sociology and so on, belonging to professional societies in those disciplines as well.[25]

History of anthropology

The first use of the term "anthropology" in English to refer to a natural science of humankind was apparently in 1593, the first of the "logies" to be coined.[26] It took Immanuel Kant 25 years to write one of the first major treatises on anthropology, his *Anthropology from a Pragmatic Point of View*.[27] Kant is not generally considered to be a modern anthropologist, however, as he never left his region of Germany nor did he study any cultures besides his own.[28] He did, however, begin teaching an annual course in anthropology in 1772. Anthropology is thus primarily an Enlightenment and post-Enlightenment endeavor.

Historians of anthropology, like Marvin Harris[29] indicate two major frameworks within which empirical anthropology has arisen: interest in comparisons of people over space and interest in longterm human processes or humans as viewed through time. Harris dates both to Classical Greece and Classical Rome, specifically Herodotus, often called the "father of history" and the Roman historian Tacitus, who wrote many of our only surviving contemporary accounts of several ancient Celtic and Germanic peoples. Herodotus first formulated some of the persisting problems of anthropology.

Medieval scholars may be considered forerunners of modern anthropology as well, insofar as they conducted or wrote detailed studies of the customs of peoples considered "different" from themselves in terms of geography. John of Plano Carpini reported of his stay among the Mongols. His report was unusual in its detailed depiction of a non-European culture.

Marco Polo's systematic observations of nature, anthropology, and geography are another example of studying human variation across space. Polo's travels took him across such a diverse human landscape and his accounts of the peoples he encountered as he journeyed were so detailed that they earned for Polo the name "the father of modern anthropology."

Another candidate for one of the first scholars to carry out comparative ethnographic-type studies in person was the medieval Persian scholar Abū Rayhān Bīrūnī in the 11th century, who wrote about the peoples, customs, and religions of the Indian subcontinent. Like modern anthropologists, he engaged in extensive participant observation with a given group of people, learnt their language and studied their primary texts, and presented his findings with objectivity and neutrality using cross-cultural comparisons. He wrote detailed comparative studies on the religions and cultures in the Middle East,

Mediterranean and especially South Asia. Biruni's tradition of comparative cross-cultural study continued in the Muslim world through to Ibn Khaldun's work in the 14th century.

Most scholars consider modern anthropology as an outgrowth of the Age of Enlightenment, a period when Europeans attempted systematically to study human behavior, the known varieties of which had been increasing since the 15th century as a result of the first European colonization wave. The traditions of jurisprudence, history, philology, and sociology then evolved into something more closely resembling the modern views of these disciplines and informed the development of the social sciences, of which anthropology was a part.

Developments in the systematic study of ancient civilizations through the disciplines of Classics and Egyptology informed both archaeology and eventually social anthropology, as did the study of East and South Asian languages and cultures.

Institutionally, anthropology emerged from the development of natural history (expounded by authors such as Buffon) that occurred during the European colonization of the 17th, 18th, 19th and 20th centuries. Programs of ethnographic study originated in this era as the study of the "human primitives" overseen by colonial administrations.

There was a tendency in late 18th century Enlightenment thought to understand human society as natural phenomena that behaved in accordance with certain principles and that could be observed empirically. In some ways, studying the language, culture, physiology, and artifacts of European colonies was not unlike studying the flora and fauna of those places.

Early anthropology was divided between proponents of unilinealism, who argued that all societies passed through a single evolutionary process, from the most primitive to the most advanced, and various forms of non-lineal theorists, who tended to subscribe to ideas such as diffusionism.[38] Most 19th-century social theorists, including anthropologists, viewed non-European societies as windows onto the pre-industrial human past.

As academic disciplines began to differentiate over the course of the 19th century, anthropology grew increasingly distinct from the biological approach of natural history, on the one hand, and from purely historical or literary fields such as Classics, on the other. A common criticism has been that many social science scholars (such as economists, sociologists, and psychologists) in Western countries focus disproportionately on Western subjects, while anthropology focuses disproportionately on the "Other";[39] this has changed over the last part of the 20th century as anthropologists increasingly also study Western subjects, particularly variation across class, region, or ethnicity within Western societies, and other social scientists increasingly take a global view of their fields.

20th Century

In the twentieth century, academic disciplines have often been institutionally divided into three broad domains. The natural and biological *sciences* seek to derive general laws through reproducible and verifiable experiments. The *humanities* generally study local traditions, through their history, literature, music, and arts, with an emphasis on understanding particular individuals, events, or eras.

The *social sciences* have generally attempted to develop scientific methods to understand social phenomena in a generalizable way, though usually with methods distinct from those of the natural sciences. In particular, social sciences often develop statistical descriptions rather than the general laws derived in physics or chemistry, or they may explain individual cases through more general principles, as in many fields of psychology. Anthropology (like some fields of history) does not easily fit into one of these categories, and different branches of anthropology draw on one or more of these domains.[40]

Anthropology as it emerged among the colonial powers (mentioned above) has generally taken a different path than that in the countries of southern and central Europe (Italy, Greece, and the successors to the Austro-Hungarian and Ottoman empires). In the former, the encounter with multiple, distinct cultures, often very different in organization and language from those of Europe, has led to a continuing emphasis on cross-cultural comparison and a receptiveness to certain kinds of cultural relativism.[41]

In the successor states of continental Europe, on the other hand, anthropologists often joined with folklorists and linguists in the nationalist/nation-building enterprise. Ethnologists in these countries tended to focus on differentiating among local ethnolinguistic groups, documenting local folk culture, and representing the prehistory of the nation through museums and other forms of public education.[42]

In this scheme, Russia occupied a middle position. On the one hand, it had a large Asian region of highly distinct, pre-industrial, often non-literate peoples, similar to the situation in the Americas; on the other hand, Russia also participated to some degree in the nationalist discourses of Central and Eastern Europe. After the Revolution of 1917, anthropology in the USSR and later the Soviet Bloc countries were highly shaped by the need to conform to Marxist theories of social evolution.[43]

Anthropology after World War II: Increasing dialogue in Anglophone anthropology

Before WWII British 'social anthropology' and American 'cultural anthropology' were still distinct traditions. After the war, enough British and American anthropologists borrowed ideas and methodological approaches from one another that some began to speak of them collectively as 'sociocultural' anthropology.

In the 1950s and mid-1960s anthropology tended increasingly to model itself after the natural sciences. Some anthropologists, such as Lloyd Fallers and Clifford Geertz, focused on processes of modernization by which newly independent states could develop. Others,

such as Julian Steward and Leslie White, focused on how societies evolve and fit their ecological niche—an approach popularized by Marvin Harris.

Economic anthropology as influenced by Karl Polanyi and practiced by Marshall Sahlins and George Dalton challenged standard neoclassical economics to take account of cultural and social factors, and also employed Marxian analysis into anthropological study. In England, British Social Anthropology's paradigm began to fragment as Max Gluckman and Peter Worsley experimented with Marxism and authors such as Rodney Needham and Edmund Leach incorporated Lévi-Strauss's structuralism into their work.

Structuralism also influenced a number of developments in 1960s and 1970s, including cognitive anthropology and componential analysis. Authors such as David Schneider, Clifford Geertz, and Marshall Sahlins developed a more fleshed-out concept of culture as a web of meaning or signification, which proved very popular within and beyond the discipline. In keeping with the times, much of anthropology became politicized through the Algerian War of Independence and opposition to the Vietnam War;[55] Marxism became a more and more popular theoretical approach in the discipline.[56] By the 1970s the authors of volumes such as *Reinventing Anthropology* worried about anthropology's relevance.

Since the 1980s issues of power, such as those examined in Eric Wolf's *Europe and the People Without History*, have been central to the discipline. In the 80s books like *Anthropology and the Colonial Encounter* pondered anthropology's ties to colonial inequality, while the immense popularity of theorists such as Antonio Gramsci and Michel Foucault moved issues of power and hegemony into the spotlight. Gender and sexuality became popular topics, as did the relationship between history and anthropology, influenced by Marshall Sahlins (again), who drew on Lévi-Strauss and Fernand Braudel to examine the relationship between social structure and individual agency. Also influential in these issues were Nietzsche, Heidegger, the critical theory of the Frankfurt School, Derrida and Lacan.[57]

In the late 1980s and 1990s authors such as George Marcus and James Clifford pondered ethnographic authority, particularly how and why anthropological knowledge was possible and authoritative. They were reflecting trends in research and discourse initiated by Feminists in the academy, although they excused themselves from commenting specifically on those pioneering critics.[58] Nevertheless, key aspects of feminist theorizing and methods became *de rigueur* as part of the 'post-modern moment' in anthropology: Ethnographies became more reflexive, explicitly addressing the author's methodology, cultural, gender and racial positioning, and their influence on his or her ethnographic analysis. This was part of a more general trend of postmodernism that was popular contemporaneously.[59] Currently anthropologists pay attention to a wide variety of issues pertaining to the contemporary world, including globalization, medicine and biotechnology, indigenous rights, virtual communities, and the anthropology of industrialized societies.

Controversies about the history of anthropology

Anthropologists, like other researchers (esp. historians and scientists engaged in field research), have over time assisted state policies and projects, especially colonialism.[60][61]

Some commentators have contended:

- That the discipline grew out of colonialism, perhaps was in league with it, and derived some of its key notions from it, consciously or not. (See, for example, Gough, Pels and Salemink, but cf. Lewis 2004).[62]
- That anthropologists typically have more power than the people they study and hence their knowledge-making is a form of theft in which the anthropologist gains something for him or herself at the expense of informants.
- That ethnographic work was often ahistorical, writing about people as if they were "out of time" in an "ethnographic present" (Johannes Fabian, *Time and Its Other*).

Anthropology and the military

Anthropologists' involvement with the U.S. government, in particular, has caused bitter controversy within the discipline. Franz Boas publicly objected to US participation in World War I, and after the war he published a brief expose and condemnation of the participation of several American archeologists in espionage in Mexico under their cover as scientists.

But by the 1940s, many of Boas' anthropologist contemporaries were active in the allied war effort against the "Axis" (Nazi Germany, Fascist Italy, and Imperial Japan). Many served in the armed forces but others worked in intelligence (for example, Office of Strategic Services (OSS) and the Office of War Information). At the same time, David H. Price's work on American anthropology during the Cold War provides detailed accounts of the pursuit and dismissal of several anthropologists from their jobs for communist sympathies.

Attempts to accuse anthropologists of complicity with the CIA and government intelligence activities during the Vietnam War years have turned up surprisingly little (although anthropologist Hugo Nutini was active in the stillborn Project Camelot).[63] Many anthropologists (students and teachers) were active in the antiwar movement and a great many resolutions condemning the war in all its aspects were passed overwhelmingly at the annual meetings of the American Anthropological Association (AAA).

In the decades since the Vietnam war the tone of cultural and social anthropology, at least, has been increasingly politicized, with the dominant liberal tone of earlier generations replaced with one more radical, a mix of, and varying degrees of, Marxist, feminist, anarchist, post-colonial, post-modern, Saidian, Foucauldian, identity-based, and more.[64]

Professional anthropological bodies often object to the use of anthropology for the benefit of the state. Their codes of ethics or statements may proscribe anthropologists from giving secret briefings. The Association of Social Anthropologists of the UK and Commonwealth

(ASA) has called certain scholarships ethically dangerous. The AAA's current 'Statement of Professional Responsibility' clearly states that "in relation with their own government and with host governments ... no secret research, no secret reports or debriefings of any kind should be agreed to or given."

However, anthropologists, along with other social scientists, are once again being used in warfare as part of the US Army's strategy in Afghanistan. The Christian Science Monitor reports that "Counterinsurgency efforts focus on better grasping and meeting local needs" in Afghanistan, under the rubric of *Human Terrain Team* (HTT).

Major discussions about anthropology

Focus on other cultures

Some authors argue that anthropology originated and developed as the study of "other cultures", both in terms of time (past societies) and space (non-European / non-Western societies). For example, the classic of urban anthropology, Ulf Hannerz in the introduction to his seminal *Exploring the City: Inquiries Toward an Urban Anthropology* mentions that the "Third World" had habitually received most of attention; anthropologists who traditionally specialized in "other cultures" looked for them far away and started to look "across the tracks" only in late 1960s.[65]

Now there exist many works focusing on peoples and topics very close to the author's "home".[57] It is also argued that other fields of study, like History and Sociology, on the contrary focus disproportionately on the West.[66]

In France, the study of existing contemporary society has been traditionally left to sociologists, but this is increasingly changing,[67] starting in the 1970s from scholars like Isac Chiva and journals like *Terrain* ("fieldwork"), and developing with the center founded by Marc Augé (*Le Centre d'anthropologie des mondes contemporains*, the Anthropological Research Center of Contemporary Societies). The same approach of focusing on "modern world" topics by *Terrain*, was also present in the British Manchester School of the 1950s.[*citation needed*]

Social anthropology is the branch of anthropology that studies how currently living human beings behave in social groups. Practitioners of social anthropology investigate, often through long-term, intensive field studies (including participant observation methods), the social organization of a particular people: customs, economic and political organization, law and conflict resolution, patterns of consumption and exchange, kinship and family structure, gender relations, childrearing and socialization, religion, and so on.

Social anthropology also explores the role of meanings, ambiguities and contradictions of social life, patterns of sociality, violence and conflict, and the underlying logics of social behaviour. Social anthropologists are trained in the interpretation of narrative, ritual and symbolic behaviour not merely as *text*, but with communication examined in relation to

action, practice, and the historical context in which it is embedded. Social anthropologists address the diversity of positions and perspectives to be found within any social group.

Substantive focus and practice

Social anthropology is distinguished from subjects such as economics or political science by its holistic range and the attention it gives to the diversity of culture and society across the world, and the capacity this gives the discipline to re-examine Euro-American assumptions. It is differentiated from sociology both in its main methods (based on long-term participant observation and linguistic competence),[*citation needed*] its commitment to the relevance and illumination provided by micro studies, and its extension beyond strictly social phenomena to culture, art, individuality, and cognition.[*citation needed*] While some social anthropologists use quantitative methods (particularly those whose research touches on topics such as local economies, demography, or health and illness), social anthropologists generally emphasize qualitative analysis of long-term fieldwork, rather than the more quantitative methods used by most economists or sociologists.[*citation needed*]

Specialisations

Specialisations within social anthropology shift as its objects of study are transformed and as new intellectual paradigms appear; ethnomusicology and medical anthropology afford examples of current, well-defined specialisms.

More recent and currently emergent areas within social anthropology include the relation between cultural diversity and new findings in cognitive development; social and ethical understandings of novel technologies; emergent forms of 'the family' and other new socialities modeled on kinship; the ongoing social fall-out of the demise of state socialism; the politics of resurgent religiosity; analysis of audit cultures and accountability.

The subject has been enlivened by, and has contributed to, approaches from other disciplines, such as philosophy (ethics, phenomenology, logic), the history of science, psychoanalysis, and linguistics.

Ethical considerations

The subject has both ethical and reflexive dimensions. Practitioners have developed an awareness of the sense in which scholars create their objects of study and the ways in which anthropologists themselves may contribute to processes of change in the societies they study.

History

Social anthropology has historical roots in a number of 19th-century disciplines, including ethnology, folklore studies, and Classics, among others. (See History of anthropology.) Its immediate precursor took shape in the work of Edward Burnett Tylor and James George Frazer in the late 19th century and underwent major changes in both method and theory during the period 1890-1920 with a new emphasis on original fieldwork, long-term holistic

study of social behavior in natural settings, and the introduction of French and German social theory.

Departments of Social Anthropology exist in universities around the world. The field of social anthropology has expanded in ways not anticipated by the founders of the field, as for example in the subfield of structure and dynamics.

1920s-1940

Modern social anthropology was founded in Britain at The London School of Economics and Political Science following World War I. Influences include both the methodological revolution pioneered by Bronisław Malinowski's process-oriented fieldwork in the Trobriand Islands of Melanesia between 1915 and 1918 and Alfred Radcliffe-Brown's theoretical program for systematic comparison that was based on a conception of rigorous fieldwork and the structure-functionalist conception of Durkheim's sociology.[1] Other intellectual founders include W. H. R. Rivers and A. C. Haddon, whose orientation reflected the contemporary Volkerpsychologie of Wilhelm Wundt and Adolf Bastian, and Sir E. B. Tylor, who defined anthropology as a positivistic science following Auguste Comte. Edmund Leach (1962) defined social anthropology as a kind of comparative micro-sociology based on intensive fieldwork studies. There was never a settled theoretical orthodoxy on the nature of science and society but always a tension between several views that were seriously opposed.

1940s-1980s

Following World War II, sociocultural anthropology as comprised by the fields of ethnography and ethnology diverged into an American school of cultural anthropology while social anthropology diversified in Europe by challenging the principles of structure-functionalism, absorbing ideas from Claude Levi-Strauss's structuralism and from Max Gluckman's Manchester school, and embracing the study of conflict, change, urban anthropology, and networks.[*citation needed*]

1980s to present

A European Association of Social Anthropologists (EASA) was founded in 1989 as a society of scholarship at a meeting of founder members from fourteen European countries, supported by the Wenner-Gren Foundation for Anthropological Research. The Association seeks to advance anthropology in Europe by organizing biennial conferences and by editing its academic journal, *Social Anthropology/Anthropologie Sociale*.

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Cultural anthropology

Cultural anthropology is one of four or five fields of anthropology (the holistic study of humanity). It is the branch of anthropology that examines culture as a meaningful scientific concept.

Cultural anthropologists study cultural variation among humans, collect observations, usually through participant observation called fieldwork and examine the impact of global economic and political processes on local cultural realities. One of the earliest articulations of the anthropological meaning of the term "culture" came from Sir Edward Tylor who writes on the first page of his 1897 book: “Culture, or civilization, taken in its broad, ethnographic sense, is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society.” The term "civilization" later gave way to definitions by V. Gordon Childe, with culture forming an umbrella term and civilization becoming a particular kind of culture.[2]

The anthropological concept of "culture" reflects in part a reaction against earlier Western discourses based on an opposition between "culture" and "nature", according to which some human beings lived in a "state of nature". Anthropologists have argued that culture *is* "human nature," and that all people have a capacity to classify experiences, encode classifications symbolically (i.e. in language), and teach such abstractions to others.

Since humans acquire culture through the learning processes of enculturation and socialization, people living in different places or different circumstances develop different cultures. Anthropologists have also pointed out that through culture people can adapt to their environment in non-genetic ways, so people living in different environments will often have different cultures. Much of anthropological theory has originated in an appreciation of and interest in the tension between the local (particular cultures) and the global (a universal human nature, or the web of connections between people in distinct places / circumstances).

The rise of cultural anthropology occurred within the context of the late 19th century, when questions regarding which cultures were "primitive" and which were "civilized" occupied the minds of not only Marx and Freud, but many others. Colonialism and its processes increasingly brought European thinkers in contact, directly or indirectly with "primitive others."[3] The relative status of various humans, some of whom had modern advanced cultures that included engines and telegraphs, while others lacked anything but face-to-face communication techniques and still lived a Paleolithic lifestyle, was of interest to the first generation of cultural anthropologists.

Parallel with the rise of cultural anthropology in the United States, social anthropology, in which *sociality* is the central concept and which focuses on the study of social statuses and roles, groups, institutions, and the relations among them, developed as an academic discipline in Britain. An umbrella term socio-cultural anthropology makes reference to both cultural and social anthropology traditions.[4]

A brief history

Modern cultural anthropology has its origins in, and developed in reaction to, 19th century "ethnology", which involves the organized comparison of human societies. Scholars like E.B. Tylor and J.G. Frazer in England worked mostly with materials collected by others – usually missionaries, traders, explorers, or colonial officials – this earned them their current sobriquet of "arm-chair anthropologists".

Ethnologists had a special interest in why people living in different parts of the world often had similar beliefs and practices. In addressing this question, ethnologists in the 19th century divided into two schools of thought. Some, like Grafton Elliot Smith, argued that different groups must somehow have learned from one another, however indirectly; in other words, they argued that cultural traits spread from one place to another, or "diffused".

Other ethnologists argued that different groups had the capability of inventing similar beliefs and practices independently. Some of those who advocated "independent invention", like Lewis Henry Morgan, additionally supposed that similarities meant that different groups had passed through the same stages of cultural evolution (See also classical social evolutionism). Morgan, in particular, acknowledged that certain forms of society and culture could not possibly have arisen before others. For example, industrial farming could have been invented before simple farming, and metallurgy could have developed without previous non-smelting processes involving metals (such as simple ground collection or mining). Morgan, like other 19th century social evolutionists, believed there was a more or less orderly progression from the primitive to the civilized.

20th century anthropologists largely reject the notion that all human societies must pass through the same stages in the same order, on the grounds that such a notion does not fit the empirical facts. Some 20th century ethnologists, like Julian Steward, have instead argued that such similarities reflected similar adaptations to similar environments (see cultural evolution).

Others, such as Claude Lévi-Strauss (who was influenced both by American cultural anthropology and by French Durkheimian sociology), have argued that apparent patterns of development reflect fundamental similarities in the structure of human thought (see structuralism). By the mid-20th century, the number of examples of people skipping stages, such as going from hunter-gatherers to post-industrial service occupations in one generation, were so numerous that 19th century evolutionism was effectively disproved.[5]

In the 20th century most cultural (and social) anthropologists turned to the crafting of ethnographies. An ethnography is a piece of writing about a people, at a particular place and time. Typically, the anthropologist actually lives among another society for a considerable period of time, simultaneously participating in and observing the social and cultural life of the group.

However, any number of other ethnographic techniques have resulted in ethnographic writing or details being preserved, as cultural anthropologists also curate materials, spend long hours in libraries, churches and schools poring over records, investigate graveyards, and decipher ancient scripts. A typical ethnography will also include information about physical geography, climate and habitat. It is meant to be a holistic piece of writing about the people in question, and today often includes the longest possible timeline of past events that the ethnographer can obtain through primary and secondary research.

Bronisław Malinowski (who conducted fieldwork in the Trobriand Islands and taught in England) developed this method, and Franz Boas (who conducted fieldwork in Baffin Island and taught in the United States) promoted it. Boas's students drew on his conception of culture and cultural relativism to develop cultural anthropology in the United States. Simultaneously, Malinowski and A.R. Radcliffe Brown´s students were developing social anthropology in the United Kingdom. Whereas cultural anthropology focused on symbols and values, social anthropology focused on social groups and institutions. Today socio-cultural anthropologists attend to all these elements.

Although 19th century ethnologists saw "diffusion" and "independent invention" as mutually exclusive and competing theories, most ethnographers quickly reached a consensus that both processes occur, and that both can plausibly account for cross-cultural similarities. But these ethnographers pointed out the superficiality of many such similarities, and that even traits that spread through diffusion often changed their meaning and functions as they moved from one society to another.

Accordingly, these anthropologists showed less interest in comparing cultures, generalizing about human nature, or discovering universal laws of cultural development, than in understanding particular cultures in those cultures' own terms. Such ethnographers and their students promoted the idea of "cultural relativism", the view that one can only understand another person's beliefs and behaviors in the context of the culture in which he or she lived.

In the early 20th century socio-cultural anthropology developed in different forms in Europe and in the United States. European "social anthropologists" focused on observed social behaviors and on "social structure", that is, on relationships among social roles (e.g. husband and wife, or parent and child) and social institutions (e.g. religion, economy, and politics).

American "cultural anthropologists" focused on the ways people expressed their view of themselves and their world, especially in symbolic forms (such as art and myths). These two approaches frequently converged (kinship, for example, and leadership function both as symbolic systems and as social institutions), and generally complemented one another. Today almost all socio-cultural anthropologists refer to the work of both sets of predecessors, and have an equal interest in what people do and in what people say.

Today ethnography continues to dominate socio-cultural anthropology. Nevertheless, many contemporary socio-cultural anthropologists have rejected earlier models of

ethnography which they claim treated local cultures as bounded and isolated. These anthropologists continue to concern themselves with the distinct ways people in different locales experience and understand their lives, but they often argue that one cannot understand these particular ways of life solely from a local perspective; they instead combine a focus on the local with an effort to grasp larger political, economic, and cultural frameworks that impact local lived realities. Notable proponents of this approach include Arjun Appadurai, James Clifford, George Marcus, Sidney Mintz, Michael Taussig and Eric Wolf.

A growing trend in anthropological research and analysis seems to be the use of multi-sited ethnography, discussed in George Marcus's article "Ethnography In/Of the World System: the Emergence of Multi-Sited Ethnography"]. Looking at culture as embedded in macro-constructions of a global social order, multi-sited ethnography uses traditional methodology in various locations both spatially and temporally. Through this methodology greater insight can be gained when examining the impact of world-systems on local and global communities.

Also emerging in multi-sited ethnography are greater interdisciplinary approaches to fieldwork, bringing in methods from cultural studies, media studies, science and technology studies, and others. In multi-sited ethnography research tracks a subject across spatial and temporal boundaries. For example, a multi-sited ethnography may follow a "thing," such as a particular commodity, as it transfers through the networks of global capitalism.

Multi-sited ethnography may also follow ethnic groups in diaspora, stories or rumours that appear in multiple locations and in multiple time periods, metaphors that appear in multiple ethnographic locations, or the biographies of individual people or groups as they move through space and time. It may also follow conflicts that transcend boundaries. Multi-sited ethnographies, such as Nancy Scheper-Hughes's ethnography of the international black market for the trade of human organs. In this research she follows organs as they transfer through various legal and illegal networks of capitalism, as well as the rumours and urban legends that circulate in impoverished communities about child kidnapping and organ theft.

Sociocultural anthropologists have increasingly turned their investigative eye on to "Western" culture. For example, Philippe Bourgois won the Margaret Mead Award in 1997 for *In Search of Respect*, a study of the entrepreneurs in a Harlem crack-den. Also growing more popular are ethnographies of professional communities, such as laboratory researchers, Wall Street investors, law firms, or IT computer employees.[6]

Ethnography

Ethnography gio (Greek ἔθνος *ethnos* = folk/people and γράφειν *graphein* = writing) is a methodological strategy used to provide descriptions of human societies, which as a methodology does not prescribe any particular method (e.g. observation, interview, questionnaire), but instead prescribes the nature of the study (i.e. to describe people

through writing) [1]. In the biological sciences, this type of study might be called a "field study" or a "case report," both of which are used as common synonyms for "ethnography" [2].

Introduction

Ethnographic studies are usually holistic, founded on the idea that humans are best understood in the fullest possible context, including: the place where they live, the improvements they've made to that place, how they make a living and providing food, housing, energy and water for themselves, what their marriage customs are, what language(s) they speak and so on. Ethnography has connections to genres as diverse travel writing, colonial office reports, the play and the novel.[3] Many cultural anthropologists consider ethnography the essence of the discipline.[4] It would be a rare program in graduate cultural anthropology that didn't require an ethnography as part of the doctoral process.[5]

Evaluating Ethnography

Ethnographic methodology is not usually evaluated in terms of philosophical standpoint (such as positivism and emotionalism), ethnographies nonetheless need to be evaluated in some manner. While there is no consensus on evaluation standards, Richardson (2000, p.254) provides 5 criteria that ethnographers might find helpful. They include:

1. *Substantive Contribution*: "Does the piece contribute to our understanding of social-life?"
2. *Aesthetic Merit*: "Does this piece succeed aesthetically?"
3. *Reflexivity*: "How did the author come to write this text…Is there adequate self-awareness and self-exposure for the reader to make judgments about the point of view?"
4. *Impact*: "Does this affect me? Emotionally? Intellectually?" Does it move me?
5. *Expresses a Reality*: "Does it seem 'true'—a credible account of a cultural, social, individual, or communal sense of the 'real'?"

Data Collection methods

One of the most common methods for collecting data in an ethnographic study is direct, first-hand observation of daily behavior. This can include participant observation. Another common method is interviewing, which may include conversation with different levels of form and can involve small talk to long interviews. A particular approach to transcribing interview data might be genealogical method. This is a set of procedures by which ethnographers discover and record connections of kinship, descent and marriage using diagrams and symbols. Questionnaires can be used to aid the discovery of local beliefs and perceptions and in the case of longitudinal research, where there is continuous long-term study of an area or site, they can act as valid instrument for measuring changes in the individuals or groups studied.

Differences across disciplines

The ethnographical method is used across a range of different disciples, primarily by anthropologists but also frequently by sociologists. Cultural studies, economics, social work, education, ethnomusicology, folklore, geography, linguistics, performance studies and psychology are other fields which have made use of ethnography.

Cultural and social anthropology

Cultural anthropology and social anthropology were developed around ethnographic research and their canonical texts which are mostly ethnographies: e.g. *Argonauts of the Western Pacific* (1922) by Bronisław Malinowski, *Coming of Age in Samoa* (1928) by Margaret Mead, *The Nuer* (1940) by E. E. Evans-Pritchard, or *Naven* (1936, 1958) by Gregory Bateson. Cultural and social anthropologists today place such a high value on actually doing ethnographic research that ethnology—the comparative synthesis of ethnographic information—is rarely the foundation for a career.[*citation needed*] The typical ethnography is a document written about a particular people, almost always based at least in part on emic views of where the culture begins and ends. Using language or community boundaries to bound the ethnography is common.[7] Ethnographies are also sometimes called "case studies."[8] Ethnographers study and interpret culture, its universalities and its variations through ethnographic study based on fieldwork. An ethnography is a specific kind of written observational science which provides an account of a particular culture, society, or community. The fieldwork usually involves spending a year or more in another society, living with the local people and learning about their ways of life. Ethnographers are participant observers. They take part in events they study because it helps with understanding local behavior and thought. Classic examples is Carol Stack's *All Our Kin*, Jean Briggs's "Never in Anger," Richard Lee's "Kalahari Hunter-Gatherers," Victor Turner's "Forest of Symbols," David Maybry-Lewis's "Akew-Shavante Society," E.E. Evans-Pritchard's "The Nuer" and Claude Levi-Strauss's "Tristes Tropiques."

A typical ethnography attempts to be holistic[9][10] and typically follows an outline to include a brief history of the culture in question, an analysis of the physical geography or terrain inhabited by the people under study, including climate, and often including what biological anthropologists call habitat. Folk notions of botany and zoology are presented as ethnobotany and ethnozoology alongside references from the formal sciences. Material culture, technology and means of subsistence are usually treated next, as they are typically bound up in physical geography and include descriptions of infrastructure. Kinship and social structure (including age grading, peer groups, gender, voluntary associations, clans, moieties, and so forth, if they exist) are typically included. Languages spoken, dialects and the history of language change are another group of standard topics.[11] Practices of childrearing, acculturation and emic views on personality and values usually follow after sections on social structure.[12]. Rites, rituals, and other evidence of religion have long been an interest and are sometimes central to ethnographies, especially when conducted in public where visiting anthropologists can see them.[13]

As ethnography developed, anthropologists grew more interested in less tangible aspects of culture, such as values, worldview and what Clifford Geertz termed the "ethos" of the culture. Clifford Geertz's own fieldwork used elements of a phenomenological approach to fieldwork, tracing not just the doings of people, but the cultural elements themselves. For example, if within a group of people, winking was a communicative gesture, he sought to first determine what kinds of things a wink might mean (it might mean several things). Then, he sought to determine in what contexts winks were used, and whether, as one moved about a region, winks remained meaningful in the same way. In this way, cultural boundaries of communication could be explored, as opposed to using linguistic boundaries or notions about residence. Geertz, while still following something of a traditional ethnographic outline, moved outside that outline to talk about "webs" instead of "outlines" [14]of culture.

Within cultural anthropology, there are several sub-genres of ethnography. Beginning in the 1950s and early 1960s, anthropologists began writing "bio-confessional" ethnographies that intentionally exposed the nature of ethnographic research. Famous examples include *Tristes Tropiques* (1955) by Claude Lévi-Strauss, *The High Valley* by Kenneth Read, and *The Savage and the Innocent* by David Maybury-Lewis, as well as the mildly fictionalized *Return to Laughter* by Elenore Smith Bowen (Laura Bohannan). Later "reflexive" ethnographies refined the technique to translate cultural differences by representing their effects on the ethnographer. Famous examples include "Deep Play: Notes on a Balinese Cockfight" by Clifford Geertz, *Reflections on Fieldwork in Morocco* by Paul Rabinow, *The Headman and I* by Jean-Paul Dumont, and *Tuhami* by Vincent Crapanzano. In the 1980s, the rhetoric of ethnography was subjected to intense scrutiny within the discipline, under the general influence of literary theory and post-colonial / post-structuralist thought. "Experimental" ethnographies that reveal the ferment of the discipline include *Shamanism, Colonialism, and the Wild Man* by Michael Taussig, *Debating Muslims* by Michael F. J. Fischer and Mehdi Abedi, *A Space on the Side of the Road* by Kathleen Stewart, and *Advocacy after Bhopal* by Kim Fortun.

Sociology

Sociology is another field which prominently features ethnographies. Urban sociology and the Chicago School in particular are associated with ethnographic research, with some well-known early examples being *Street Corner Society* by William Foote Whyte and *Black Metropolis* by St. Clair Drake and Horace R. Caton. Some of the influence for this can be traced to the anthropologist Lloyd Warner who was on the Chicago sociology faculty, and to Robert Park's experience as a journalist. Symbolic interactionism developed from the same tradition and yielded several excellent sociological ethnographies, including *Shared Fantasy* by Gary Alan Fine, which documents the early history of fantasy role-playing games. Other important ethnographies in the discipline of sociology include Pierre Bourdieu's work on Algeria and France, Paul Willis's *Learning To Labour* on working class youth, and the work of Mitchell Duneier and Loic Wacquant on black America. But even though many sub-fields and theoretical perspectives within sociology use ethnographic methods, ethnography is not the *sine qua non* of the discipline, as it is in cultural anthropology.

Other fields

The American anthropologist George Spindler (Stanford University) was a pioneer in applying ethnographic methodology to the classroom.

Anthropologists like Daniel Miller and Mary Douglas have used ethnographic data to answer academic questions about consumers and consumption. In this sense, Tony Salvador, Genevieve Bell, and Ken Anderson describe design ethnography as being "a way of understanding the particulars of daily life in such a way as to increase the success probability of a new product or service or, more appropriately, to reduce the probability of failure specifically due to a lack of understanding of the basic behaviors and frameworks of consumers.

Businesses, too, have found ethnographers helpful for understanding how people use products and services, as indicated in the increasing use of ethnographic methods to understand consumers and consumption, or for new product development (such as video ethnography). The recent Ethnographic Praxis in Industry (EPIC) conference is evidence of this.[*citation needed*] Ethnographers' systematic and holistic approach to real-life experience is valued by product developers, who use the method to understand unstated desires or cultural practices that surround products. Where focus groups fail to inform marketers about what people really do, ethnography links what people say to what they actually do—avoiding the pitfalls that come from relying only on self-reported, focus-group data.

Ethics

Gary Alan Fine argues that the nature of ethnographic inquiry demands that researchers deviate from formal and idealistic rules or ethics that have come to be widely accepted in qualitative and quantitative approaches to research. Many of these ethical assumptions are rooted in positivist and post-positivist epistemologies that have adapted over time, but nonetheless are apparent and must be accounted for in all research paradigms. These ethical dilemmas are evident throughout the entire process of conducting ethnographies, including the design, implementation, and reporting of an ethnographic study. Essentially, Fine maintains that researchers are typically not as ethical as they claim or assume to be — and that “each job includes ways of doing things that would be inappropriate for others to know”

Fine is not necessarily casting blame or pointing his finger at ethnographic researchers, but rather is attempting to show that researchers often make idealized ethical claims and standards which in actuality are inherently based on partial truths and self-deceptions. Fine also acknowledges that many of these partial truths and self-deceptions are unavoidable. He maintains that “illusions” are essential to maintain an occupational reputation and avoid potentially more caustic consequences. He claims, “Ethnographers cannot help but lie, but in lying, we reveal truths that escape those who are not so bold”.Based on these assertions, Fine establishes three conceptual clusters in which ethnographic ethical dilemmas can be situated: “Classic Virtues,” “Technical Skills,” and “Ethnographic Self.”

Much debate surrounding the issue of ethics arose after the ethnographer Napoleon Chagnon conducted his ethnographic fieldwork with the Yanomamo people of South America.

Classic Virtues

- "The kindly ethnographer" – Most ethnographers present themselves as being more sympathetic than they actually are, which aids in the research process, but is also deceptive. The identity that we present to subjects is different from who we are in other circumstances.
- "The friendly ethnographer" – Ethnographers operate under the assumption that they should not dislike anyone. In actuality, when hated individuals are found within research, ethnographers often crop them out of the findings.
- "The honest ethnographer" – If research participants know the research goals, their responses will likely be skewed. Therefore, ethnographers often conceal what they know in order to increase the likelihood of acceptance.[18]

Technical Skills

- "The Precise Ethnographer" – Ethnographers often create the illusion that field notes are data and reflect what "really" happened. They engage in the opposite of plagiarism, giving credit to those undeserving by not using precise words but rather loose interpretations and paraphrasing. Researchers take near-fictions and turn them into claims of fact. The closest ethnographers can ever really get to reality is an approximate truth.
- "The Observant Ethnographer" – Readers of ethnography are often led to assume the report of a scene is complete – that little of importance was missed. In reality, an ethnographer will always miss some aspect because they are not omniscient. Everything is open to multiple interpretations and misunderstandings. The ability of the ethnographer to take notes and observe varies, and therefore, what is depicted in ethnography is not the whole picture.
- "The Unobtrusive Ethnographer" – As a "participant" in the scene, the researcher will always have an effect on the communication that occurs within the research site. The degree to which one is an "active member" affects the extent to which sympathetic understanding is possible.[19]

The Ethnographic Self

- "The Candid Ethnographer" – Where the researcher situates themselves within the ethnography is ethically problematic. There is an illusion that everything reported has actually happened because the researcher has been directly exposed to it.
- "The Chaste Ethnographer" – When ethnographers participate within the field, they invariably develop relationships with research subjects/participants. These relationships are sometimes not accounted for within the reporting of the ethnography despite the fact that they seemingly would influence the research findings.

- "The Fair Ethnographer" – Fine claims that objectivity is an illusion and that everything in ethnography is known from a perspective. Therefore, it is unethical for a researcher to report fairness in their findings.
- "The Literary Ethnographer" – Representation is a balancing act of determining what to "show" through poetic/prosaic language and style versus what to "tell" via straightforward, 'factual' reporting. The idiosyncratic skill of the ethnographer influences the face-value of the research.[20]

Seven principles should be considered for observing, recording and sampling data according to Denzin:

1. The groups should combine symbolic meanings with patterns of interaction.
2. Observe the world from the point of view of the subject, while maintaining the distinction between everyday and scientific perceptions of reality.
3. Link the group's symbols and their meanings with the social relationships.
4. Record all behaviour.
5. Methodology should highlight phases of process, change and stability.
6. The act should be a type of symbolic interactionism.
7. Use concepts that would avoid casual explanations.

Cultural relativism

Cultural relativism is the principle that an individual human's beliefs and activities should be understood in terms of his or her own culture. This principle was established as axiomatic in anthropological research by Franz Boas in the first few decades of the 20th century and later popularized by students. Boas first articulated the idea in 1887: "...civilization is not something absolute, but ... is relative, and ,,, our ideas and conceptions are true only so far as our civilization goes."[1] but did not actually coin the term "cultural relativism." The term became common among anthropologists after Boas' death in 1942, to express their synthesis of a number of ideas Boas had developed; the first use of the term was in the journal *American Anthropologist* in 1948.

Cultural relativism involves specific epistemological and methodological claims. Whether or not these claims necessitate a specific ethical stance is a matter of debate. This principle should not be confused with moral relativism.

Epistemological origins

The epistemological claims that led to the development of cultural relativism have their origins in the German Enlightenment. The philosopher Immanuel Kant argued that human beings are not capable of direct, unmediated knowledge of the world. All of our experiences of the world are mediated through the human mind, which universally structures perceptions according to sensibilities concerning time and space.

Although Kant considered these mediating structures universal, his student Johann Gottfried Herder argued that human creativity, evidenced by the great variety in national

cultures, revealed that human experience was mediated not only by universal structures, but by particular cultural structures as well. The philosopher and linguist, Wilhelm von Humboldt, called for an anthropology that would synthesize Kant and Herder's ideas.

Although Herder focused on the positive value of cultural variety, the sociologist William Graham Sumner called attention to the fact that one's culture can limit one's perceptions. He called this principle ethnocentrism, the viewpoint that "one's own group is the center of everything," against which all other groups are judged.

As a methodological and heuristic device

According to George Marcus and Michael Fischer,

> 20th century social and cultural anthropology has promised its still largely Western readership enlightenment on two fronts. The one has been the salvaging of distinct cultural forms of life from a process of apparent global Westernization. With both its romantic appeal and its scientific intentions, anthropology has stood for the refusal to accept this conventional perception of homogenization toward a dominant Western model.[2]

Cultural relativism was in part a response to Western ethnocentrism. Ethnocentrism may take obvious forms, in which one consciously believes that one's people's arts are the most beautiful, values the most virtuous, and beliefs the most truthful. Franz Boas, originally trained in physics and geography, and heavily influenced by the thought of Kant, Herder, and von Humboldt, argued that one's culture may mediate and thus limit one's perceptions in less obvious ways. He understood "culture" to include not only certain tastes in food, art, and music, or beliefs about religion. He assumed a much broader notion of culture, defined as

> the totality of the mental and physical reactions and activities that characterize the behavior of the individuals composing a social group collectively and individually in relation to their natural environment, to other groups, to members of the group itself, and of each individual to himself.[3]

This understanding of culture confronts anthropologists with two problems: first, how to escape the unconscious bonds of one's own culture, which inevitably bias our perceptions of and reactions to the world, and second, how to make sense of an unfamiliar culture. The principle of cultural relativism thus forced anthropologists to develop innovative methods and heuristic strategies.

As a methodological tool

Between World War I and World War II, "cultural relativism" was the central tool for American anthropologists in this refusal of Western claims to universality, and salvage of non-Western cultures. It functioned to transform Boas' epistemology into methodological lessons.

This is most obvious in the case of language. Although language is commonly thought of as a means of communication, Boas understood that it is also a means of categorizing experiences. The existence of different languages suggests that people categorize, and thus experience, language differently (this view was more fully developed in the Sapir-Whorf hypothesis). He especially called attention to language not as a means of communication but as a means of categorizing experiences.

Thus, although all people perceive visible radiation the same way, in terms of a continuum of color, people who speak different languages slice up this continuum into discrete colors in different ways. Some languages have no word that corresponds to the English word "green." When people who speak such languages are shown a green chip, some identify it using their word for blue, others identify it using their word for yellow. Thus, Boas' student Melville Herskovits summed up the principle of cultural relativism thus: "Judgements are based on experience, and experience is interpreted by each individual in terms of his own enculturation."

Boas pointed out that scientists grow up and work in a particular culture, and are thus necessarily ethnocentric. He provided an example of this in his article, "On Alternating Sounds"[4] Alternating sounds is a phenomenon described by a number of linguists at Boas' time, in which speakers of a language pronounce a given word in two distinct ways. The difference is not a matter of accent but of specific phonetic elements.

For example, when many native-Japanese speakers speak in English, many English speakers hear them alternate between pronouncing one word as "lice" and as "rice." Anthropologists in the 19th century observed that it was common in Native American languages that an individual would pronounce a word *in his or her own language* in such different ways. These anthropologists believed they had perceived a unique feature of Native American languages.

Boas, however, argued that in these cases Native Americans had been pronouncing the word in question the same way, consistently. He pointed out that the problem was that English lacks a certain sound (just as some languages lack a word for green). Consequently, when English speakers hear someone use that sound in another language, they systematically misperceive it as one of two similar sounds (just as some people classify a green chip as either blue or yellow).

Boas' students drew not only on his engagement with German philosophy. They also engaged the work of contemporary philosophers and scientists, such as Karl Pearson, Ernst Mach, Henri Poincaré, William James and John Dewey in an attempt to move, in the words of Boas' student Robert Lowie, from "a naively metaphysical to an epistemological stage" as a basis for revising the methods and theories of anthropology.

Boas and his students realized that if they were to conduct scientific research in other cultures, they would need to employ methods that would help them escape the limits of their own ethnocentrism. One such method is that of ethnography: basically, they

advocated living with people of another culture for an extended period of time, so that they could learn the local language and be enculturated, at least partially, into that culture.

In this context, cultural relativism is an attitude that is of fundamental methodological importance, because it calls attention to the importance of the local context in understanding the meaning of particular human beliefs and activities. Thus, in 1948 Virginia Heyer wrote, "Cultural relativity, to phrase it in starkest abstraction, states the relativity of the part to the whole. The part gains its cultural significance by its place in the whole, and cannot retain its integrity in a different situation."

As a heuristic tool

Another method was ethnology: to compare and contrast as wide a range of cultures as possible, in a systematic and even-handed manner. In the late nineteenth century, this study occurred primarily through the display of material artifacts in museums. Curators typically assumed that similar causes produce similar effects; therefore, in order to understand the causes of human action, they grouped similar artifacts together — regardless of provenance. Their aim was to classify artifacts, like biological organisms, according to families, genera, and species. Thus organized, museum displays would illustrate the evolution of civilization from its crudest to its most refined forms.

In an article in the journal *Science*, Boas argued that this approach to cultural evolution ignored one of Charles Darwin's main contributions to evolutionary theory:

> It is only since the development of the evolutional theory that it became clear that the object of study is the individual, not abstractions from the individual under observation. We have to study each ethnological specimen individually in its history and in its medium .... By regarding a single implement outside of its surroundings, outside of other inventions of the people to whom it belongs, and outside of other phenomena affecting that people and its productions, we cannot understand its meanings .... Our objection ... is, that classification is not explanation.[6]

Boas argued that although similar causes produce similar effects, different causes may also produce similar effects. Consequently, similar artifacts found in distinct and distant places may be the products of distinct causes. Against the popular method of drawing analogies in order to reach generalizations, Boas argued in favor of an inductive method. Based on his critique of contemporary museum displays, Boas concluded:

> It is my opinion that the main object of ethnological collections should be the dissemination of the fact that civilization is not something absolute, but that it is relative, and that our ideas and conceptions are true only so far as our civilization goes.

Boas' student Alfred Kroeber described the rise of the relativist perspective thus:

> Now while some of the interest in anthropology in its earlier stages was in the exotic and the out-of-the-way, yet even this antiquarian motivation ultimately contributed to a

> broader result. Anthropologists became aware of the diversity of culture. They began to see the tremendous range of its variations. From that, they commenced to envisage it as a totality, as no historian of one period or of a single people was likely to do, nor any analyst of his own type of civilization alone. They became aware of culture as a "universe," or vast field in which we of today and our own civilization occupy only one place of many. The result was a widening of a fundamental point of view, a departure from unconscious ethnocentricity toward relativity. This shift from naive self-centeredness in one's own time and spot to a broader view based on objective comparison is somewhat like the change from the original geocentric assumption of astronomy to the Copernican interpretation of the solar system and the subsequent still greater widening to a universe of galaxies.

This conception of culture, and principle of cultural relativism, were for Kroeber and his colleagues the fundamental contribution of anthropology, and what distinguished anthropology from similar disciplines such as sociology and psychology.

Ruth Benedict, another of Boas' students, also argued that an appreciation of the importance of culture and the problem of ethnocentrism demands that the scientist adopt cultural relativism as a method. Her book, *Patterns of Culture*, did much to popularize the term in the United States. In it, she explained that:

> The study of custom can be profitable only after certain preliminary propositions have been violently opposed. In the first place any scientific study requires that there be no preferential weighting of one or another items in the series it selects for its consideration. In all the less controversial fields like the study of cacti or termites or the nature of nebulae, the necessary method of study is to group the relevant material and to take note of all possible variant forms and conditions. In this way we have learned all that we know of the laws of astronomy, or of the habits of the social insects, let us say. It is only in the study of man himself that the major social sciences have substituted the study of one local variation, that of Western civilization.[8]

Benedict was adamant that she was not romanticizing so-called primitive societies; she was emphasizing that any understanding of the totality of humanity must be based on as wide and varied a sample of individual cultures as possible. Moreover, it is only by appreciating a culture that is profoundly different from our own, that we can realize the extent to which our own beliefs and activities are culture-bound, rather than natural or universal. In this context, cultural relativism is a heuristic device of fundamental importance because it calls attention to the importance of variation in any sample that is used to derive generalizations about humanity.

Further reading

1. ^ Barth, Fredrik, et al. (2005) *One Discipline, Four Ways: British, German, French, and American anthropology*. Chicago: University of Chicago Press.
2. ^ http://www.dspace.cam.ac.uk/handle/1810/131558 interview by Alan Macfarlane, in which Mary Douglas talks about her life and work in Africa and elsewhere.

3. ^ http://www.dspace.cam.ac.uk/handle/1810/447 Rosemary Firth interview by Alan Macfarlane: about her arrival in anthropology and fieldwork in Malaya with Raymond Firth, and about the position of a woman anthropologist.
4. ^ http://www.dspace.cam.ac.uk/handle/1810/131552 Eight lectures for first year Cambridge University students in February 2006. Introducing some of the major approaches to the anthropology of politics and economics.

5. ^ http://www.dspace.cam.ac.uk/handle/1810/131557 James Woodburn Interview and film of James Woodburn by Alan Macfarlane: about his life and work in anthropology and visual anthropology in Africa and Britain

Course Name : Fundamentals of Social Work & Social Administration
Course Code : APDPS 106
Course level : level 1
Course Credit : 4 CU
Contact Hours : 60 Hrs

Course Description

The Course focuses on defining the clear history of social work, its embedded interventions to populations suffering from social problems like poverty, poor health and illiteracy. It also involves expounding on the knowledge of community development and practice, the history of community development, it undergoes through a phase of critical policy analysis, modes of policy analysis, recommended steps in developing a policy relevant for both social and economic development. The course further looks upon the social actions the collects individual members to engage into movements of fostering development through approved approaches like massive participation and empowerment. It captures a concrete bit and deep analysis of social development and its theories embedded in it to bring about social change in the country. The course also deals with provision of welfare in form of goods and services by different service providers like public sector, private sector, as well the voluntary sector. It details how public services should be planned, organized and distributed to the needy populations. Social Administration in other part looks up the proper management of service delivery with in different areas in an economy for the benefit of all citizens. Instances of social security, disability insurance and welfare in broader terms are also key focus of administration.

Course Objectives

· To introduce students to the basic principles of social work, a profession that is client based to bring social change in the communities.
· To educate students on the basic knowledge of designing interventions practically to solve existing social problems among communities.
· To introduce to students to different theoretical and practical skills in identifying community needs and problems.
· To equip students with skills of improving the community's social functioning through integration of indigenous knowledge and modern knowledge.
· To broaden the student's understanding of welfare plus different players involved in distribution of welfare services.
· To provide them with knowledge of identifying the existence of accountability and transparency in the provision of social welfare services to the intended beneficiaries.
· To strengthen the students' capacity to suggest better approaches for improving a well and sustainable conduit through which services can

reach the needy/vulnerable groups of people.

Course content

Introduction

· Definition of Social Work
· History of Social Work
· Role of a Professional Social Worker
· Types of Professional Intervention

Community Development

· Meaning of Community Development
· Community Development Practice
· Different approaches to Community Development
· The History of Community Development

Community Building & Organizing

· Meaning of Community building
· Meaning of Community Organizing
· Critical Social Work
· History of Critical Social Work
· Focus of critical Social Work
· Sub-theories of critical social work

Policy Analysis

· Definition of Policy Analysis
· Approaches to Policy Analysis
· Models of policy analysis
· Easy steps of policy analysis

Social Actions

· Definition of Social Actions
· Types of Social Action
· Micrological theories of economy

Social Development

· Definition of Social Development
· Evolution of Social Development
· Theories of Social Development
· Meaning of Social Change
· Models of Change

The Provision of Welfare

· Public Sector
· Private Sector
· Voluntary Sector
· Mutual Aid
· Informal Sector

The Public Services

· The Structure of Social Services
· Social Service Management
· Planning
· Finance

· Evaluating Policy

Service Delivery

· Targeting
· Rationing
· Discretion
· Empowering users

Social Security

· Definition of Social Security
· Social Insurance
· Income Maintenance
· Social Protection

Disability Insurance

· Definition of Disability Insurance
· Types of disability insurance
· Individual disability insurance policies

Welfare

· Definition of Welfare
· History of provision of welfare
· Provision and funding
· Welfare systems; United States

Other related topics; Meaning of Social, Social theorists, Socialism and Social Democracy, Regional Uses

Mode of delivery Face to face lectures

Assessment

Course work 40%

Exams 60%

Total Mark 100%

Fundamentals of Social work and social administration

Social work is both a profession and social science. It involves the application of social theory and research methods to study and improve the lives of people, groups, and societies. It incorporates and utilizes other social sciences as a means to improve the human condition and positively change society's response to chronic problems.

Social work is a profession committed to the pursuit of social justice, to the enhancement of the quality of life, and to the development of the full potential of each individual, group and community in the society. It seeks to simultaneously address and resolve social issues at every level of society and economic status, but especially among the poor and sick.

Social workers are concerned with social problems, their causes, their solutions and their human impacts. They work with individuals, families, groups, organizations and communities.

Social work and human history go together. Social work was always in human societies although it began to be a defined pursuit and profession in the 19th century. This definition was in response to societal problems that resulted from the Industrial Revolution and an increased interest in applying scientific theory to various aspects of study. Eventually an increasing number of educational institutions began to offer social work programmes.

The settlement movement's emphasis on advocacy and case work became part of social work practice. During the 20th century, the profession began to rely more on research and evidenced-based practice as it attempted to improve its professionalism. Today social workers are employed in a myriad of pursuits and settings.

Professional social workers are generally considered those who hold a professional degree in social work and often also have a license or are professionally registered. Social workers have organized themselves into local, national, and international professional bodies to further the aims of the profession.

History

Jane Addams is considered one of the early influences on professional social work in the United States.

Social work has its roots in the struggle of society to ameliorate poverty and the resultant problems. Therefore, social work is intricately linked with the idea of charity work; but must be understood in broader terms. The concept of charity goes back to ancient times, and the practice of providing for the poor can be found in all major world religions.[1]

The practice and profession of modern social work has a relatively long scientific origin, originating in the 19th Century.[2] The movement began primarily in Europe and North America.

Contemporary professional development

Social Work education begins in a systematised manner in universities, but is also an ongoing process that occurs though research and in the workplace.

The International Federation of Social Workers states, of social work today,

"social work bases its methodology on a systematic body of evidence-based knowledge derived from research and practice evaluation, including local and indigenous knowledge specific to its context. It recognizes the complexity of interactions between human beings and their environment, and the capacity of people both to be affected by and to alter the multiple influences upon them including bio-psychosocial factors. The social work profession draws on theories of human development and behaviour and social systems to analyse complex situations and to facilitate individual, organizational, social and cultural changes."[3]

The current state of social work professional development is characterized by two realities. There is a great deal of traditional social and psychological research (both qualitative and quantitative) being carried out primarily by university-based researchers and by researchers based in institutes, foundations, or social service agencies.

Meanwhile, many social work practitioners continue to look to their own experience for knowledge. This is a continuation of the debate that has persisted since the outset of the profession in the first decade of the twentieth century.

One reason for the gap between information obtained through practice, as opposed to through research, is that practitioners deal with situations that are unique and idiosyncratic, while research concentrates on similarities. The combining of these two types of knowledge is often imperfect.

A hopeful development for bridging this gap is the compilation, in many practice fields, of collections of "best practices" which attempt to distill research findings and the experience of respected practitioners into effective practice techniques. Although social work has roots in the informatics revolution, an important contemporary development in the profession is overcoming suspicion of technology and taking advantage of the potential of information technology to empower clients.

Role of the professional

Professional social workers have a strong tradition of working for social justice and of refusing to recreate unequal social structures.[*citation needed*] The main tasks of professional social workers can include a variety of services such as case management (linking clients with agencies and programs that will meet their psychosocial needs), medical social work, counseling (psychotherapy), human services management, social welfare policy analysis, policy and practice development, community organizing, advocacy, teaching (in schools of social work), and social science research.

Professional social workers work in a variety of mainly public settings, including: grassroots advocacy organizations, hospitals, hospices, community health agencies, schools, international organizations, employee assistance, philanthropy, and even the military. Some social workers work as psychotherapists, counselors, psychiatric social workers, community organizers or mental health practitioners.

The emphasis has varied among these task areas by historical era and country. Some of these areas have been the subject of controversy as to whether they are properly part of social work's mission.

Types of professional intervention

There are three general categories or levels of intervention. The first is "**Macro**" social work which involves society or communities as a whole. This type of social work practice would include policy forming and advocacy on a national or international scale.

The second level of intervention is described as "**Mezzo**" social work practice. This level would involve work with agencies, small organizations, and other small groups. This practice would include policy making within a social work agency or developing programs for a particular neighborhood.

The final level is the "**Micro**" level that involves service to individuals and families.

There are a wide variety of activities that can be considered social work and professional social workers are employed in many different types of environments. The following list details some of the main fields of social work.

Community development

Community development, often abbreviated as CD, and informally called **community building**, is a broad term applied to the practices and academic disciplines of civic leaders, activists, involved citizens and professionals to improve various aspects of local communities.

Community development seeks to empower individuals and groups of people by providing these groups with the skills they need to effect change in their own communities. These skills are often concentrated around building political power through the formation of large social groups working for a common agenda. Community developers must understand both how to work with individuals and how to affect communities' positions within the context of larger social institutions.

There are complementary definitions of community development. The Community Development Challenge report, which was produced by a working party comprising leading UK organisations in the field (including Community Development Foundation, Community Development Exchange and the Federation of Community Development Learning) defines community development as:

> "A set of values and practices which plays a special role in overcoming poverty and disadvantage, knitting society together at the grass roots and deepening democracy. There is a CD profession, defined by national occupational standards and a body of theory and experience going back the best part of a century. There are active citizens who use CD techniques on a voluntary basis, and there are also other professions and agencies which use a CD approach or some aspects of it."

Community Development Exchange defines community development as:

"The process of developing active and sustainable communities based on social justice and mutual respect. It is about influencing power structures to remove the barriers that prevent people from participating in the issues that affect their lives.

Community workers (officers) facilitate the participation of people in this process. They enable connections to be made between communities and with the development of wider policies and programmes.

Community Development expresses values of fairness, equality, accountability, opportunity, choice, participation, mutuality, reciprocity and continuous learning. Educating, enabling and empowering are at the core of Community Development."

Community development practice

Community development *practitioners* are involved in organizing meetings and conducting searches within a community to identify problems, identify assets, locate resources, analyze local power structures, assess human needs, and investigate other concerns that comprise the community's character (case study). These practitioners, sometimes called social activists, use social resources to get the economic and political leverage that a community uses to meet their needs. Often, the social resources within the community are found to be adequate to meet these needs if individuals work collectively through techniques like cooperation and volunteerism. A form of community development that links academic resources to community problems in a reciprocally beneficial manner is community-based participatory research (CBPR), a form of research which engages a community fully in the process of problem definition/issue selection, research design, conducting research, and interpreting the results. One of the principal ways in which CBPR differs from traditional research is that instead of creating knowledge for the advancement of a field or for knowledge's sake, CBPR is an iterative process, incorporating research, reflection, and action in a cyclical process. In the UK Rural Community Councils support local communities to build sustainable futures. They assist local communities in a form of CBPR called community led planning. Rural Community Councils employ experienced, independent community development workers.

A number of different approaches to community development can be recognized, including:

- Community economic development (CED)
- Community capacity building
- Social capital formation
- Political participatory development
- Nonviolent direct action
- Ecologically sustainable development
- Asset-based community development
- Faith-based community development
- Community practice social work
- Community-based participatory research (CBPR)

- Community mobilization
- community empowerment
- Community participation
- Participatory planning including community-based planning (CBP)
- community-driven development (CDD)
- approaches to funding communities directly

The history of community development

Community Development has been a sometimes explicit, sometimes implicit goal of community people, aiming to achieve, through collective effort, a better life, and has occurred throughout history. In the 18th Century the work of the early socialist thinker Robert Owen (1771-1851), sought through Community Planning, to create the perfect community. At New Lanark and at later utopian communities such as Oneida in the USA and the New Australia Movement in Australia, groups of people came together to create intentional utopian communities, with mixed success. Such community planning techniques became important in the 1920s and 1930s in East Africa, where Community Development proposals were seen as a way of helping local people improve their own lives with indirect assistance from colonial authorities.

Mohondas K. Gandhi adopted African community development ideals as a basis of his South African Ashram, and then introduced it as a part of the Indian Swaraj movement, aiming at establishing economic interdependence at village level throughout India. With Indian independence, despite the continuing work of Vinoba Bhave in encouraging grassroots land reform, India under its first Prime Minister Jawaharlal Nehru adopted a centralist heavy industry approach, antithetical to self-help community development ideas.

In the United States, the term "community development" in the 1960s began to complement and generally replace the idea of urban renewal, which typically focused on physical development projects often at the expense of working-class communities. In the late 1960s, philanthropies such as the Ford Foundation and government officials such as Senator Robert Kennedy took an interest in local nonprofit organizations--a pioneer was the Bedford-Stuyvesant Restoration Corporation in Brooklyn--that attempted to apply business and management skills to the social mission of uplifting low-income residents and their neighborhoods. Eventually such groups became known as "community development corporations" or CDCs Federal laws beginning with the 1974 Housing and Community Development Act provided a way for state and municipal governments to channel funds to CDCs and other nonprofit organizations. National organizations such as the Neighborhood Reinvestment Corporation (founded in 1978 and now known as NeighborWorks America), the Local Initiatives Support Corporation (founded in 1980 and known as LISC), and the Enterprise Foundation (founded in 1981) have built extensive networks of affiliated local nonprofit organizations to which they help provide financing for countless physical and social development programs in urban and rural communities.

The CDCs and similar organizations have been credited with starting the process that stabilized and revived seemingly hopeless inner city areas such as the South Bronx in New York City.

Community Development became a part of the Ujamaa Villages established in Tanzania by Julius Nyerere, where it had some success in assisting with the delivery of education services throughout rural areas, but has elsewhere met with mixed success. In the 1970s and 1980s, Community Development became a part of "Integrated Rural Development", a strategy promoted by United Nations Agencies and the World Bank. Central to these policies of community development were

- Adult Literacy Programs, drawing on the work of Brazilian Educator Paulo Freire and the "Each One Teach One" adult literacy teaching method conceived by Frank Laubach.
- Youth and Women's Groups, following the work of the Serowe Brigades of Botswana, of Patrick van Rensburg.
- Development of Community Business Ventures and particularly Cooperatives, in part drawn on the examples of José María Arizmendiarrieta and the Mondragon Cooperatives of the Basque Region of Spain
- Compensatory Education for those missing out in the formal education system, drawing on the work of Open Education as pioneered by Michael Young.
- Dissemination of Alternative Technologies, based upon the work of E. F. Schumacher as advocated in his book *Small is Beautiful: Economics as if people really mattered*
- Village Nutrition Programs and Permaculture Projects, based upon the work of Australians Bill Mollison and David Holmgren.
- Village Village Water Supply Programs

Community development in Canada has roots in the development of co-operatives, credit unions and caisses populaires. The Antigonish Movement which started in the 1920s in Nova Scotia, through the work of Doctor Moses Coady and Father James Tompkins, has been particularly influential in the subsequent expansion of community economic development work across Canada.

In the 1990s, following critiques of the mixed success of "top down" government programs, and drawing on the work of Robert Putnam, in the rediscovery of Social Capital, Community Development internationally became concerned with social capital formation. In particular the outstanding success of the work of Muhammad Yunus in Bangladesh with the Grameen Bank, has led to the attempts to spread microenterprise credit schemes around the world. This work was honoured by the 2006 Nobel Peace Prize.

The *"Human Scale Development"* work of Right Livelihood Award winning Chilean economist Manfred Max Neef promotes the idea of development based upon fundamental human needs, which are considered to be limited, universal and invariant to all human beings (being a part of our human condition). He considers that poverty results from the failure to satisfy a particular human need, it is not just an absence of money. Whilst

human needs are limited, Max Neef shows that the ways of satisfying human needs is potentially unlimited. Satisfiers also have different characteristics: they can be violators or destroyers, pseudosatisfiers, inhibiting satisfiers, singular satisfiers, or synergic satisfiers. Max-Neef shows that certain satisfiers, promoted as satisfying a particular need, in fact inhibit or destroy the possibility of satisfying other needs: eg, the arms race, while ostensibly satisfying the need for protection, in fact then destroys subsistence, participation, affection and freedom; formal democracy, which is supposed to meet the need for participation often disempowers and alienates; commercial television, while used to satisfy the need for recreation, interferes with understanding, creativity and identity. Synergic satisfiers, on the other hand, not only satisfy one particular need, but also lead to satisfaction in other areas: some examples are breast-feeding; self-managed production; popular education; democratic community organisations; preventative medicine; meditation; educational games.

Community building and organizing

Community building is a field of practices directed toward the creation or enhancement of community between individuals within a regional area (such as a neighbourhood) or with a common interest. It is sometimes encompassed under the field of community development.

A wide variety of practices can be utilized for community building, ranging from simple events like potlucks and small book clubs, to larger–scale efforts such as mass festivals and building construction projects that involve local participants rather than outside contractors. Activists engaged in community building efforts in industrialized nations see the apparent loss of community in these societies as a key cause of social disintegration and the emergence of many harmful behaviors. They may see building community as a means to increase social justice, individual well-being and reduce negative impacts of otherwise disconnected individuals.

Community organizing is a process by which people are brought together to act in common self-interest. While organizing describes any activity involving people interacting with one another in a formal manner, much community organizing is in the pursuit of a common agenda. Many groups seek populist goals and the ideal of participatory democracy. Community organizers create social movements by building a base of concerned people, mobilizing these community members to act, and developing leadership from and relationships among the people involved

Critical social work

Critical social work is the application of social work to address social injustices, as opposed to focusing on individual people's problems. Critical theories explain social problems as arising from various forms of oppression. This theory is like all social work theories, in that it is made up of a polyglot of theories from across the humanities and sciences, borrowing from many different schools of thought

Social workers have an ethical commitment to working to overcome inequality and oppression. For radical social workers this implies working towards the transformation of capitalist society towards building social arrangements which are more compatible with these commitments. Mullaly & Keating (1991) suggest three schools of radical thought corresponding to three versions of socialist analysis; social democracy, revolutionary Marxism and evolutionary Marxism. However they work in institutional contexts which paradoxically implicates them in maintaining capitalist functions.[1] Social work theories have three possible aims, as identified by Rojek et al. (1986). These are:

- **The progressive position**. Social work is seen as a catalyst for social change. Social workers work with the oppressed and marginalised and so are in a good position to harness class resistance to capitalism and transform society into a more social democracy or socialist state. (Bailey & Brake, 1975, Galper, 1975, Simpkin, 1979, Ginsberg, 1979)
- **The reproductive position**. Social work seen as an indispensable tool of the capitalist social order. It's function is to produce and maintain the capitalist state machine and to ensure working class subordination. Social workers are the 'soft cops' of the capitalist state machine. (Althusser, 1971, Poulantzas, 1975, Muller & Neususs, 1978)
- **The contradictory position**. Social work can undermine capitalism and class society. While it acts as an instrument of class control it can simultaneously create the conditions for the overthrow of capitalist social relations. (Corrigan & Leonard, Phillipson, 1979, Bolger, 1981)

History

Critical social work is heavily influenced by Marxism, the Frankfurt School of Critical Theory and by the earlier approach of Radical social work, which was focused on class oppression. Critical social work evolved from this to oppose all forms of oppression. Several writers helped codify radical social work, such as Jeffry Galper (1975) and Harold Throssell (1975). They were building on the views expounded by earlier social workers such as Octavia Hill, Jane Addams & Bertha Reynolds, who had at various points over the previous 200 years sought to make social work & charity more focused on structural forces.

Focus of critical social work

Major themes that critical social work seeks to address are:

- Poverty, unemployment and social exclusion
- Racism and other forms of discrimination
- Inadequacies in housing, health care and education
- Crime and social unrest (although it should be noted that the critical approach would be more focused on the structural causes than the behaviour itself)
- Abuse and exploitation

Sub-theories of critical social work

As critical social work grew out of radical social work, it split into various different theories. They are listed below, with a selection of writers who have influenced the theory.

- *Structural social work* theory (Ann Davis, Maurice Moreau, Robert Mullaly)
- *Anti-discriminatory* and *anti-oppressive social work* theory (Neil Thompson, Dalrymple & Burke)
- *Post- colonial social work* theory (Linda Briskman)
- *New structural social work* theory (Robert Mullaly)
- *Critical social work* theory (Jan Fook, Karen Healy)

Dialectic explanations of free will

While critical social work has a strong commitment to structural change, it does not discount the role of free will. Critical analysis in social work looks at competing forces such as the capitalist economic system, the welfare state or human free will as all affecting individual choices. Therefore, according to critical theory the aim of social work is to emancipate people from oppression and allow individual liberty to prevail.

"A dialectical approach to social work avoids the simplistic linear cause-effect notion of historical materialism and the naïve romanticism associated with the notion of totally free human will." (Mullaly and Keating, 1991). "Dialectical analysis helps to illuminate the complex interplay between people and the world around them and to indicate the role of social work within society" (Mullaly, 2007:241)

Practice models

Some of the practice theories that critical social work utilises include:

- Working collectively
- Building cooperation and consciousness
- Helping people to understand the social consequences of the market system
- Helping people deal collectively with social problems rather than individualising them
- Making alliances with working class organisations and recognise social workers as 'workers' themselves

Policy analysis

Policy analysis can be defined as "determining which of various alternative policies will most achieve a given set of goals in light of the relations between the policies and the goals". However, policy analysis can be divided into two major fields. Analysis **of** policy is analytical and descriptive -- i.e., it attempts to explain policies and their development. Analysis **for** policy is prescriptive -- i.e., it is involved with formulating policies and proposals (e.g., to improve social welfare). The area of interest and the purpose of analysis

determines what type of analysis is conducted. A combination of policy analysis together with program evaluation would be defined as Policy studies.

Policy Analysis is frequently deployed in the public sector, but is equally applicable to other kinds of organizations. Most policy analysts have graduated from public policy schools with public policy degrees. Policy analysis has its roots in systems analysis as instituted by United States Secretary of Defense Robert McNamara during the Vietnam War.

Policy analysts can come from many backgrounds including sociology, psychology, economics, geography, philosophy, law, political science, American studies, anthropology, public policy, policy studies, social work, environmental planning, and public administration.

Approaches to policy analysis

Although various approaches to policy analysis exist, three general approaches can be distinguished: the analycentric, the policy process, and the meta-policy approach.

The **analycentric** approach focuses on individual problems and its solutions; its scope is the micro-scale and its problem interpretation is usually of a technical nature. The primary aim is to identify the most effective and efficient solution in technical and economic terms (e.g. the most efficient allocation of resources).

The **policy process** approach puts its focal point onto political processes and involved stakeholders; its scope is the meso-scale and its problem interpretation is usually of a political nature. It aims at determining what processes and means are used and tries to explain the role and influence of stakeholders within the policy process. By changing the relative power and influence of certain groups (e.g., enhancing public participation and consultation), solutions to problems may be identified.

The **meta-policy approach** is a systems and context approach; i.e., its scope is the macro-scale and its problem interpretation is usually of a structural nature. It aims at explaining the contextual factors of the policy process; i.e., what are the political, economic and socio-cultural factors influencing it. As problems may result because of structural factors (e.g., a certain economic system or political institution), solutions may entail changing the structure itself.

Methodology

Policy analysis is methodologically diverse using both qualitative methods and quantitative methods, including case studies, survey research, statistical analysis, and model building among others. One common methodology is to define the problem and evaluation criteria; identify all alternatives; evaluate them; and recommend the best policy agenda per favor.

Models of policy analysis

Many models exist to analyze the creation and application of public policy. Analysts use these models to identify important aspects of policy, as well as explain and predict policy and its consequences.

Some models are:

Institutional model

Public policy is determined by political institutions, which give policy legitimacy. Government universally applies policy to all citizens of society and monopolizes the use of force in applying policy.

Process model

Policy creation is a process following these steps:

- Identification of a problem and demand for government action.
- Formulation of policy proposals by various parties (e.g., congressional committees, think tanks, interest groups).
- Selection and enactment of policy; this is known as **Policy Legitimation**.
- Evaluation of policy.

Rational model

Policy is intended to achieve *maximum social gain*. Rationally, the policy that maximizes benefits while minimizing costs is the best policy. It is a part of rational choice theory. This is step by step mode of analysis. It has its own limitations. The thinking procedure implied is linear and can face difficulties in extra ordinary problems or chaotic problems which has no sequences of happenings.

Incremental model

Policy is a continuation of previous government activity, with minimal changes made to previous policy. The goal is a systematic periodic review.

Group model

The political system's role is to establish and enforce compromise between various, conflicting interests in society.

Elite model

Policy is a reflection of the interests of those individuals within a society that have the most power, rather than the demands of the mass.

Policy Analysis in six easy steps

1. Verify, define and detail the problem
2. Establish evaluation criteria
3. Identify alternative policies
4. Evaluate alternative policies
5. Display and distinguish among alternative policies
6. Monitor the implemented policy

Social actions

"Social action" redirects here. For the Italian political party, see Social Action.

In sociology, **social actions** refer to any action that takes into account the actions and reactions of other individuals and is modified based on those events. Social action is a concept developed by Max Weber that explores interaction between humans in society. The concept of social action is used to observe how certain behaviors are modified in certain environments. The impact of social action is clearly seen in the development of norms and customs and everyday interaction between people.

Social action is an action that regards the reactions of other people. When the potential reaction is not desirable, the action is modified accordingly. Sociology is the study of society and behavior, the heart of interaction, and thus the study of social action. Social action states that humans vary their actions according to social contexts and how it will affect other people. Sociology studies that alteration.

Action in sociology can either mean a basic action (one that has a meaning) or a more advanced social action, one that not only has a meaning but is directed at other humans and induces a response. The term "social action" was introduced by Max Weber. It is a more encompassing term than Florian Znaniecki's social phenomena, since the individual performing social actions is not passive, but (potentially) active and reacting.

Weber differentiated between several types of social actions:

Types of social action

- rational actions (also known as value-rational ones, *wertrational*): actions which are taken because it leads to a valued goal, but with no thought of its consequences and often without consideration of the appropriateness of the means chosen to achieve it ('the end justifies the means'). Value rational or Instrumentally rational social action is divided into two groups: rational consideration and rational orientation. Rational Orientation comes into account when secondary results are taken into account rationally. This is also considered alternative means when secondary consequences have ended. Determining this mean of action is quite hard and even incompatible. Rational orientation is being able to recognize and understand certain mediums under common conditions. According to Weber, heterogeneous actors

and groups that are competing, find it hard to settle on a certain medium and understand the common social action;

- instrumental action (also known as value relation, goal-instrumental ones, *zweckrational*): actions which are planned and taken after evaluating the goal in relation to other goals, and after thorough consideration of various means (and consequences) to achieve it. An example would be a high school student preparing for life as a lawyer. The student knows that in order to get into college, he/she must take the appropriate tests and fill out the proper forms to get into college and then do well in college in order to get into law school and ultimately realize his/her goal of becoming a lawyer. If the student chooses not to do well in college, he/she knows that it will be difficult to get into law school and ultimately achieve the goal of being a lawyer. Thus the student must take the appropriate steps to reach the ultimate goal.

Another example would be most economic transactions. Value Relation is divided into the subgroups commands and demands. According to the law, people are given commands and must use the whole system of private laws to break down the central government or domination in the legal rights in which a citizen possess. Demands can be based on justice or human dignity just for morality. These demands have posed several problems even legal formalism has been put to the test. These demands seem to weigh on the society and at times can make them feel immoral.

The rational choice approach to religion draws a close analogy between religion and the market economy. Religious firms compete against one another to offer religious products and services to consumers, who choose between the firms. To the extent that there are many religious firms competing against each other, they will tend to specialize and cater to the particular needs of some segments of religious consumers. This specialization and catering in turn increase the number of religious consumers actively engaged in the religious economy. This proposition has been confirmed in a number of empirical studies.

It is well known that strict churches are strong and growing in the contemporary United States, whereas liberal ones are declining. For Iannaccone's religious experience is a jointly produced collective good. Thus members of a church face a collective action problem. Strict churches, which often impose costly and esoteric requirements on their members, are able to solve this problem by weeding out potential free riders, since only the very committed would join the church in the face of such requirements. Consistent with the notion that religious experience is a collective good, Iannaccone et al. show that churches that extract more resources from their members (in the form of time and money) tend to grow in membership.

- Affectional action (also known as emotional actions): actions which are taken due to one's emotions, to express personal feelings. For examples, cheering after a victory, crying at a funeral would be affectional actions. Affectual is divided into two subgroups: uncontrolled reaction and emotional tension. In uncontrolled reaction there is no restraint and there is lack of discretion. A person with an uncontrolled

reaction becomes less inclined to consider other peoples' feelings as much as their own. Emotional tension comes from a basic belief that a person is unworthy or powerless to obtain his/her deepest aspirations. When aspirations are not fulfilled there is internal unrest. It is often difficult to be productive in society because of the unfulfilled life. Emotion is often neglected because of concepts at the core of exchange theory. A common example is behavioral and rational choice assumptions. From the behavioral view, emotions are often inseparable from punishments.

- Emotion: Emotions are one's feelings in response to a certain situation. There are six types of emotion; social emotions, counterfactual emotions, emotions generated by what may happen(often manifests itself in anxiety), emotions that are generated by joy and grief(examples are found in responses typically seen when a student gets a good grade and when a person is at a funeral, respectively), thought triggered emotions(sometimes manifested as flashbacks), and finally emotion of love and disgust. All of these emotions are considered to be unresolved. There are six features that are used to define emotions. They are as follows; intentional objects,valence, cognitive antecedents, physiological arousal, action tendencies, and lastly physiological expressions. These six concepts were identified by Aristotle and are still the topic of several talks.

- Macro institutional theory of Economic Order: Nicole Biggart and Thomas Beamish have a slightly different approach to human habit then Max Weber. Whereas Weber believed economic organization is based on structures of material interest and ideas, institutional sociologist like Biggart and Beamish stress macro-institutional sources of arrangements of market capitalism.

Micrological theories of economy consider acts of a group of individuals. Economic theory is based on the assumption that when the highest bidder succeeds the market clears. Microeconomics theories believes that individuals are going to find the cheapest way to buy the things they need. By doing this it causes providers to be competitive and therefore creates order in the economy.

- Rational choice theorist on the other hand believe that all social action is rationally motivated. Rationality means that the actions taken are analyzed and calculated for the greatest amount of (self)-gain and efficiency. Rational choice theory although increasingly colonized by economist, it does differ from microeconomic conceptions. Yet rational choice theory can be similar to microeconomic arguments. Rational choice assumes individuals to be egoistic and hyperrational although theorist mitigate these assumptions by adding variables to their models.

- traditional actions: actions which are carried out due to tradition, because they are always carried out in a particular manner for certain situations. An example would be putting on clothes or relaxing on Sundays. Some traditional actions can become a cultural artifact Traditional is divided into two subgroups: customs and habit. A custom is a practice that rests among familiarity. It is continually perpetuated and is

ingrained in a culture. Customs usually last for generations. A habit is a series of steps learned gradually and sometimes without conscious awareness. As the old cliché goes, "old habits are hard to break" and new habits are difficult to form.

- Social Action models help explain Social Outcomes because of basic sociological ideas such as the Looking Glass Self. The idea of Cooley's "Looking glass self" is that our sense of self develops as we observe and reflect upon others and what they may think.

- Social Actions and Institutions Model: The term 'institution' is important in a society. Specialized roles within society as well as groups are key to how much better of a society may be.

In sociological hierarchy, social action is more advanced than behavior, action and social behavior, and is in turn followed by more advanced social contact, social interaction and social relation.

Social development

Social development is a process which results in the transformation of social structures in a manner which improves the capacity of the society to fulfill its aspirations. Society develops by consciousness and social consciousness develops by organization. The process that is subconscious in the society emerges as conscious knowledge in pioneering individuals. Development is a process, not a programme. Its power issues more from its subtle aspects than from material objects.

Not all social change constitutes development. It consists of four well-marked stages -- survival, growth, development and evolution, each of which contains the other three within it. The quantitative expansion of existing activities generates growth or horizontal expansion. Development implies a qualitative change in the way the society carries out its activities, such as through more progressive attitudes and behavior by the population, the adoption of more effective social organizations or more advanced technology which may have been developed elsewhere. The term evolution refers to the original formulation and adoption of qualitative and structural advances in the form of new social attitudes, values, behaviors, or organizations.

While the term is usually applied to changes that are beneficial to society, it may result in negative side-effects or consequences that undermine or eliminate existing ways of life that are considered positive.

Social change

Social change is a general term which refers to:

- change in social structure: the nature, the social institutions, the social behaviour or the social relations of a society, community of people, and so on.

- When behaviour pattern changes in large numbers, and is visible and sustained, it results in a social change. Once there is a deviance from culturally-inherited values, rebellion against the established system may result, causing a change in the social order.
- any event or action that affects a group of individuals who have shared values or characteristics.
- acts of advocacy for the cause of changing society in a way subjectively perceived as normatively desirable.

The term is used in the study of history, sociology, economies and politics, and includes topics such as the success or failure of different political systems, globalization, democratization, development and economic growth. The term can encompass concepts as broad as revolution and paradigm shift, to narrow changes such as a particular cause within small-town government. The concept of social change implies measurement of some characteristics of a group of individuals. While the term is usually applied to changes that are beneficial to society, it may also result in negative side-effects and consequences that undermine or eliminate existing ways of life that are considered positive.

Social change is a topic in sociology and social work , but also involves political science, economics, history, anthropology, and many other social sciences.

Among the many forms of creating social change are the theatre for social change, direct action, protesting, advocacy, community organizing, community practice, revolution, and political activism.

Models of Change

Generally there are two sources or dimensions of change (Shackman, Liu, Wang, 2002). One source is non-systematic change, such as climate change, some kind of technological innovation from the outside, or changes forced by foreign countries.

The other source is a systems change: Eisenstadt (1973) argued that modernisation required a basic level of free resources and the development of standardised and predictable institutions, such as a stable but flexible market system and political process. An additional requirement was that governing institutions be flexible enough to adapt to the changes that come up. Most of the time, changes to society come about through some combination of both systematic and non-systematic processes (Shackman, Liu and Wang, 2002, op cit).

- **Hegelian**: The classic Hegelian dialectic model of change is based on the interaction of opposing forces. Starting from a point of momentary stasis, Thesis countered by Antithesis first yields conflict but subsequently results in a new Synthesis.
- **Kuhnian**: Thomas Kuhn in *The Structure of Scientific Revolutions* argued with respect to the Copernican Revolution that people are unlikey to jettison an unworkable

paradigm, despite many indications that the paradigm is not functioning properly, until a better paradigm can be presented.

- **Heraclitan**: The Greek philosopher Heraclitus used the metaphor of a river to speak of change thus, "On those stepping into rivers staying the same other and other waters flow" (DK22B12). What Heraclitus seems to be suggesting here, later interpretations notwithstanding, is that, in order for the river to remain the river, change must constantly be taking place. Thus one may think of the Heraclitan model as parallel to that of a living organism, which, in order to remain alive, must constantly be changing.
- **Daoist**: The Chinese philosophical work Dao De Jing, I.8 and II.78 uses the metaphor of water as the ideal agent of change. Water, although soft and yielding, will eventually wear away stone. Change in this model is to be natural, harmonious and steady, albeit imperceptible.

Introduction

Social Policy is an applied subject; it was developed to meet the needs of people who would be working in the public services. Social administration is the area of the field concerned with the practicalities of service organisation and delivery. In the US, it is dealt with as 'public policy' or 'policy analysis'.

The provision of welfare

There are five main sectors:

- public sector (provision by the state),
- private (provision for profit by commercial organisations or individuals),
- voluntary (provision on a non-profit basis),
- mutual aid (provision by solidarity) and
- informal (provision by friends, neighbours and families).

For some, the idea of the 'welfare state' means the same as 'state welfare', and opposition is seen as a commitment to the 'private market'. This is a false choice. The state is not the only provider of welfare in any country, and the 'private market' does not consist of activity for profit, but a wide range of different motivations. There is a 'mixed economy of welfare'. The state does not operate in isolation; rather, it acts in conjunction with a number of non-statutory organisations. The state is actively involved in regulation, finance or subsidy, and direct provision.

The public sector

There are four main arguments for public sector provision.

- *Universal standards.* The state is uniquely able to impose a general régime, and so can ensure uniform or minimum standards.
- *Social control.* Control is used where people need protection (e.g. child abuse), as punishment (like prisoners), and where control increases freedom (like compulsory education).
- *Economic benefit* The state may be able to perform the action more cost-effectively than is the case elsewhere. National health systems have proved to be cheaper than many liberal systems.
- *Residual provision*. The state may act as a safety net where other sectors do not provide.

The main arguments against are

- *Economic efficiency.*State provision does not have clear incentives to reduce unit costs.
- *Clientelism.* State provision can be the source of patronage or corruption.
- *Paternalism.* States make decisions for people who could choose for themselves.

The private sector

Economic liberals argue that the private market is the best method of arranging the distribution of resources. Arthur Seldon argues that the price mechanism leads to

- choice for the consumer
- a service led by the consumer rather than by the professions
- more efficient services at lower costs (because this increases profitability)
- responsiveness to need (because their payment depends on it)
- education of people as to the implications of their choices. [1]

If poor people cannot afford services, we can give them the money to decide for themselves - as we do with food and clothing; there does not have to be a publicly provided service.

The main arguments against this position are:

- *Market failure*. Markets do not work if people do not have choice (e.g. in health care), where there are monopolies, and if people do not bear the costs of their actions themselves.
- *Exclusion.* Markets exclude 'bad risks' and people with extreme needs.
- *Social preference*. Markets respond to individual preferences; social needs may be different.

Mutual aid

Mutual aid is sometimes represented as private, and sometimes as voluntary. There is a good case to consider this category as a sector in itself, because the organisation and behaviour of solidaristic groups is quite different from that of other non-profit organisations. Historically, mutual aid was one of the main foundations of welfare organisations, through trades unions, professional associations and friendly societies; in many countries, solidaristic services of this kind have continued to be one of the main focuses through which welfare is provided.

The central principle of mutual aid has been voluntary collective effort, which is both self-interested and supportive of others. People who enter such arrangements make some kind of contribution - such as paying a subscription, offering labour, or participating in management - and receive support on a mutual basis. The most common model is probably a system of voluntary insurance, usually for income maintenance or health care,

which offers social protection in return for a basic contribution. But there are many other examples, including co-operatives, self-help groups, and the trades unions themselves.

The scope of mutual aid is considerable, but solidarity cannot be comprehensive: some people have a limited ability to contribute, and others are likely to be excluded by the conditions of membership.

The voluntary sector

The voluntary sector is extremely diverse, ranging from small local societies to large, very 'professional' agencies. Jones, Brown and Bradshaw classify the different types of volunteering as follows:

- direct service giving
- running voluntary organisations
- participation or self-help groups
- fundraising
- public service (many elected officials are unpaid volunteers)
- pressure group activity. [2]

The role of the voluntary sector is often supplementary to statutory services, but it can also be seen as complementary through:

- the initiation of new approaches and techniques
- the development of specialist expertise
- the establishment of 'partnerships' with statutory services - like the provision of meals on wheels
- provision to groups which statutory services do not reach, like drug addicts.

The informal sector

The 'informal sector' consists of communities, friends, neighbours and kin. The emphasis on informal care has grown for three reasons:

- *Ideology*. Conservatives have emphasised the pluralistic nature of welfare, and an 'organic view' of society as a series of interconnecting relationships, and the role of family and duty.
- *The emphasis on community care*. The discharge of people from institutions, and maintenance of individuals at home, has led to a greater emphasis on the role of carers.
- *Comprehensive planning*. Most care is provided by informal carers, not the state; the role of the state is supplementary to the care given by others. Planning has to take this into account.

This approach has led to a range of criticisms.

- Feminist writers have criticised the burden imposed on women. [3] Most care of this type occurs within families, and in practice the burden falls substantially on women within families.
- The economic costs to carers are underestimated because they are not charged.
- The social costs to carers also need to be considered.
- Service to dependent individuals is often unexamined. Carers may be well-meaning, but they will not necessarily offer the best care.

The public services

The structure of public services

The structure of services varies with government structure, history, and service development; many developed economies have a complex hotch-potch of agencies, schemes and programmes. Billis outlines a scheme which helps to view the pattern systematically. He describes five levels, or 'strata', of service provision. They are:

5: Comprehensive field coverage This is the level of policy-making and planning, creating a framework of services to meet a range of needs. This level is sometimes missing where coverage is done through programmes and ad hoc services rather than by government.
4: Comprehensive service provision This is the organisation and direction of a service or programme, like a housing department or social services department. There is a broad territorial focus, and specific responses are not prescribed.
3: Systematic service provision This is a responsibility for performing particular functions within a service. Examples are schools, residential care homes or the units within a hospital.
2: Dealing with problems as situations This is generally the level at which professionals work; the test is that the professional is able to define the problem and the response. Doctors, social workers, health visitors, area housing managers and police officers work at this level.
1: Dealing with problems as demands. This is a reactive approach, where service is provided in response to a specific demand; the response made is prescribed for the person who makes it. Receptionists or social security clerical officers are examples. [4]

Social service management

There are two traditional models of administration: professionalism and bureaucracy. In recent years, a new model of 'management' has been added.

	Professionals	Managers	Bureaucrats

Expertise	Specialised competence	Administrative management	Functionally differentiated administrative tasks
Motivation	Professional commitment	Personal incentives	Public service
Accountability	Professional standards	Performance criteria	Responsibility to superiors
Decision-making	Discretion	Quasi-autonomous	Rule based

Planning

Policy has to be put into practice. Service planning is a process of making implementation explicit. This is usually represented as either an 'incremental' or a 'rational-comprehensive' process. Incremental plans are based on what has gone before. The 'rational' model has seven stages:

- *Evaluation of the environment*. Decisions have to be taken in the light of existing situations.
- The identification of *aims and objectives*. Criteria have to be established by which decisions can subsequently be evaluated.
- Consideration of the alternative *methods* which are available.
- Examination of the *consequences*. Possible consequences are judged against the aims and objectives in order to decide their likely effect.
- *Selection of methods*. The choice of methods is guided by consideration of efficiency and practical constraints.
- *Implementation*. There has to be a plan for how and when things will be done, and who will do them.
- *Re-evaluation*. The consequences of policy are monitored, and fed back into a re-assessment of the environment - at which point the process begins again.

The rational-comprehensive model asks for too much detail to be practical, but at least it helps to make things explicit. A minimally adequate plan needs a statement of aims, selection of methods, and an action plan covering implementation and criteria for evaluation.

Public finance

The sources of finance for public services are hugely varied: they include, for example, tax, levies, borrowing, charges, commercial profits, public subscription, sales of licences, voluntary donation, labour conscription and lottery funding. As a counterbalance, public services also tend to be limited by special rules which do not apply to private firms. For example, in order to avoid distortions in the operation of the independent sector, the

public services may not be allowed to diversify activities or their financial base. In the interests of economic management, public services are not always allowed to 'vire' - to transfer money across budget heads; this means that they cannot carry losses or unspent funds across financial years, or use money allocated for one purpose for another.

Public expenditure commitments tend to be inflexible. This happens in part because many of the beneficiaries of public expenditure, like pensioners, have established entitlements, but also because macro-economic management calls for a degree of stability in overall spending patterns. Adjustments to budgets have to be made incrementally. Public sector budgeting is usually divided between revenue and capital expenditure.

- *Revenue expenditure* deals with regular and recurring spending. This may be managed by a programme budget, which is based on total expenditure for a programme or category (for example, expenditure on 'social security' or 'old people') . Over- or under-spending has consequences for other services within the same expenditure category. Alternatively, there may be a budget for an agency, or a part or an agency: the basic unit is a 'cost centre', which records the budget of each part of a service in its own right.
- *Capital expenditure* is more problematic. It is mainly used for consumption by government - the purpose of capital finance is to buy something. However, because government finance is usually geared to annual revenue, as part of economic management, capital expenditure has to be converted into manageable chunks, or 'tranches'. In large-scale capital projects, resources are budgeted for in instalments until the project is finished. This has often been associated with serious failures of control.

Evaluating policy

Effectiveness The most basic form of evaluation of policy is to ask whether it meets its objectives. A policy is effective if it meets its aims. It is 'cost-effective' if it meets its aims at the lowest cost possible.

Efficiency. Efficiency is an economic concept, which should be distinguished clearly from effectiveness. A process is efficient if it produces goods at the lowest possible cost per unit. Achieving every aim may be inefficient, because some aims are more expensive and difficult than others, and because when agencies are straining to meet targets costs are likely to rise. Public services often have no choice about meeting certain aims - for example, keeping destitute people alive, or ensuring that long-term nursing care is available for frail elderly people - and they tend to aim for cost effectiveness rather than efficiency.

Equity. The principle of 'equity' or fairness is an important issue in service delivery. Equity means that like cases are treated alike. Procedural fairness is concerned with procedures,

like non-discrimination; substantive fairness with outcomes. Le Grand points to several different measures:

- public expenditure - whether people have different amounts of money spent on them
- final income - whether the amount of money spent has an equivalent effect on the recipients
- use - whether people are able to use the service to an equivalent extent
- cost - whether people suffer equivalent costs as a result of their problems; and
- outcome - whether people finish in equivalent positions. [5]

Usually, there are other implicit criteria, which are only triggered when there are problems: examples are ethical assumptions, financial constraints, or political support.

Service delivery

Targeting

Social policies have to affect someone, and any attempt to identify a client group specifically can be referred to as 'targeting'. Policies may be focused on a range of different groups: individuals, households, families, communities, and sections of the population. Distribution to everyone is exceptional - most 'universal' benefits are, in fact, categorical, and targeted at a broad class of people in need (like children or old people) as a way of addressing needs within the group. The World Bank has argued, in developing countries, for 'indicator targeting', focusing on broad areas of the population. [6]

Three main problems affect the efficiency of targeted services.

- *deadweight*. People receive the service or benefit, but their circumstances are not materially affected by the measure.
- *spillovers.* People are helped who it was not intended or necessary to help.
- *low takeup* There is failure to reach those at whom the policy was targeted.

Targeting is sometimes confused with selectivity (services which are confined to the poor, or people in need); this has further problems associated with testing and exclusion. Some degree of targeting is unavoidable, and the main issue raised in practice is how to overcome these problems.

Rationing

In the private sector, demand and supply are governed by the price mechanism. Higher prices mean more supply and less demand. In the public services, demand and supply may have to be rationed.

Supply can be limited through

- *denial*, through restricted access and eligibility rules. A lottery is a random, selective form of denial.
- *delay* (including waiting lists)
- filtering and *deflection* (e.g. medical referrals)
- *dilution* - giving people less service.

Demand can be limited through

- eligibility qualifications
- increasing costs to consumers - for example, through charges; or
- deterrence.

Discretion

Officials have to make judgments in order to apply any general rule to a specific case. They are said to have 'discretion' when they are allowed to make decisions about the rules themselves. The exercise of judgment is not the same as discretion; discretion is necessary when there are no established rules to guide judgment. "Discretionary rules", which sound at first like a contradiction in terms, are rules which are developed to fill administrative gaps.

In some agencies, discretion will be exercised by the worker who is closest to the issue. Professional staff (like doctors and social workers) are given the scope to use discretion, making their own rules and methods of working according to general principles. In other agencies, discretion may be exercised by the managers of the agency; rules on 'management practice' may develop because there is no clear policy guidance. Discretionary rules and established practice can also develop because of workers' experience at the operational level. Lipsky calls this process 'street level bureaucracy' [7]; it is mainly found in the 'common sense' of office practice, though it can also feed back into organizational rules.

Discretion in social services is sometimes thought to drive out users' rights; if an official has the right to decide, the user does not. Rights are rather more complex, however; 'rights' in social security are not very strong even when the discretion of officers is limited, while the considerable discretion which doctors have has not undermined the view that their patients have rights.

Empowering users

The idea of 'empowerment' can be taken individually, to refer to the ability of each user to affect outcomes, or collectively, to refer to the status of disadvantaged and stigmatised

groups. Its growing importance reflects long-standing concerns that social services may disempower the people who use them.

Deakin and Wright propose six tests for responsiveness to users.

- *Accountability.* There has to be some way services can be made to answer to service users for their decisions.
- *Representation and participation.* Participation in decision making implies not only that the views of consumers are expressed, but also that their views carry some weight. This is often represented in terms of a 'voice' for consumers.
- *Information.* Lack of information denies users the opportunity for comment or control.
- *Access.* Inaccessibility denies people the opportunity to use the service.
- *Choice.* A lack of options means in itself that users are unable to control outcomes. The possibility of 'exit' is also important.
- *Redress.* Obtaining redress of grievances, and even having concerns addressed, is important to limit the use of control by agencies as well as to give users the formal opportunity to raise concerns.

Redistribution can mean:

- Redistribution (Australia), the legal process in Australia whereby electoral

boundaries are moved

- Redistribution (cultural anthropology) in relation to non-market economic exchange
- Redistribution (economics), redistribution of income, property and/or wealth
- Redistribution (election), the changing of political borders
- Redistricting, the redistribution of political borders in the United States

TOPIC 2: Social security

Social security is primarily a social insurance program providing social protection, or protection against socially recognized conditions, including poverty, old age, disability, unemployment and others. Social security may refer to:

- **social insurance**, where people receive benefits or services in recognition of contributions to an insurance scheme. These services typically include provision for retirement pensions, disability insurance, survivor benefits and unemployment insurance.
- **income maintenance**—mainly the distribution of cash in the event of interruption of employment, including retirement, disability and unemployment

- **services** provided by administrations responsible for social security. In different countries this may include medical care, aspects of social work and even industrial relations.
- More rarely, the term is also used to refer to **basic security**, a term roughly equivalent to access to basic necessities—things such as food, clothing, shelter, education and medical care.

Social insurance

Actuaries define social insurance as a government-sponsored insurance program that is defined by statute, serves a defined population, and is funded through premiums or taxes paid by or on behalf of participants. Participation is either compulsory or the program is subsidized heavily enough that most eligible individuals choose to participate.

In the U.S., programs that meet this definition include Social Security, Medicare, the PBGC program, the railroad retirement program and state-sponsored unemployment insurance programs.[1]

Income maintenance

This policy is usually applied through various programs designed to provide a population with income at times when they are unable to care for themselves. Income maintenance is based in a combination of five main types of program:

- **social insurance**, considered above
- **means-tested** benefits. This is financial assistance provided for those who are unable to cover basic needs, such as food, clothing and housing, due to poverty or lack of income because of unemployment, sickness, disability, or caring for children. While assistance is often in the form of financial payments, those eligible for social welfare can usually access health and educational services free of charge. The amount of support is enough to cover basic needs and eligibility is often subject to a comprehensive and complex assessment of an applicant's social and financial situation. See also, Income Support.
- **non-contributory** benefits. Several countries have special schemes, administered with no requirement for contributions and no means test, for people in certain categories of need - for example, veterans of armed forces, people with disabilities and very old people.
- **discretionary** benefits. Some schemes are based on the discretion of an official, such as a social worker.
- **universal** or categorical benefits, also known as **demogrants**. These are non-contributory benefits given for whole sections of the population without a test of means or need, such as family allowances or the public pension in New Zealand (known as New Zealand Superannuation). See also, Alaska Permanent Fund Dividend.

Social protection

Social protection refers to a set of benefits available (or not available) from the state, market, civil society and households, or through a combination of these agencies, to the individual/households to reduce multi-dimensional deprivation. This multi-dimensional deprivation could be affecting less active poor persons (e.g. the elderly, disabled) and active poor persons (e.g. unemployed). This broad framework makes this concept more acceptable in developing countries than the concept of social security. Social security is more applicable in the conditions, where large numbers of citizens depend on the formal economy for their livelihood. Through a defined contribution, this social security may be managed. But, in the context of wide spread informal economy, formal social security arrangements are almost absent for the vast majority of the working population. Besides, in developing countries, the state's capacity to reach the vast majority of the poor people may be limited because of its limited resources. In such a context, multiple agencies that could provide for social protection is important for policy consideration. The framework of social protection is thus capable of holding the state responsible to provide for the poorest sections by regulating non-state agencies.

Collaborative research from the Institute of Development Studies debating Social Protection from a global perspective, suggests that advocates for social protection fall into two broad categories: 'instrumentalists' and 'activists'. 'Instrumentalists' argue that extreme poverty, inequality and vulnerability, is dysfunctional in the achievement of development targets (e.g. the MDGs). In this view social protection is about putting in place risk management mechanisms that will compensate for incomplete or missing insurance (and other) markets, until a time that private insurance can play a more prominent role in that society. 'Activist' arguments view the persistence of extreme poverty, inequality and vulnerability, as symptoms of social injustice and structural inequality and see social protection as a right of citizenship. Targeted welfare is a necessary step between humanitarianism and the ideal of a 'guaranteed social minimum' where entitlement extends beyond cash or food transfers and is based on citizenship, not philanthropy.

TOPIC 3 : Disability insurance

Disability insurance, often called **disability income insurance**, is a form of insurance that insures the beneficiary's earned income against the risk that disability will make working (and therefore earning) impossible. It includes paid sick leave, short-term disability benefits, and long-term disability benefits.

Types of disability insurance

National social insurance programs

In most developed countries, the single most important form of disability insurance is that provided by the national government for all citizens. For example, the UK's version is part of the National Insurance; the U.S.'s version is Social Security (SS)—specifically, several parts of SS including Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI). These programs provide a floor beneath all the other piecemeal forms of disability insurance in our societies. In other words, they are the safety net that catches everyone who was either (a) otherwise uninsured or (b) otherwise underinsured. As such, they are very large, very important programs, with many beneficiaries. The general theory of the benefit formula is that the benefit is not large but is enough to prevent abject poverty.

Employer-supplied disability insurance

Since one of the top reasons for becoming disabled is getting hurt on the job, it is not surprising that the second-most important form of disability insurance is that provided by employers to cover their employees. There are several subtypes that may or may not be separate parts of the benefits package: workers' compensation and more general (but very basic) disability insurance policies.

Workers' compensation

Workers' compensation (also known by variations of that name, e.g., **workman's comp**, **workmen's comp**, **worker's comp**, **compo**) offers payments to employees who are (usually temporarily, rarely permanently) unable to work because of a job-related injury. However, workers' compensation is in fact more than just income insurance, because it may pay compensation for economic loss (past and future), reimbursement or payment of medical and like expenses (functioning in this case as a form of health insurance), general damages for pain and suffering, and benefits payable to the dependents of workers killed during employment (functioning in this case as a form of life insurance).

Other

These policies offer payments to employees who are (usually temporarily, rarely permanently) unable to work because of any injury or illness, even if it is not job-related. Unlike workers' compensation, this coverage may not involve any aspect of health insurance, life insurance, or payments for pain and suffering. Similarly to most employer-supplied health insurance, these plans are essentially just open-market plans with the advantage of a negotiated group rate. That is, they are similar to what an individual would buy, but they are purchased with a volume discount. Another general fact about them is that they tend to offer rather basic, low-end coverage, essentially because most people balk at paying for anything more. Sometimes each employee has the option to buy upgraded coverage if they are willing to pay for it.

Veterans' benefits

The various kinds of compensation and insurance that are provided to military veterans by organizations such as the U.S. Department of Veterans Affairs (VA) are very much analogous to workers' compensation, with soldiers, sailors, and marines being the analogues of the worker. In both cases, the overall compensation system involves more than just one type of insurance, but rather encompasses health insurance, disability income insurance, life insurance, and even mortgage insurance on VA mortgages. The scope of each of these is limited. For example, the life insurance aspect is limited only to paying (rather small) survivors' benefits to survivors of veterans killed in the course of their service; it is not a general term life policy.

Newsweek magazine's cover story for the issue of March 05, 2007 discusses the problems that American veterans of the wars in Afghanistan and Iraq are currently facing in receiving their VA benefits. The article tells the story of one veteran who waited 17 months to start receiving payments from the disability income insurance aspect of his VA coverage. Another article, in the *New York Times*, points out that besides the long waits, there are also inequalities based on which state a vet is from and whether he or she is regular army, National Guard, or Reserve. The *Newsweek* article says that even when a veteran manages to get his or her claim approved (which can be burdensome),

> "The compensation is not huge. A veteran with a disability rating of 100 percent gets about $2,400 a month—more if he or she has children. A 50 percent rating brings in around $700 a month. But for many returning servicemen burdened with wounds, it is, initially at least, their sole income."

According to a sidebar in the same Newsweek article, the Americans injured in these wars, for all the obstacles to proper care, will still probably receive much better compensation and healthcare in years to come than injured Afghani or Iraqi soldiers. And of the two groups (U.S. disabled vets and middle-eastern disabled vets), the latter group is larger.

Individual disability insurance policies

Those whose employers do not provide benefits, and self-employed individuals who desire disability coverage, may purchase their own policies on the open market. Premiums and available benefits for individual coverage vary considerably between different companies, for individuals in different occupations, and by State and Country. In general, premiums are higher for policies that provided more monthly benefit, pay the benefit for a longer period of time, and start payments for benefits more quickly following a disability. Premiums also tend to be higher for policies that define disability in broader terms, meaning the policy would pay benefits in a wider variety of circumstances.

Claims: what is covered, and for how long

The important variables regarding claims are listed below. Not every variable matters to every type of disability insurance, but most of these are generally relevant.

- Was the disability unpredictable (not resulting from previously-known chronic illness)?
- Was the disability incurred in the course of performing job-related duties?
- How long is the waiting period before claim payments start?
- What other insurance policies will pay claims for this event?
- How much money will be paid per week / month / pay period?
- For how many weeks / months / pay periods will payments continue?
- What if the beneficiary is not totally disabled, but only partially?

Examples of how each variable may be important

Was the disability unpredictable (not resulting from previously-known chronic illness)?

For example, a potential policyholder seeking a regular individual policy on the open market must warrant that he is in good health and to the best of his own knowledge is not currently HIV-positive. A general principle of insurance is that the policyholder sells risk that, to the best of his knowledge, is not higher than the stated circumstances imply. Withholding relevant circumstances or hiding them is selling something that is not what it is represented to be. Analogies are insider trading using material non-public information and making fraudulent (incomplete or false) seller disclosure in a real estate transaction.

Was the disability incurred in the course of performing job-related duties?

For example, workers' compensation policies are not obligated to pay claims for disability that is not job-related. Insurance for such risks can indeed be purchased, but because the risks are more inclusive, the premiums are higher. A policyholder always needs to understand what she is or isn't buying with her premium. And the insurer is legally obligated to specify exactly what coverage is or isn't being sold.

How long is the waiting period before claim payments start?

Because most disability events are temporary, insurance coverage for them is cheaper when the policyholder agrees to wait longer before receiving claim payments. For example, if you break a finger, it may only be 2 months before you are able to do your job again. If you agreed to wait 60 days before receiving claim payments, then the insurer will not have to pay a claim for your event. This reduction to his risk is reflected in the lower price that you paid to purchase coverage (lower premiums).

Another important example in this category is that the standard waiting period before starting to collect Social Security's disability benefits is one year.

What other insurance policies will pay claims for this event?

For example, if an auto accident renders you unable to work for 5 months, your auto insurance policy with Company A may include coverage for lost income during this period. (Often lost-income coverage is a separate rider to the auto insurance policy that you must pay extra for if you choose to have it.) In this case, you may choose to make a claim with Company A and either (1) make another, secondary claim with Company B, who issues your disability income insurance, or (2) decide that the primary claim is enough and avoid making an unnecessary claim with Company B. Sometimes there is a previously established order of priority that rules that Company B is liable for the claim only to the extent that Company A's coverage is not enough.

Another important example in this category is that if your injury is someone else's fault, their liability coverage from, say, an auto, home, or personal umbrella policy may pay for your lost income, and therefore you will not make a claim on your own policy.

How much money will be paid per week/month/pay period?

For example, it is rare for any policy to pay the full amount of the beneficiary's regular salary. (Policies that do are expensive, "high-end-of-the-market"-type policies.) Generally it will pay only some percentage, such as 80%, or it will pay only a flat amount, such as $1500/month, regardless of the normal salary amount. The idea behind this reduced benefit is that it is enough to protect you from mortgage foreclosure, or to keep you from running up huge debts, during your convalescence, even though it is not enough to live a carefree lifestyle on. In return for this trade-off, your premiums are lower. This is a good trade-off when you remember that hopefully, you will never have to make a claim anyway, so why pay higher premiums than you have to?

For how many weeks/months/pay periods will payments continue?

Most policies in the lower and middle areas of the market will have a cap, for example, 5 years. More expensive policies will pay all the way to the age when the national social insurance program takes over as the primary income source. For example, in the U.S., this is at age 65, when Social Security takes over. Also, in the U.S. all long term disability insurance providers require those receiving benefits to apply for government social security disability benefits. The insurance company usually refer the disabled person to non-attorney representative company's such as Allsup.

What if the beneficiary is not totally disabled, but only partially?

Most policies in the lower and middle areas of the market will only pay claims if there is *no* job that the beneficiary can possibly do. Others, referred to as **own-occ** policies, will pay the claim as long as you cannot return to *your own occupation*. Own-occ policies cost more to buy (higher premiums) than non-own-occ, because their claims risk is greater. For example, suppose that your normal job involves lifting heavy boxes and getting paid $4000/month. Then you get injured, and can't lift so much weight. However, you are still

capable of doing light assembly work at a workbench for $2000/month. If your policy is a less-expensive model, the insurer will tell you that no claim will be paid, because you are capable of working (although not at your own occupation). But if your policy is an own-occ policy with a claim amount of 75% of your normal salary, it will pay you a claim of $3000/month. This payment will recur monthly until (a) you are able to do your normal job again; or (b) the cap is reached (for example, 5 years later); or (c) you reach age 65 (when the policy ends and you begin collecting Social Security).

TOPIC 4: Welfare

Welfare or **welfare work** consists of actions or procedures — especially on the part of governments and institutions — striving to promote the basic well-being of individuals in need. These efforts usually strive to improve the financial situation of people in need but may also strive to improve their employment chances and many other aspects of their lives including sometimes their mental health. In many countries, most such aid is provided by family members, relatives, and the local community and is only theoretically available from government sources.

In American English, *welfare* is often also used to refer to financial aid provided to individuals in need, which is called *benefit(s)* or *welfare benefits* in British English.

Welfare can take a variety of forms, such as monetary payments, subsidies and vouchers, health services, or housing. Welfare can be provided by governments, non-governmental organizations, or a combination of the two. Welfare schemes may be funded directly by governments, or in social insurance models, by the members of the welfare scheme.

Welfare systems differ from country to country, but welfare is commonly provided to those who are unemployed, those with illness or disability, those of old age, those with dependent children and to veterans. A person's eligibility for welfare may also be constrained by means testing or other conditions.

In a more general sense, *welfare* also means the well-being of individuals or a group, in other words their health, happiness, safety, prosperity, and fortunes.

Welfare can consist of a monetary payment or payments, which may be provided as a lump sum or by way of a pension.

Provision and funding

Welfare may be provided directly by governments or their agencies, by private organizations, or by a combination of both in a mixed economy model. The term welfare state is used to describe a state in which the government provides the majority of welfare services, or to describe those services collectively.

Welfare may be funded by governments out of general revenue, typically by way of redistributive taxation. Social insurance type welfare schemes are funded on a contributory basis by the members of the scheme. Contributions may be pooled to fund the scheme as a whole, or reserved for the benefit of the particular member. Participation in such schemes is either compulsory or the program is subsidized sufficiently heavily that most eligible individuals choose to participate.

Welfare systems

United States

: American welfare state

From the 1930s on, New York City government provided welfare payments to the poor. By the 1960s, as whites moved to the suburbs, the city was having trouble making the payments and attempted to purge the rolls of those who were committing welfare fraud. Twenty individuals who had been denied welfare sued in a case that went to the United States Supreme Court, *Goldberg v. Kelly*. The Court ruled that those suspected of committing welfare fraud must receive individual hearings before being denied welfare. David Frum considers this ruling to be a milestone leading to the city's 1975 budget disaster.

After the Great Society legislation of the 1960s, for the first time a person who was not elderly or disabled could receive a living from the American government. This could include general welfare payments, health care through Medicaid, food stamps, special payments for pregnant women and young mothers,and federal and state housing benefits. In 1968, 4.1% of families were headed by a woman on welfare; by 1980, this increased to 10%. In the 1970s, California was the U.S. state with the most generous welfare system. Virtually all food stamp costs are paid by the federal government. Before the Welfare Reform Act of 1996, welfare was "once considered an open-ended right," but welfare reform converted it "into a finite program built to provide short-term cash assistance and steer people quickly into jobs." Prior to reform, states were given "limitless" money by the federal government, increasing per family on welfare, under the 60-year-old Aid to Families with Dependent Children (AFDC) program. This gave states no incentive to direct welfare funds to the neediest recipients or to encourage individuals to go off welfare (the state lost federal money when someone left the system). One child in seven nationwide received AFDC funds, which mostly went to able-bodied single mothers.

After reforms, which President Bill Clinton said would "end welfare as we know it," amounts from the federal government were given out in a flat rate per state based on population. The new program is called Temporary Assistance to Needy Families (TANF).

It also encourages states to require some sort of employment search in exchange for providing funds to individuals and imposes a five-year time limit on cash assistance. The bill restricts welfare from most legal immigrants and increased financial assistance for child care. The federal government also maintains an emergency $2 billion TANF fund to assist states that may have rising unemployment.

Millions of people left the welfare rolls (a 60% drop overall), employment rose, and the child poverty rate was reduced. A 2007 Congressional Budget Office study found that incomes in affected families rose by 35%. The reforms were "widely applauded" after "bitter protest." *The Times* called the reform "one of the few undisputed triumphs of American government in the past 20 years." Critics of the reforms sometimes point out that the reason for the massive decrease of people on the welfare rolls in the United States in the 1990s wasn't due to a rise in actual gainful employment in this population, but rather, due almost exclusively to their offloading into workfare, giving them a different classification than classic welfare recipient.

Aspects of the program vary in different states; Michigan, for example, requires a month in a job search program before benefits can begin.

The National Review editorialized that the Economic Stimulus Act of 2009 will reverse the welfare-to-work provisions that Bill Clinton signed in the 1990s and again base federal grants to states on the number of people signed up for welfare rather than at a flat rate. One of the experts who worked on the 1996 bill said that the provisions would lead to the largest one-year increase in welfare spending in American history. The House bill provides $4 billion to pay 80% of states' welfare caseloads. Although each state received $16.5 billion annually from the federal government as welfare rolls dropped, they spent the rest of the block grant on other types of assistance rather than saving it for worse economic times.

TOPIC 5: Social

5 Regional uses

The term **Social** refers to a characteristic of living organisms (humans in particular, though biologists also apply the term to populations of other animals). It always refers to the interaction of organisms with other organisms and to their collective co-existence, irrespective of whether they are aware of it or not, and irrespective of whether the interaction is voluntary or involuntary.

Definition

In the absence of agreement about its meaning, the term "ps" is used in many different senses and regarded as a [[]], referringse among other things to:

- Attitudes, orientations, or behaviours which take the interests, intentions, or needs of other people into account (in contrast to anti-social behaviour);has played some role in defining the idea or the principle. For instance terms like social realism, social justice, social constructivism, social psychology and social capital imply that there is some social process involved or considered, a process that is not there in regular, "non-social", realism, justice, constructivism, psychology, or capital.

The adjective "social" is also used often in political discourse, although its meaning in such a context depends heavily on who is using it. In left-wing circles it is often used to imply a positive characteristic, while in right-wing circles it is generally used to imply a negative characteristic. It should also be noted that, overall, this adjective is used much more often by those on the political left than by those on the political right. For these reasons, those seeking to avoid association with the left-right political debates often seek to label their work with phrases that do not include the word "social". An example is quasi-empiricism in mathematics which is sometimes labelled social constructivism by those who see it as an unwarranted intrusion of social considerations in mathematical practice, which is supposed to be "objective" and "above" social concerns.

Social theorists

In the view of Karl Marx [1]human beings are intrinsically, necessarily and by definition social beings who - beyond being "gregarious creatures" - cannot survive and meet their needs other than through social co-operation and association. Their social characteristics are therefore to a large extent an objectively given fact, stamped on them from birth and affirmed by socialization processes; and, according to Marx, in producing and reproducing their material life, people must necessarily enter into relations of production which are "independent of their will".

By contrast, the sociologist Max Weber [2] for example defines human action as "social" if, by virtue of the subjective meanings attached to the action by individuals, it "takes account of the behavior of others, and is thereby oriented in its course". In this case, the "social" domain really exists only in the intersubjective relations between individuals, but by implication the life of these individuals also exists in part outside the social domain. "Social" is thus implicitly also contrasted with "private".

In the positivist sociology of Emile Durkheim,[2] a social fact is an abstraction external to the individual which constrains that individual's actions. In his 1895 work *Rules of Sociological Method*, Durkheim writes: "A social fact is every way of acting, fixed or not, capable of exercising on the individual an influence, or an external constraint; or again,

every way of acting which is general throughout a given society, while at the same time existing in its own right independent of its individual manifestations." In Durkheim's view, sociology is 'the science of social facts'.

Social, socialism, social democracy

The term "socialism", used from the 1830s onwards in France and the United Kingdom, was directly related to what was called the social question. In essence, it contended that the emergence of competitive market societies did not create "liberty, equality and fraternity" for all citizens, requiring the intervention of politics and social reform to tackle social problems, injustices and grievances (a topic on which Jean-Jacques Rousseau discourses at length in his classic work *The Social Contract*). Originally the term "socialist" was often used interchangeably with "co-operative", "mutualist", "associationist" and "collectivist". The modern concept of socialism evolved in response to the development of industrial capitalism.

The term social democracy originally referred to the political project of extending democratic forms of association to the whole of society, substituting popular sovereignty, the universal franchise and social ownership for the rule of a propertied class which had exclusive voting rights.

Modern uses

In contemporary society, "social" often refers to the redistributive policies of the government which aim to apply resources in the public interest, for example, social security. Policy concerns then include the problems of social exclusion and social cohesion. Here, "social" contrasts with "private" and to the distinction between the public and the private (or privatised) spheres, where ownership relations define access to resources and attention.

The social domain is often also contrasted with that of physical nature, but in sociobiology analogies are drawn between humans and other living species in order to explain social behavior in terms of biological factors. The term "social" is also added in various other academic sub-disciplines such as social geography, social psychology, social anthropology, social philosophy, social ontology, social statistics and social choice theory in mathematics.

Regional uses

There is a peculiar use of "social" in some parts of the world. In the Canadian province of Manitoba, a "social" is a fund raising party (for a wedding, non-profit organisation, charity, small town hockey team or some other worthy cause) which is typically held in a

Royal Canadian Legion hall or community centre. It is also known as a Manitoba Social. Typically, they will include music, dancing, food, raffles (and other fund raising games). When held in support of a wedding, often they are used as a way to settle some details of the wedding (e.g., letting the bride try a hair style, practicing dancing, etc.)

Another common meaning of a "social" in English-speaking countries such as Britain, New Zealand, Canada and Australia is that of a leisure-time gathering with food and drink, organised by an institution, association, or company. A distinguishing feature is that it is deliberately organised at a venue at a predetermined time. Thus one might say, "are you going to the social?", meaning a social event by some organisation.

Other Topics : Social problems ,social issues e.g. family breakdowns,HIV& AIDS, poverty, urban housing ,unemployment, rural urban migration , refugees, street children,problems,immorality problems like prostitution, defilement ,adultery,fornication,drug abuse, causes effects and solutions for intervention should be discussed

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AFRICA POPULATION INSTITUTE
DIPLOMA IN POPULATION STUDIES COURSE WORKS
Answer all questions for each coursework

APDPS 101
Introduction to Population Science

1. a) Discuss the Elements of public health in your country.
   b) Name and discuss public health care programs in your country.

2. a, What is public health as opposed to community health.
   b, what are the categories of community health.

3. a) -What is health policy and health promotion?
   b) -Discuss with examples, health policies in your country.
   c) -What are the elements of health promotions.

APDPS 102
Micro Economics Theory

1(a) Explain in details the three fundamental concepts in economics?
(b) Discuss the five economic questions asked during the process of resource allocation and exploitation?

2 (a) Discuss the six factors that affect demand?
(b) With an Illustration Distinguish between change in supply and change in quantity supplied?

3 (a) As an economist, Explain the five ways how you would ensure price stability in your country?
(b) With examples, clearly distinguish between a pure capitalistic economies and socialistic economies?

APDPS 103
Statistics for Population & Health Scientists

Qn. 1. (a) What is meant by the term Biostatistics?
(b) How is it different from the statistics discipline?

Qn. 2. Using the examples of your choice, calculate and interpret the following epidemiologic measures;

(a) Ratio
(b) Proportion
(c) Rates (i) Incidence
(ii) Prevalence
(iii) Various Mortalities
(d) Years of Potential Loss (YPLL)

Qn. 3. Discuss the various Measures of Central tendency using your own example
a) - Mean, mode and Median
b) - Standard Deviation

APDPS 104
Computer Theory and Applications

1. Explain the term operating system and state its function to the computer

2. Describe properly characteristics of a personal computer and their limitations in today's world of work.

3. Discuss the major components of a computer system (Hard ware, Software and Human ware)

APDPS 105
Sociology Population and Anthropology

1. a) Discuss the different branches of social anthropology
b) What are the concerns of social anthropology?

2. Explain in details the following terms as used in social anthropology; ethnography, ethnology, kinship and family, social structure, cultural relativism, material culture, religion and politics.

3. a) Discuss the causes and effects and solutions for divorce in any community you are familiar with.
b) Discuss the embedded nature of social anthropology with other disciplines

APDPS 106
Fundamentals of Social Work & Social Administration

QN1,
i) In your own words, discuss what is meant by social policy?
ii) Discuss the five main sectors that defines the provision of social welfare?

QN2,
i) With relevant examples explain what is meant by social insurance?
ii) Examine the difference between a social insurance and disability insurance?

QN3,
i)Define a welfare system and how useful it is to Nation building?
ii) Define the term socialism as opposed to social democracy?

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