# PHI 102
# Arguments and Critical Thinking

Course Manual

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# Arguments and Critical Thinking

## PHI102

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# Vice-Chancellor's Message

The Distance Learning Centre is building on a solid tradition of over two decades of service in the provision of External Studies Programme and now Distance Learning Education in Nigeria and beyond. The Distance Learning mode to which we are committed is providing access to many deserving Nigerians in having access to higher education especially those who by the nature of their engagement do not have the luxury of full time education. Recently, it is contributing in no small measure to providing places for teeming Nigerian youths who for one reason or the other could not get admission into the conventional universities.

These course materials have been written by writers specially trained in ODL course delivery. The writers have made great efforts to provide up to date information, knowledge and skills in the different disciplines and ensure that the materials are user-friendly.

In addition to provision of course materials in print and e-format, a lot of Information Technology input has also gone into the deployment of course materials. Most of them can be downloaded from the DLC website and are available in audio format which you can also download into your mobile phones, IPod, MP3 among other devices to allow you listen to the audio study sessions. Some of the study session materials have been scripted and are being broadcast on the university's Diamond Radio FM 101.1, while others have been delivered and captured in audio-visual format in a classroom environment for use by our students. Detailed information on availability and access is available on the website. We will continue in our efforts to provide and review course materials for our courses.

However, for you to take advantage of these formats, you will need to improve on your I.T. skills and develop requisite distance learning Culture. It is well known that, for efficient and effective provision of Distance learning education, availability of appropriate and relevant course materials is a *sine qua non*. So also, is the availability of multiple plat form for the convenience of our students. It is in fulfilment of this, that series of course materials are being written to enable our students study at their own pace and convenience.

It is our hope that you will put these course materials to the best use.

Prof. Isaac Adewole

Vice-Chancellor

# Foreword

As part of its vision of providing   education for "Liberty and Development" for Nigerians and the International Community, the University of Ibadan, Distance Learning Centre has recently embarked on a vigorous repositioning agenda which aimed at embracing a holistic and all encompassing approach to the   delivery of its Open Distance Learning (ODL) programmes. Thus we are committed to global best practices in distance learning provision. Apart from providing an efficient administrative and academic support for our students, we are committed to providing educational resource materials for the use of our students. We are convinced that, without an up-to-date, learner-friendly and distance learning compliant course materials, there cannot be any basis to lay claim to being a provider of distance learning education. Indeed, availability of appropriate course materials in multiple formats is the hub of any distance learning provision worldwide.

In view of the above, we are vigorously pursuing as a matter of priority, the provision of credible, learner-friendly and interactive course materials for all our courses. We commissioned the authoring of, and review of course materials to teams of experts and their outputs were subjected to rigorous peer review to ensure standard. The approach not only emphasizes cognitive knowledge, but also skills and humane values which are at the core of education, even in an ICT age.

The development of the materials which is on-going also had input from experienced editors and illustrators who have ensured that they are accurate, current and learner-friendly. They are specially written with distance learners in mind. This is very important because, distance learning involves non-residential students who can often feel isolated from the community of learners.

It is important to note that, for a distance learner to excel there is the need to source and read relevant materials apart from this course material. Therefore, adequate supplementary reading materials as well as other information sources are suggested in the course materials.
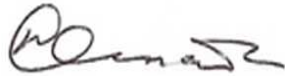
Apart from the responsibility for you to read this course material with others, you are also advised to seek assistance from your course facilitators especially academic advisors during your study even before the interactive session which is by design for revision. Your academic advisors will assist you using convenient technology including Google Hang Out, You Tube, Talk Fusion, etc. but you have to take advantage of these. It is also going to be of immense advantage if you complete assignments as at when due so as to have necessary feedbacks as a guide.

 The implication of the above is that, a distance learner has a responsibility to develop requisite distance learning culture which includes diligent and disciplined self-study, seeking available administrative and academic support and acquisition of basic information technology skills. This is why you are encouraged to develop your computer skills by availing yourself the opportunity of training that the Centre's provide and put these into use.

In conclusion, it is envisaged that the course materials would also be useful for the regular students of tertiary institutions in Nigeria who are faced with a dearth of high quality textbooks. We are therefore, delighted to present these titles to both our distance learning students and the university's regular students. We are confident that the materials will be an invaluable resource to all.

We would like to thank all our authors, reviewers and production staff for the high quality of work.

Best wishes.

Professor Bayo Okunade

Director

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# About this course manual

Arguments and Critical ThinkingPHI102 has been produced by University of Ibadan Distance Learning Centre. All course manuals produced by University of Ibadan Distance Learning Centreare structured in the same way, as outlined below.

# How this course manual is structured

## The course content

The course is broken down into Study Sessions. Each Study Session comprises:

- An introduction to the Study Session content.
- Study Session outcomes.
- Core content of the Study Session with a variety of learning activities.
- A Study Session summary.
- Assignments and/or assessments, as applicable.
- Bibliography is provided while starting the course.

## Your comments

After completing Arguments and Critical Thinking we would appreciate it if you would take a few moments to give us your feedback on any aspect of this course. Your feedback might include comments on:

- Course content and structure.
- Course reading materials and resources.
- Course assignments.
- Course assessments.
- Course duration.
- Course support (assigned tutors, technical help, etc.)

Your constructive feedback will help us to improve and enhance this course.

# GENERAL INTRODUCTION

*PHI 102: Arguments and Critical Thinking* is a course that shows students and general readers how to analyze and evaluate passages of reasoning or argument. The course is divided into ten Study Sessions. In Study Session One, we shall look at the basic concepts that are most central to this course, namely, logic, propositions and arguments. Study Session One will also avail us the opportunity to look at ways of recognizing arguments. In Study Session Two, we shall look at the structures and types of arguments, namely, deductive and inductive arguments. The distinguishing features between deductive and inductive arguments, the relations between the validity (or invalidity) of deductive arguments and the truth (or falsity) of propositions will be discussed. In Study Session Three, we shall discuss Basic Valid Argument-Forms which is an aspect of propositional logic. This Study Session will give us the opportunity to know how to determine the validity and invalidity of an argument by looking at the form of the argument. In our discussion of argument-forms, we shall examine the following nine argument-forms:Modus Ponens, Modus Tollens, Hypothetical Syllogism, Disjunctive Syllogism, Simplification, Addition, Conjunction, Constructive Dilemma, Destructive Dilemma. In Study Sessions Four, Five and Six, we shall discuss Informal Fallacies. These Study Sessions will strengthen our ability to identify and explain how ordinary language sentences can easily lead us to fallacies of reasoning.More specifically, we shall discuss Fallacies of Relevance, Fallacies of Ambiguity and Fallacies of Presumption in Study Sessions Four, Five and Six respectively. In Study Session Seven, we shall explore the term "dispute" and its relation to definition by looking at three categories of disputes, namely, obvious genuine dispute, merely verbal disputes and apparently verbal but really genuine disputes. In Study Session Eight, we shall discuss definitions and their uses by examining six types of definition, namely, stipulative, lexical, précising, theoretical, persuasive and ostensive definitions. In Study Session Nine, we shall discuss the Rules

for Definition by Genus and Difference with a view to showing thoughtful selection of the most appropriate genus for any term to be defined. Finally, in Study Session Ten, we shall look at a number of Logical Puzzles which require skill or ingenuity for their solutions.

# Bibliography

**Reading**

The following access the following additional materials for further reading

Bello, A.G.A. *Introduction to Logic* (Ibadan: University Press Ltd., 2007)

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Lawhead, W. *The Voyage of Discovery: A Historical Introduction to Philosophy* (U.K.: Wadsworth, 2002)

Lemmon, E.J. *Beginning Logic* (Ontario: Thomas Nelson, 1965)

Offor, Francis, *Essentials of Logic* (Ibadan: BookWright Publishers, 2012)

Thomas, S.T. *Practical Reasoning in Natural Language* (New Jersey: Prentice Hall Inc., 1997

http://plato.stanford.edu/entries/definitions/ retrieved Dec., 2014

http://en.wikibooks.org/wiki/Introduction_to_Philosophical_Logic/Arguments retrieved Dec., 2014

http://philosophy.lander.edu/logic/structure.html retrieved Dec., 2014

# Getting around this course manual

## Margin icons

While working through this course manual you will notice the frequent use of margin icons. These icons serve to "signpost" a particular piece of text, a new task or change in activity; they have been included to help you to find your way around this course manual.

A complete icon set is shown below. We suggest that you familiarize yourself with the icons and their meaning before starting your study.

| | | | |
|---|---|---|---|
| **Activity** | **Assessment** | **Assignment** | **Case study** |
| **Discussion** | **Group Activity** | **Help** | **Outcomes** |
| **Note** | **Reflection** | **Reading** | **Study skills** |
| **Summary** | **Terminology** | **Time** | **Tip** |

# Part I

# Arguments

In the first part of this course, we shall examine the basic concepts such as logic, proposition and argument. We shall also examine the various types, structures and forms which argument can take. Finally in this part, we will look at

# Study Session 1

# Basic Concepts in Argument and Critical Thinking

## Introduction

In this opening Study Session, we shall be looking at the basic concepts in Arguments and Critical Thinking, namely, logic, proposition, and arguments. This opening session is quite important because our understanding of these concepts will aid our grasping mettle in subsequent Study Sessions. We shall also be looking at how to analyze arguments, premise-indicators and conclusion-indicators.

### Learning Outcomes

**Outcomes**

When you have studied this session, you should be able to:

1.1  define and use correctly the following terms:
  - logic
  - proposition
  - argument
1.2  distinguish between simple and compound propositions.

## 1.1 Logic

The word **logic** can be used in different ways. It can be used to describe the totality of all laws guiding the human thought since we are rational beings whose thinking processes are based on certain principles. In strict, technical and professional sense, however, "logic is that branch of

philosophy that deals with the study of the basic principles, techniques or methods for evaluating arguments" (Offor 2012: 3). This definition shows that logic as a branch of philosophy attempts mainly to distinguish between good and bad arguments. It also can be defined as "the study of the methods and principles used to distinguish correct from incorrect reasoning" (Copi, et al 2006: 1). Thus, basically, logic is "the study of the nature and characteristics of good reasoning, and the differences between good ("correct") and bad ("incorrect") reasoning" (Thomas 1997: 1).

# 1.2 Propositions

A **proposition** can be used to refer to the content of a meaningful declarative sentence or the pattern of symbols, marks or sounds that make up a meaningful declarative sentence. It "asserts that something is (or is not) the case; any proposition may be affirmed or denied" (Copi et al 2006: 2). A proposition has the quality or property of being true or false, implying that every proposition must be either true or false. This is why a proposition is sometimes referred to as "truthbearers". Truth and falsity therefore apply always to propositions. Copi et al distinguish between propositions and sentences. They point out that sentences are the meansby which propositions are asserted. In other words, "Two different sentences, consisting of different words differently arranged, may have the same meaning and be used to assert the same proposition" (Copi et al 2006: 2). For example, the following are two different sentences that make the same assertion: "Goodluck Jonathanwon the 2011 Presidential

Election in Nigeria" and "The 2011 Presidential Election was won by Goodluck Jonathan".

We must add here that the terms "proposition" and "statement" have been used interchangeably by some logicians. Therefore, the term "statement", though not an exact synonym of proposition, "is used in logic in much the same sense. Some logicians prefer statement to propositions, although the latter has been more common in the history of logic" (Copi et al 2006: 2).

There are simple as well as compound propositions.A simple proposition makes only one assertion, while a compound proposition contains two or more simple propositions. In other words, you assert more than one proposition in a compound proposition. For example:

i.   The largest country in the world is the third most populous country in the world.

ii.  The man who won the 2011 Presidential Election is the President of Nigeria.

iii. By the 1830s the white men were the dominant race in the Hunter Valley. Most of the prime land along the main river frontages had been taken up for crops and cattle and settlers were moving into the back country north and west of the Hunter. After 1830 most resistance by the Kooris was passive, although there were spasmodic outbreaks of violence. Nevertheless, the two races could not live completely apart and growing contact was inevitable (cited in Copi et al 2006).

iv.  Turning local government areas to development areas will maximise growth. We say this because turning local government areas into development areas will depoliticise development, as suspicions of neglect due to fears of ethnic domination in various states will diminish and support for the party at the helm of affairs at the state capital or centre will also cease to be the basis for the provision of amenities in local government areas. (Adapted from *African Guardian*).

Examples (i) and (ii) are simple propositions, while (iii) and (iv) are examples of compound propositions.

# 1.3 Arguments

According to Copi et al (2006: 4):

> Propositions are the building blocks of which arguments are made. When we reach or affirm one proposition on the basis of other propositions, we say that an ***inference*** has been drawn. Inference is process that may tie a cluster of propositions together. Some inferences are warranted or correct, others are not. To determine whether an inference is correct, the logician examines the propositions with which the process begins and ends, and the relations between those propositions. This cluster of propositions constitutes an *argument.* Arguments are the chief concern to logic.

The term 'argument' can have a dual meaning. In ordinary discourse, it connotes a quarrel or disagreement, whereas in logic – thatis, in the technical sense – an argument is a sequence of statements, 'declarative sentences' or propositions, in which one part known as the conclusion is claimed to follow from the others called the premises. In clear terms, therefore, an argument is any group of propositions of which one is claimed to follow from the others, which are regarded as providing support or grounds for the truth of that one.That means that an argument is not just a mere collection of statements. An argument has a structure which is defined by the terms 'premises' and 'conclusion' and the nature of the relationship between them.

**Reflection**

Do you think that an argument is different from a quarrel?

The conclusion of an argument is that proposition which is affirmed on the basis of some other propositions, which serve as justification for the acceptance of the conclusion. These other propositions, which go by various names such as evidence, grounds, or reasons, are more professionally called premises. In an argument, therefore, the premises are intended to provide sufficient grounds for the acceptance of the conclusion.For an argument to be present, "there must be some structure within the cluster of propositions, a structure that captures or exhibits some inference. This structure we describe using the terms *premise* and*conclusion*" (Copi et al 2006: 4).Thus, the premise is a proposition used in an argument to support some other proposition, while the

conclusion is the proposition in an argument that the other propositions (that is, the premises) support. Where there is no relationship whatsoever between the putative claim or conclusion and the reasons given for its acceptance, then there is no argument.

An argument may have two sentenceswhere the first sentence serves as the basis for accepting the other which is the conclusion.In other words, the premise and the conclusion may be stated separately, each in a separate sentence. For example:

(i)     Donte Drumm has not been convicted of the crime of murder. Therefore, any statement indicting him of the murder should be jettisoned as mere insinuation.

(ii)    Okorocha is a politician who has recorded great success at the state level. Therefore, he will win the presidential election in 2015.

Sometimes, both the premise and the conclusion may be stated in the same sentence. For example:

(i)     Since it turns out thatall humans are descended from a small number of African ancestors in our recent evolutionary past, believing in profound differences between the races is as ridiculous as believing in a flat earth (Copi et al 2006: 4).

(ii)    Since it was clear that Daryll was not in London when her husband died, it would be wrong to bring her to court for questioning.

(iii)   Large numbers of people in this country have never had to deal with the criminal justicesystem, thus they are unaware of how it works and of the extraordinary detrimental impact it has upon many people's lives.

(iv)   Human brains have the same kind of chemistry and cell receptors as rats regarding glucocorticoids, so, it seems possible that our response to being handles as infants is similar.

In an argument with two separate sentences (one the premise and the other the conclusion), the statement of the conclusion may be stated first before the statement of its premise. For example:

(i)   Smoking in public places should be banned immediately. After all, passive smoking can cause cancer in non-smokers (Copi et al 2006: 5).

(ii)   Corrupt politicians should be banned from holding public offices. After all, statistics has shown that corrupt politicians who hold public offices are responsible for our economic problem.

It is also the case that, even when premise and conclusion are united in one sentence, the conclusion of an argument may be stated first before its single premise.Let's take, for example, a statement made by Malcolm X in 1965:

You can't separate peace from freedom because no one can be at peace unless he has freedom.

The above examples of simple arguments remind us that, in some arguments, the premises of the argument are stated first and the conclusion last. In some others, the conclusion is either stated first or is sandwiched in-between different premises offered in its support.

Just as we drew a distinction between simple and compound propositions, it must be stated that most arguments are more complicated than the ones we used as examples. In other words, "some arguments contain compound propositions with their several components related intricately" (Copi et al 2006: 5). This means that we have cases where an argument has two or more propositions (premises) supporting a proposition (conclusion).We are warned however that some compound propositions may resemble arguments; to determine whether a group of propositions or statements is an argument or not, therefore,we should ensure that (1) an inference is drawn and (2) a conclusion should be claimed to be true. For example:

> It is likely that life evolved on countless other planets that scientists now believe exist in our galaxy, because life very probably evolved on Mars during an early period in its history when it had an atmosphere and climate similar to Earth's (cited in Copi et al 2006).

In the above argument,an inference is drawn and a conclusion is claimed to be true.The proposition "life very probably evolved on Mars during an early period in its history" is asserted as a premise and the proposition "life likely evolved

on countless other planets" is here claimed to follow from that premise and to be true.

## Recognizing Arguments

Earlier we have shown with examples the following:

(i)  An argument may have two sentenceswhere the first sentence serves as the basis for accepting the other which is the conclusion.In other words, the premise and the conclusion may be stated separately, each in a separate sentence.

(ii)  Sometimes, both the premise and the conclusion may be stated in the same sentence.

(iii)  In an argument with two separate sentences (one the premise and the other the conclusion), the statement of the conclusion may be stated first before the statement of its premise.

(iv)  It is also the case that, even when premise and conclusion are united in one sentence, the conclusion of an argument may be stated first before its single premise.

The inference from this is that, in some arguments, the premises of the argument are stated first and the conclusion last. In some others, the conclusion is either stated first or is sandwiched in-between different premises offered in its support. In order to arrange such arguments into their premises and conclusions, "there are words or phrases that typically serve to introduce the premises and the conclusion of an argument" (Offor 2012:15). The words and phrases are referred to variously as conclusion-indicators and premise-

indicators.  The following is a list of some conclusion-indicators:

| | |
|---|---|
| Therefore | for these reasons |
| Hence | it follows that |
| So | I conclude that |
| Accordingly | which shows that |
| In consequence | which means that |
| Consequently | which  entails that |
| Proves that | which implies that |
| As a result | which allows us to infer that |
| For this reason | which points to the conclusion that |
| Thus | we may infer |

The following is a list of premise-indicators:

| | |
|---|---|
| Since | as indicated by |
| Because | the reason is that |
| For | for the reason that |
| As | may be inferred from |
| Follows from | may be derived from |
| As shown by | may be deduced from |
| In as much as | in view of the fact that |

Let us rely on these indicators to identify the premises and conclusions in the following arguments:

(i)  What science can't know, mankind can't know. Therefore, all knowledge comes from science.

(ii)    Abortion is evil not only to the victim but also to our sense of justice. Hence, it should be abolished.

(iii)   Inasmuch as man is created first, man should be the master of all creatures (Offor 2012: 16).

In (i) and (ii), the indicators "therefore" and "hence" help to identify the conclusions which affirm that "... all knowledge comes from science" and that abortion "... should be abolished" respectively. In (iii), the indicator "inasmuch as" helps to identify the premise which gives support to the claim (conclusion) that "man should be the master of all creatures". It must be stated, however, that "the words and phrases listed above may help to recognize the presence of an argument or identify its premises or conclusion, but such indicators do not necessarily appear. Sometimes it is just the meaning of the passage, or its setting, that indicates the presence of an argument" (Copi et al 2006: 28).Thus, if an argument does not have premise or conclusion indicators, we are required "to identify the claim the person presenting the argument is trying to make. This is the conclusion of the argument, while the reasons given in support of such a claim are the premises of the argument" (Offor 2012: 17).

**Reflection**

Construct three arguments from typical texts in a newspaper or law report.

# Study Session Summary

**Summary**

In this Study Session, we looked at the basic concepts that are most central to this course, Arguments and Critical Thinking, namely: logic, propositions and

arguments. We defined logicas the study of the methods and principles used to distinguish correct from incorrect reasoning. We gave an account of propositionsand distinguished them from the sentences in which they may be expressed. We gave an account of the concept of an argument and defined an argument as a cluster of propositions of which one is the conclusion and the other(s) are premises offered in its support. Finally, we looked at ways of recognizing arguments through phrases and words we call conclusion-indicators and premise-indicators.

# Assessment

**Assessment**

**SAQ 1.1 (tests Learning Outcomes 1.1, 1.2 and 1.3)**

Identify the premises and conclusions in the following passages, each of which contains only one argument:

(i)  "Untouchability" is abolished and its practice in any form is forbidden. The enforcement of any disability arising out of "Untouchability" shall be an offence punishable in accordance with law.

(ii)  Forbear to judge, for we are sinners all.

(iii)  Because light moves at a finite speed, looking at objects that are millions of miles away is actually at light that was emitted many years ago.

(iv)  Because the education of parents directly impacts the ability of their children to succeed in school, it is an urgent necessity that this generation of Nigerian youth is properly educated.

(v)   Unquestionably, no more important goal exists in medical research today than the development of an AIDS vaccine. Last year ... AIDS, caused by HIV (Human Immunodeficiency Virus) was the infection disease that killed the most people around the world, and the epidemic is not abating.

**See Copi et al 2006: 6 – 9**

# Assignment

**Assignment**

1. Indicate which of the following statements are true or false:

   a. Logic deals only with deductive arguments.

   b. An argument refers to a group of statements in which one part known as the premise(s) follows from the other part called the conclusion.

   c. The transition or movement from the premises to the conclusion is the inference upon which an argument relies.

2. Is there any difference between a proposition and a statement?

3. Give two examples of a simple proposition.

4. Give two examples of a compound proposition.

5. Do you agree that not all propositions are arguments? Justify your answer.

6. Identify the premise(s) and the conclusion in each of the following passages:

   a. People who smoke cigarettes should be forced to pay for their own health insurance. They know that smoking is bad for their health. They have no right to expect others to pay for their addiction.

   b. Being married provides a man with greater freedom than being single because he needs not worry about day-to-day chores, cleaning the house, making dinner, spending hours with children, or anything else to do with home.

c. Put off thy shoes from thy feet, for the place whereon thou standest is holy ground.

d. According to law, a man is innocent until proved guilty. So Mr Larry must be innocent of the charge of murder, since he has not yet been proved guilty.

e. Capital punishment should not be permitted because it consists of killing of human beings, and killing of human beings should never be permitted by society.

f. It is essential that levels of arsenic in drinking water be kept to a minimum. Arsenic cause lung, skin and bladder cancer. It also causes diseases of the liver, blood vessels and other organs.

g. People who pirate music from the internet are cutting their own throats. By cheating recording artistes out of their royalties, these pirates are driving the artistes out of business. If the artistes go out of business, there will be no more music.

h. It is likely that innocent Americans have been executed in recent past. During the past 25 years, 87 innocent men and women have been released from death row as a result of evidence that turned up after they were convicted.

i. The presumption that the creation of states automatically means the creation of development is wrong. There are many areas in this country which have seen no progress even though they have been affected several times by the state creation exercise.

# Study Session 2

# Structure and Types of Argument

## Introduction

In the previous study session, we pointed out that a proposition may not necessarily qualify as an argument; to determine whether a group of propositions or statements is an argument or not, therefore, we should ensure that an inference is drawn and a conclusion should be claimed to be true. But there are basically two different ways in which a conclusion of an argument may be supported by its premises, namely, (1) the premises may give total support to the conclusion of an argument and (2) the premises may support the conclusion only with some degree of probability. This distinction informs why arguments are categorized into two: Deductive and Inductive.

### Learning Outcomes

**Outcomes**

When you have studied this session, you should be able to:

2.1 distinguish between deductive and inductive arguments.

2.2 point out if an argument is valid or invalid.

## 2.1 Overview on Deductive Reasoning and Inductive Reasoning

Historically speaking, deductive reasoning can be traced back to the ancient Greek philosopher, Aristotle. Inductive reasoning, on the other hand, was developed by the famous

British philosopher, Francis Bacon and his successor, J.S. Mill. In deduction, we infer particular from general truths, while in induction, we infer general from particular. Accordingly:

> A deductive argument makes the claim that its conclusion is supported by its premises conclusively. An inductive argument, in contrast, does not make such a claim. Therefore, if we judge that in some passage a claim or conclusiveness is being made, we treat the argument as deductive; if we judge that such a claim is not being made, we treat it as inductive. Since every argument either makes this claim of conclusiveness (explicitly or implicitly) or does not make it, every argument is either deductive or inductive (Copi et al 2006: 9).

There are distinguishing features between deductive and inductive arguments. If we are confronted with an argument whose truth of its premises guarantees the truth of its conclusion, then that argument is said to involve in a deductive inference. In other words, "a deductive inference succeeds only if its premises provide such absolute and complete support for its conclusion that it would be utterly inconsistent to suppose that the premises are true but the conclusion false" (Offor 2012: 22). On the other hand, an argument is said to involve an inductive inference if it "claims merely that the truth of its premises make it likely or probable that its conclusion is also true" (Ibid.) This means that in an

inductive argument the premises do not give total support to the conclusion but merely provide some grounds for the truth of their conclusions. The foregoing can be termed as the distinguishing features between deductive and inductive arguments. These features can be summarised thus:

1. In a deductive argument, the premises conclusively or logically imply the conclusion; in an inductive argument, the premises only provide some probable grounds for the acceptance of the conclusion.

2. If the premises of a deductive argument provide conclusive grounds for the truth of the conclusion, then the argument is said to be valid; inductive arguments cannot be valid but can be strengthened or weakened by additional premises.

3. If a deductive argument is valid, then it is impossible for its premises to be true and its conclusion false; it is possible for the conclusion of an inductive argument to be false even when the premises are true (Offor 2012: 23).

Examples of deductive argument are:

(i)    All humans are mortal

Aristotle is human

Therefore Aristotle is mortal.

(ii)   All humans are animals
All animals are mortal
Therefore all humans are mortal.

(iii)  All Nigerians are Africans
All Africans are coloured

Therefore, all Nigerians are coloured.

(iv) In order to study in the United Kingdom, you have to develop yourself in the field of philosophy, and in order to develop yourself in the field of philosophy, you have to read the works of Plato and Aristotle. Therefore, in order to study in the United Kingdom you have to read the works of Plato and Aristotle.

Examples of inductive argument are:

(i) John is human and is mortal

Peter is human and is mortal

James is human and is mortal

Therefore, probably all humans are mortal.

(ii) Kennedy was an orator and was a good leader. Churchill was an orator and was a good leader. Babangida was an orator. Therefore, Babangida will probably be a good leader.

(iii) The cows have kidneys and have lungs. All horses have kidneys and have lungs. All human beings have kidneys and have lungs. Therefore, all animals with kidneys have lungs.

(iv) All politicians are criminals and will eventually die. All soldiers are criminals and will eventually die. Therefore, probably all men are criminals and will eventually die.

| ITQ | 27 |
| --- | --- |

**Question**

Fill the blank spaces with the appropriate term.

1) The conclusion of _____ follows necessarily from the premises and inferences.
2) _____ is supposed to be a definitive proof of the truth of the claim (conclusion).
3) _____ is one in which the premises are supposed to support the conclusion in such a way that if the premises are true, it is improbable that the conclusion would be false.
4) In _____, if the premises are true (and they are), then it simply isn't possible for the conclusion to be false.
5) In _____, the conclusion follows probably from the premises and inferences.
6) _____ starts out with a general statement and examines the possibilities to reach a specific, logical conclusion.
7) In _____, if something is true of a class of things in general, it is also true for all members of that class.

**Feedback**

Deductive argument is applicable as answers to questions 1,2, 4, 6 and 7
.

Inductive argument is applicable as answers to questions 3 and 5.

# 2.2 Truth, Validity and Soundness of an Argument

Earlier in this study session, we pointed out that, in deductive arguments, the premises provide conclusive grounds for the truth of the conclusion. A statement or proposition is said to be true if it expresses what really is the case and is false if it does not conform with the situation it expresses. More lucidly, truth is the attribute of a statement or proposition that asserts what really is the case.Therefore, when the premises provide conclusive or incontrovertible grounds for the truth of the conclusion, the argument is said to be valid. This shows that there is some connection between truth and validity of an argument. However, the term *validity* is applicable only to deductive arguments and to say that a deductive argument is valid is to say that it is not possible for its conclusion to be

false if its premises are true. Thus,"adeductive argument is *valid* when, if its premises are true, its conclusion *must* be true" (Copi et al 2006: 9).But if the premises of a deductive argument fail to guarantee the truth of its conclusion, the argument is said to be invalid. Here, it is instructive to show the contrast between truth and validity. If, for instance, I assert that Nigeria's premier university is situated in Ibadan, the capital of Oyo State, I assert what really is the case, what is true. If I had claimed that the premier university is in Abuja, my assertion would not be in accord with the real world; therefore it would be false. It can be gleaned, therefore, that"truth and falsity are attributes of individual propositions or statements; validity and invalidity are attributes of arguments" (Copi et al 2006: 12).

Copi et al (2006: 12) explicate further on the relations between truth and validity by pointing out that:

> Just as the concept of validity cannot apply to single propositions, the concept of truth cannot apply to arguments. Of the several propositions in an argument, some (or all) may be true and some (or all) may be false. But the argument as a whole is neither *true* nor *false*. Propositions, which are statements about the world, may be true or false; deductive arguments, which consist of inferences from one set of propositions to other propositions, may be *valid or invalid*.

With seven illustrative arguments, Copi et al (2006: 13 – 14) show that there are many possible combinations of true and false premises and conclusions in both valid and invalid arguments, implying that:

1. an argument may be valid even when its conclusion and one or more of its premises are false and

2. the validity of an argument depends only on the relation of the premises to the conclusion. In other words, the truth or falsity of an argument's conclusion does not by itself determine the validity or invalidity of that argument and, also, the fact that an argument is valid does not guarantee the truth of its conclusion.

The illustrative arguments can be represented thus:

I.  Some *valid* arguments contain *only true* propositions– true premises and a true conclusion:

All terrestrial beings live on earth.

All humans are terrestrial beings.

Therefore all humans live on earth.

II. Some *valid* arguments contain *only false* propositions– false premises and a false conclusion:

All Cyclops have dark skin.

All flying horses are Cyclops.

Therefore all flying horses have dark skin.

This argument is valid because, if its premises were true, its conclusion would have to be true also- even though we know that in fact both the premises *and* the conclusion of this argument are false.

III. Some *invalid* arguments contain *only true* propositions – all their premises are true, and theirconclusions are true as well:

If I bagged a bachelor's degree from the University of Ibadan, then I would be a graduate.

I do not have a degree from the University of Ibadan.

Therefore I am not a graduate.

The true conclusion of this argument does not follow from its true premises. The fact that I do not have a degree from the University of Ibadan does not presuppose that I am not a graduate.

IV. Some *invalid* arguments contain *only true premises* and have a *false conclusion.* This is illustrated by an argument exactly like the previous example (III)in form, changed only enough to make the conclusion false.

If Adebola Ekanola bagged a bachelor's degree from the University of Ibadan, then he would be a graduate.

He does not have a degree from the University of Ibadan.

Therefore he is not a graduate.

The premises of this argument are true, but its conclusion is false. This above example underscores our point that it is impossible for the premises of a valid argument to be true and its conclusion to be false.

V. Some *valid* arguments have *false premises and a true conclusion:*

All spiders belong to the cat family.

All tigers are spiders.

Thereforetigers belong to the cat family.

The conclusion of this argument is true and may be validly inferred from these two premises, both of which are wildly false.

VI.Some *invalid* arguments also have *false premises and a true conclusion:*

All arachnids have wings.

All scorpions have wings.

Therefore all scorpions are arachnids.
From examples V and VI taken together, it can be inferred that the validity or invalidity an argument does not depend on whether it has false premises and a true conclusion.

VII. Some *invalid* arguments, of course, contain *all false* propositions– false premises and a false conclusion:

All arachnids have wings.

All scorpions have wings.

Therefore all arachnids are scorpions.
An argument is said to be sound if that argument is valid and has all its premises as true. On the contrary, an argument is unsound if the premises fail to establish the truth of its conclusion. Thus, "the conclusion of a sound argument obviously must be true – and only a sound argument can

establish the truth of its conclusion. If a deductive argument is not sound – that is, if the argument is not valid *or* if not all its premises are true – it fails to establish the truth of its conclusion even if in fact the conclusion is true" (Copi et al 2006: 15). Let's illustrate the difference between sound and unsound arguments with examples:

(i)   All elephants are herbivores

   All herbivores live on land

   Therefore, all elephants live on land.

(ii)   All university graduates are lawyers

   All lawyers are soothsayers

   Therefore, all university graduates are soothsayers.

The first example is a sound argument, while the second is unsound because all the statements in the argument are false, though the argument is valid.

# Study Session Summary

**Summary**

In this Study Session, we pointed out the distinguishing features between deductive and inductive arguments. You learnt that if an argument whose truth of its premises guarantees the truth of its conclusion, then that argumentinvolves a deductive inference. In other words, the conclusion of a deductive argument is claimed to follow from the premises with necessity, and a valid deductive argument as one in which conclusion is necessarily true if the premises are true. An inductive argument, on the other hand, is an argument whose conclusion has some degree of probability

but for which the claim of necessity is not made. We went on to discuss therelations between the validity (or invalidity) of deductive arguments and the truth (or falsity) of propositions.

# Assessment

**Assessment**

**SAQ 2.1 (tests Learning Outcome 2.1)**

Analyse the following set of statement:

1) Socrates was Greek.

   Most Greeks eat fish.

   Socrates ate fish.

2) All men are mortal.

   Socrates was a man.

   Socrates was mortal.

**SAQ 2.2 (tests Learning Outcome 2.1 and 2.2)**

Construct a series of deductive arguments, on any subject of your choosing, each with only two premises, having the following characteristics:

(i)    A valid argument with one true premise, one false premise, and a false conclusion.

(ii)   A valid argument with two false premises and a true conclusion.

# Assignment

**Assignment**

1) State the distinguishing features of deductive and inductive arguments.

2) Indicate which of the following statements are true or false:

   a. In a deductive argument, the premises logically imply the conclusion.

   b. It is possible for the conclusion of an inductive argument to be false even when the premises are true.

3) Identify each of the following arguments by stating whether it is deductive or inductive:

   a. Kennedy was an orator and was a good leader. Churchill was an orator and was a good leader. Babangida was an orator. Therefore, Babangida will probably be a good leader.

   b. Hunting, particularly the hunting of large animals, is so complicated, difficult and hazardous that the cooperation of numerous individuals are needed. It can be inferred, therefore, that Peking man was more likely to have been living in a group than in solitude when he began to hunt deer.

   c. The cows have kidneys and have lungs. All horses have kidneys and have lungs. All human beings have kidneys and have lungs. Therefore, all animals with kidneys have lungs.

   d. In order to study in the United Kingdom, you have

to develop yourself in the field of philosophy, and in order to develop yourself in the field of philosophy, you have to read the works of Plato and Aristotle. Therefore, in order to study in the United Kingdom you have to read the works of Plato and Aristotle.

e.   All London-based businessmen are graduates from Boston. William Crain is a London-based businessman. Therefore, William Crain is a graduate from Boston.

4) Discuss the relation between validity and truth.

5) State one feature of a sound argument.

6) Construct a series of deductive arguments, each with only two premises and having the following characteristics:

a.  a valid argument with one true premise, one false premise, and a true conclusion.

b.  An invalid argument with two true premises and a false conclusion.

c.  An invalid argument with two true premises and a true conclusion.

d.  An invalid argument with two false premises and a true conclusion.

e.  An invalid argument with one true premise, one false premise and a true conclusion.

f.  A valid argument with two true premises and a true conclusion.

# Study Session 3

# Basic Valid Argument-Forms

## Introduction

In our last Study Session, we examined types of arguments which include: logic, proposition and arguments. In this session, we shall examine an aspect of propositional logic - basic valid argument-forms. Specifically, this session will help you to know how to determine the validity and invalidity of an argument by looking at the form of the argument. The point here is that if an argument with a form X is valid, all other arguments having form X will also be valid. If, on the other hand, an argument with a form Y is invalid, then all other arguments having form Y will be invalid. To state this more clearly, the form of an argument determines the validity and invalidity of such an argument.

## Learning Outcomes

Outcomes

When you have studied this session, you should be able to:

3.1  use logical connectives to combine simple statements to form compound statements.

3.2  identify the valid argument-form that is represented by different arguments that are valid.

## 3.1 Symbols for Logical Connectives

**Basic valid argument-forms** deal mainly with *the ways in which simple statements are combined together to form compound statements, as well as the validity and invalidity of arguments that can be constructed using such statements*

(Offor 2012: 131). Before we go into the details of our study, however, it is expedient that we look first at the symbols for "logical connectives". These symbols are indispensable in propositional logic because they help in "connecting" or to combine two or more simple statements to form compound statements

For instance, the statement "John is in Ibadan" is a simple statement because it has no other statement as part of its component; whereas the statement"John is in Ibadan and Mary is studying law"is a compound statement because it combines two simple statements. Therefore, a compound statement is a statement that contains another statement as a component. Note that the connective in the compound statement cited above is the word "and", the symbol of which we shall see shortly. We must add that the components of a compound statement may themselves be compound.

We have shown that compound statements or propositions are formed by using logical connectives to "connect" or combine two or more simple statements. Let's now look at the symbols for logical connectives by examining propositions under the following:    (i)  conjunction,

(ii) disjunction,

(iii) conditional,

(iv) bi-conditional, and

(v) negation.

### 3.1.1 Conjunction

A **conjunction** is a type of compound statement which consists of two propositions joined together by words like 'and', 'but', 'though' and their equivalents. The two statements combined to form a conjunction are called *conjuncts* and "and" (or its equivalents) that is placed between the two statements is symbolized by the dot(•) sign. Thus, the statement "John is in Ibadan and John is studying law" is a conjunction whose first conjunct is "John is in Ibadan" and whose second conjunct is "John is studying law". Where each of the conjuncts is represented by *p*and*q* respectively, the above conjunction will be symbolized as *p•q*. Given any two statements, say *p* and *q*, there are fourpossible conditions under which the statements can be true or false. Therefore, the four possible conditions under which statements involving a conjunction can be true or false can be expressed using the following table:

$$p•q$$

T  T  T

T  F  F

F  F  T

F  F  F

The above table shows that a conjunction is true only when both conjuncts are true, and false when at least one of the conjuncts is false.

## 3.1.2 Disjunction

A **disjunction** is a compound proposition in which two statements are joined together by inserting the logical connective "or"(or its equivalent) between them. The two component statements of a disjunction are called *disjuncts*(or "alternatives") and the logical symbol that represents the disjunction is the wedge (**v**). The expression "John is in Ibadan or Mary is studying law" is a disjunction whose first disjunct is "John is in Ibadan" and whose second disjunct is "Mary is studying law". Where each of the disjuncts is represented by *p*and*q* respectively, the above disjunction will be symbolized as *p*v*q*. Given any two statements, say *p* and *q*, the truth conditions for a disjunction can be expressed as follows:

$$p\textbf{v}q$$

T  T  T

T  T  F

F  T  T

F  F  F

The above table shows that a disjunction is true when at least one of the disjuncts is true. A disjunction is false only in case both of its disjuncts are false.

## 3.1.3 Conditional

Referred to variously as "hypothetical" or "implicative" statement, a conditional is formed when two statements or propositions are joined together by placing the word"If" before the first and inserting the word"then" between them. To put this simply, a conditional statement is a compound

statement of the form "If *p* then *q*"in a conditionalthe statement between the "If" and the "then" is called the "antecedent", while the statement following the "then" is called the "consequent". The logical symbol that represents the conditional is the "horseshoe" sign (⊃).The expression "If John is in Ibadan then Mary is studying law" is a conditional whose antecedent is "John is in Ibadan" and whose consequent is "Mary is studying law". Where the antecedent and consequent are represented by *p*and*q* respectively, the above conditional will be symbolized as *p⊃q*. Given any two statements, say *p* and *q*, the truth conditions for a conditional can be expressed as follows:

*p⊃q*

T  T  T

T  F  F

F  T  T

F  T  F

The above table shows that a conditional statement is only false when the antecedent is true and the consequent is false.

### 3.1.4 Bi-conditional

A bi-conditional is a compound statement or proposition that asserts that its two component statements have the same truth value and therefore are equivalent. In other words, the two component statements in a conditional are either both true or both false, thereby implying one another. In a bi-conditional, two statements or propositions are joined together by the connective "if and only if", where each of the two statements

that form a bi-conditional is called a "component". The logical sign that represents the bi-conditional is the triple bar ().  "John is in Ibadan if and only if Mary is studying law" is a bi-conditional. The first component in the bi-conditional is "John is in Ibadan", the second is "Mary is studying law". Where the first and the second component of a bi-conditional are represented by *p* and *q* respectively, the above bi-conditional will be symbolized as *pq*. Given any two statements, say *p* and *q*, the truth conditions for a bi-conditional can be expressed as follows:

<div align="center">

*pq*

T  T  T

T  F  F

F  F  T

F  T  F

</div>

The above table shows that a bi-conditional statement is true when either both components are true or both components are false; it is false if both components have different truth-values.

## 3.1.5 Negation

The statement "Mary is studying law" is negated when it is expressed as "Mary is not studying law". Therefore, the negation of a statement is also referred to as the denial of that statement. A negation is a sentence which contains the word "not" or its equivalents, like "it is false that", "it is not the case that". The logical sign that represents the negation is the tilde or curl sign (). Thus, the statement "Mary is studying law" is negated when it is expressed as "It is false that Mary is studying law" or "It is not the case that Mary is studying law".

In other words, where the statement "Mary is studying law" is symbolized as *p*, its negation "Mary is studying law" or "It is false that Mary is studying law" or "It is not the case that Mary is studying law" will be symbolized as "*p*". In summary, the negation of any true statement will be false and the negation of any false statement will be true. This is presented in the table below:

| *p* | *p* |
|-----|-----|
| T   | F   |
| F   | T   |

# 3.2 Valid Argument-Forms

Now that we are familiar with the various symbols, called "logical connectives", which will unavoidably come into play in our discussion of argument-forms, let's now examine nine argument-forms that are valid. Remember that we've pointed out that if an argument having a form X is valid, all other arguments having form X will also be valid. If, on the other hand, an argument having a form Y is invalid, then all other arguments having form Y will be invalid.

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**ITQ**

**Question**

True or false: Valid argument-forms are made of compound statements?

**Feedback**

If you have chosen true, then you are right. Valid argument-forms comprises of two or more simple statements.

---

### 3.2.1 Modus Ponens

**FORM:**  $p \supset q$

  $p$

  $q$

The above form can be represented by the following argument:

**Premise I:** If the sun rises then the weather is hot.

**Premise II:** The sun rises.

**Conclusion**: Therefore, the weather is hot.

What Modus Ponens as a valid argument-form is saying is that, given a conditional statement as a first premise, and the antecedent of the first premise as the second premise, then we can infer the consequent of the first premise as the conclusion of an argument.

### 3.2.2 Modus Tollens

**FORM:**  $p \supset q$

  $q$

  $p$

The above form can be represented by the following argument:

**Premise I:** If the sun rises then the weather is hot.

**Premise II:** The weather is not hot.

**Conclusion**: Therefore, the sun does not rise.

What is implied by the above is that, given a conditional statement as the first premise, and the denial of the consequent

of the first premise as the second premise, we can arrive at the conclusion of an argument by negating the antecedent of the first premise.

### 3.2.3 Hypothetical Syllogism

FORM:      $p \supset q$

$q \supset r$

$p \supset r$

The above form can be represented by the following argument:

**Premise I:** If the sun rises then the weather is hot.

**Premise II:** If the weather is hot then there will be drought.

**Conclusion**: Therefore, if the sun rises then there will be drought.

Thus, hypothetical syllogism is saying that, given two conditional statements as the first and second premise of an argument, and the consequent of the first premise is the same as the antecedent of the second premise, then we can arrive at the conclusion by stating that the antecedent of the first premise implies the consequent of the second premise.

### 3.2.4 Disjunctive Syllogism

FORM:      $p \lor q$

$q$

$p$

OR      $p \lor q$

$p$

$q$

The above form can be represented by the following argument:

**Premise I:** Either the sun rises or the weather is hot.

**Premise II:** The weather is not hot.

**Conclusion:** Therefore, the sun rises.

**OR**

**Premise I:** Either the sun rises or the weather is hot.

**Premise II:** The sun does not rise.

**Conclusion:** Therefore, the weather is hot.

The above argument-form is saying that, given a disjunction as the first premise in an argument, and a negation of any of the disjuncts of the first premise as the second premise, then we can arrive at the conclusion by affirming the other disjunct which does not appear in the second premise.

## 3.2.5 Simplification

$$\textbf{FORM:} \qquad \textit{\textbf{p•q}}$$

$$\textit{\textbf{p}}$$

$$\textbf{OR} \qquad \textit{\textbf{p•q}}$$

$$\textit{\textbf{q}}$$

The above form can be represented by the following argument:

**Premise:** The sun rises and the weather is hot.

**Conclusion:** Therefore, the sun rises.

**OR**

**Premise:** The sun rises and the weather is hot.

**Conclusion:** Therefore, the weather is hot.

The above is saying that, given a conjunction of two statements as the only premise in an argument, you can conclude by affirming any of the conjuncts.

### 3.2.6 Addition

$$\begin{array}{ll} \textbf{FORM:} & p \\ & p \lor q \end{array}$$

$$\begin{array}{ll} \textbf{OR} & p \\ & q \\ & p \lor q \end{array}$$

The above form can be represented by the following argument:

**Premise:** The sun rises.

**Conclusion:** Therefore, the sun rises or the weather is hot.

**OR**

**Premise I:** The sun rises.

**Premise II:** The weather is hot.

**Conclusion:** Therefore, the sun rises or the weather is hot.

The above implies that, given a statement, you can form a disjunction of which that statement is a part or you can form a disjunction of two existing statements. Simply put, given any proposition $p$, addition permits the inference that $p$ or $q$.

### 3.2.7 Conjunction

$$\begin{array}{ll} \textbf{FORM:} & p \\ & q \\ & p \cdot q \end{array}$$

The above form can be represented by the following argument:

**Premise I:** The sun rises.

**Premise II:** The weather is hot.

**Conclusion:** Therefore, the sun rises and the weather is hot.

The above shows that conjunction permits statements assumed to be true to be combined in one compound statement. In other words, given two separate statements (premises), your conclusion simply is the conjunction of the two statements.

## 3.2.8 Constructive Dilemma

$$\textbf{FORM:} \qquad (p \supset q) \cdot (r \supset s)$$

$$p \lor r$$

$$q \lor s$$

The above form can be represented by the following argument:

**Premise I:** If the sun rises then the weather is hot and if there is earthquake then there will be flood.

**Premise II:** Either the sun rises or there is earthquake.

**Conclusion:** Therefore, either the weather is hot or there will be flood.

The above argument-form states that, given a conjunction of two conditional statements as the first premise in an argument, and the disjunction of their respective antecedents as the second premise, our conclusion will be the disjunction of their consequents.

### 3.2.9 Destructive Dilemma

**FORM:**       $(p \supset q) \cdot (r \supset s)$

$q$ v $s$

$p$ v$r$

The above form can be represented by the following argument:

**Premise I:** If the sun rises then the weather is hot and if there is earthquake then there will be flood.

**Premise II:** Either the weather is not hot or there will be no flood.

**Conclusion:** Therefore, either the sun does not rise or there is no earthquake.

The above argument-form states that, given a conjunction of two conditional statements as the first premise in an argument, and the disjunction of their negated consequents as the second premise, our conclusion will be the disjunction of their negated antecedents.

# Study Session Summary

**Summary**

In this Study Session, we have explored the symbols for "logical connectives" because these symbols are indispensable in propositional logic. You consequently learnt how to determine the validity and invalidity of an argument by looking at the form of the argument.

# Assignment

**Assignment**

Give the name of the valid argument-form represented by each of the following:

(i)     If the system is democratic, then we must elect the officers. The system is democratic; thus, we must elect the officers.

(ii)    If drunkenness were the cause of the accident, some trace of alcohol would have been found. After careful investigation, no trace of alcohol was found. Hence, drunkenness was not the cause of the accident.

(iii)   If you are a teacher then you will be poor. If you are poor then you will remain a bachelor. Therefore, if you are a teacher, then you will remain a bachelor.

(iv)    You are either a teacher or a morgue attendant. You are not a morgue attendant. Therefore, you are a teacher.

(v)     Either the wealthiest people are the happiest, or it is not the case that money can buy everything. The wealthiest people are not the happiest. Therefore, money cannot buy everything.

# Part II

# Informal Fallacy

From the foregoing Study Sessions, we have been able to show that, for us to have a good argument, the premises must support the conclusion. When the premises of an argument fail to support its conclusion, the argument is said to be bad or, more technically, fallacious.

A fallacy is, therefore, "a type of argument that may seem to be correct but that proves, on examination, not to be so". From the foregoing, it is clear that "a fallacy has two features: first, it is an argument; second, its premises provide no support to the conclusion though they appear to do so, because the argument is psychologically persuasive". There are 'Formal' and 'Informal' fallacies.

- Formal fallacies are the types of mistakes we make in our attempt to construct syllogisms (deductive reasoning/a logical argument with two premises and a conclusion) or in using logical symbols.
- Informal fallacies, on the other hand, are the types of errors in reasoning that occur as a result of carelessness or inattention to the content of the propositions constituting an argument.

At this level, we shall focus on Informal Fallacy which can be classified into three broad categories, namely,

1. fallacies of relevance,
2. fallacies of ambiguity, and
3. fallacies of presumption.

# Study Session 4

# Fallacies of Relevance

## Introduction

In this Study Session, we shall explore fallacies of relevance. These are fallacies whose premises appear to be relevant to the conclusion drawn but, on close examination, are simply not relevant.

### Learning Outcomes

**Outcomes**

When you have studied this session, you should be able to:

3.1  state at least two defining characteristic of fallacies of relevance.

## 4.1 The Appeal to Force (*argumentum ad baculum*)

**Fallacy** A type of argument that may seem to be correct but that proves, on examination, not to be so

This **fallacy** is committed when one resorts to the use of threat to cause the acceptance of a conclusion, especially when evidence or rational methods fail.In other words, this fallacy is committed when an argument relies on the threat of force, though the threat may be veiled and not necessarily be physical. For instance, I'll be committing this fallacy if I threatento fail students who disagree with my political ideologies. This means that the fallacy can be committed by someone in a position of power if he uses threat to coerce his opponents to accept his proffered proposition. The following are examples of arguments that commit this fallacy:

(i) All fresh students in the Department of Philosophy should attend my wedding if they want me to be lenient in assessing their exam scripts.

(ii) If you do not agree with my political opinions, you will not graduate from this university.

# 4.2 The Appeal to Pity (argumentum ad misericordiam)

Literally, *misericordiam* means "a pitying heart". Thus, this fallacy occurs when the premises of an argument plainly relies on mercy, generosity, altruism, and so on. For instance, a lawyer might use the special circumstances of his client (an offender) to justify leniency in punishment. In short, when the lawyer emphasizes the unfortunate consequences that will befall his client instead of looking at the overwhelming proof of his guilt, he has committed this fallacy. The following passages commit this fallacy:

(i) I am a single parent, solely responsible for the financial support of my children. If you give me this traffic ticket, I will lose my license and be unable to drive to work. If I cannot work, my children and I will become homeless and may starve to death. Therefore, you should not give me this traffic ticket (Offor 2012: 42).

(ii) I implore the jury to temper justice by mercy. Though my client, barely eighteen, is accused of killing his mother and father with an axe, I plead for leniency on the grounds that he is an orphan.

## 4.3 The Appeal to Emotion (*argumentum ad populum*)

This fallacy is committed when, instead of using evidence and rational argument, you appeal to the emotion of the people to win their assent to a conclusion. The appeal to emotion, therefore, relies on expressive language and other devices to arouse strong feelings that may lead an audience to accept its conclusion. This fallacy is a device often used by politicians, propagandists, is common in commercial advertising. The following example explains this fallacy:

(i) The wisest men and women in Yoruba history have all been interested in *Ifa*. Obas, queens and regents of all epochs in Yoruba land have believed in it and have guided the affairs of their people by it. Therefore those who say that *Ifa* is not a science are mistaken (Bello 2007: 53).

(ii) In the last presidential campaign, a mammoth crowd welcomed Goodluck Jonathan in each of the northern zones. In the last election, he led the other presidential candidates with very wide margins and became president. Therefore, those who accuse Jonathan of financial misappropriation are not sincere.

## 4.4 The Appeal to Inappropriate Authority (*argumentumadverecundiam*)

This fallacy arises when we appeal to the opinions of someone who in fact does not have any legitimate claim to authority in the matter at hand. In other words, it "involves the mistaken supposition that there is some connection between the truth of

a proposition and some feature of the person who asserts or denies it" (Offor 2012: 42). For instance, it would be fallacious to appeal to the opinions of a movie star on whether taking a brand of beer is good for the body or not. Someone with expertise in food nutrition would be the appropriate authority. Thus, "when the truth of some proposition is asserted on the basis of the authority of one who has no special competence in that sphere, the appeal to inappropriate authority is the fallacy committed" (Copi et al 2006: 374). Consider these examples:

(i)   Philip Ogundeji, a Professor of Linguistics and African Languages at the University of Ibadan, believes that the stars revolve round the earth in a perfect circle. Therefore, the stars revolve round the earth in a perfect circle.

(ii)  But can you doubt that air has weight when you have the clear testimony of Aristotle affirming that all the elements have weight including air, and excepting only fire?

# 4.5 Argument Against the Man or Person (*argumentum ad hominem*)

This is a fallacy in which the argument relies on an attack against the person taking a position. In other words, when the thrust of an argument is directed at someone who is defending a conclusion in dispute (and not the conclusion itself), the fallacy committed id *ad hominem*. There are two major forms of the argument *ad hominem*, namely, the 'abusive' and the 'circumstantial'. The 'abusive' variety of *ad hominem* is

committed when one attacks the person who made an assertion, instead of giving reasons why the assertion should not be accepted. The 'circumstantial' occurs when one argues against the circumstance of the opponent, instead of assessing the dispute in question. Consider the followingexamples:

**Abusive**

(i)  Mr. Brown's arguments for pre-marital sex should be dropped because he is a womanizer.

(ii) Darwin's thesis of natural selection should be discarded as a work of fiction because he is a racist.

**Circumstantial**

(i)  Rev. Father John should accept my position that abortion should be abolished because this is compatible with his faith as a Catholic.

(ii) Former President Bush wouldn't approve of President Obama's economic policies because he is a Republican.

**Reflection**

Can you give two reasons why lawyers and politicians may deliberately commit fallacies.

# 4.6 Appeal to Ignorance (*argumentum ad ignorantiam*)

This fallacy is committed when one posits that a proposition is true simply because it has not been proved false or that it is false because it has not been proved true. Bello (2007: 52) adds that "this mode of argument is commonly used to against the existence of witches, spirits, and other forms of

'extraordinary' phenomena". The following passages commit this fallacy:

(i) No one has conclusively proven that there is no intelligent life on the moons of Jupiter. Therefore, there is intelligent life on the moons of Jupiter (Offor 2012: 43).

(ii) The alarmists have not succeeded in proving that the toxic and radioactive materials dumped at Koko (Delta state) are dangerously harmful to human life. The materials are therefore perfectly safe (Bello 2007: 52).

# 4.7 Irrelevant Conclusion (*ignoratio elenchi*)

*Ignoratio elenchi* translates to "mistaken proof" and is a type of fallacy in which the premises provide justification or grounds for a different conclusion than the one that is proposed. It tries to establish the truth of a proposition with premises which actually provide support for an entirely different conclusion. The following are examples of this fallacy:

(i) The Golden rule is basic to every system of ethics ever devised. Everyone accepts it in some form or other. Therefore, people's lives are guided by legislations (Offor 2012: 43)

(ii) Capitalism is desirable. For at one time all utilities were state-owned; now more and more of them are being commercialised or privatised. The Structural Adjustment Programme (SAP), moreover, is based on capitalist principles. We are well on our way to full-

blown capitalism and its complete triumph is inevitable (Bello 2007: 51).

# 4.8 Black-or-White Fallacy

Also referred to as *Fallacy of False Alternatives*, this fallacy is committed when it is falsely assumed in an argument that only two alternatives or positions are possible in regards to a certain issue or when the possibility of a third alternative to the two already allowed is ignored (Bello, 2000). For xample:

(i) He who is not a PDP member is against Jonathan's regime

Oshiomole is not a PDP member

He is therefore against Jonathan's regime.

(ii) He who does not preach the Word of God is an anti-Christ

Bisala does not preach the Word of God

Therefore, he is an anti-Christ.

# Study Session Summary

**Summary**

In this Study Session, we defined the term "fallacy" as any error we commit in reasoning. We pointed out that Informal Fallacy can be classified into three broad categories, namely, fallacies of relevance, fallacies of ambiguity, and fallacies of presumption. This Study Session was devoted to fallacies of relevance, whose premises appear to be relevant to the conclusion drawn but, on close examination, are simply not relevant. Under fallacies of relevance, we discussed The Appeal to Force (argumentum ad baculum)which is committed when one resorts to the use of threat to cause the acceptance of a conclusion, especially when evidence or rational methods fail; The Appeal to Pity (argumentum ad misericordiam) which occurs when the premises of an argument plainly relies on mercy, generosity, altruism, and so

on; The Appeal to Emotion (argumentum ad populum) which relies on expressive language and other devices to arouse strong feelings that may lead an audience to accept its conclusion; The Appeal to Inappropriate Authority (argumentumadverecundiam) which arises when we appeal to the opinions of someone who in fact does not have any legitimate claim to authority in the matter at hand; Argument Against the Man or Person (argumentum ad hominem), a fallacy in which the argument relies on an attack against the person taking a position; Appeal to Ignorance (argumentum ad ignorantiam) which is committed when one posits that a proposition is true simply because it has not been proved false or that it is false because it has not been proved true; Irrelevant Conclusion (ignoratio elenchi), a type of fallacy in which the premises provide justification or grounds for a different conclusion than the one that is proposed; Black-or-White Fallacywhich is committed when it is falsely assumed in an argument that only two alternatives or positions are possible in regards to a certain issue or when the possibility of a third alternative to the two already allowed is ignored.

# Assessment

**Exercises: (see Copi et al 2006: 367 – 370)**

Identify the fallacies of relevance in the following passages:

1) ICICI, a premier financial institution in the country is offering best financial product with value added services. It is not just finance but it is love and affection, which is being transacted. Most personalized service at your doorstep offered by the ICICI for housing finance seekers. Like a family member and a good friend ICICI fulfils your needs to have your sweet home.

2) When we had got to this point in the argument and everyone saw that the definition of justice had been completely upset, Thrasymachus, instead of replying me, said: "Tell me, Socrates, have you got a nurse?"

"Why do you ask such a question," I said, "when you ought rather to be answering?"

"Because she leaves you to snivel, and never wipes your nose; she has not even taught you to know the shepherd from the sheep."

# Assignment

1) With two examples each, discuss the following fallacies of relevance:

   a.  Irrelevant conclusion

   b.  Appeal to force

c.  Appeal to pity

d.  Appeal to authority

e.  Argument against the man

f.  Black-or-white fallacy

# Study Session 5

# Fallacies of Ambiguity

## Introduction

In this Study Session, we shall continue our discussion of fallacies by looking at fallacies of ambiguity which, as the name implies, arise from the imprecise use of language. These fallacies arise "from *the equivocal use of words or phrases* in the premises or in the conclusion of an argument". This means that, in fallacies of ambiguity, an important term may have two or more distinct meanings. Thus when we notice a shift or confusion of meanings within an argument, a fallacy of ambiguity is committed.

## Learning Outcomes

**Outcomes**

When you have studied this session, you should be able to:

5.1 point out the following fallacies of ambiguity

- equivocation
- division
- accent
- amphiboly

## 5.1 Fallacy of Equivocation

This fallacy is committed when two or more meanings of a word or phrase are used in different parts of an argument. Since most words have more than one literal meaning, we often consider the contexts in which they are used to

differentiate those meanings. However, we often confuse the meanings of a word or phrase and when this occurs we are guilty of using the word equivocally, thereby committing the fallacy of equivocation. An equivocation, therefore, "trades upon the use of an ambiguous word or phrase in one of its meanings in one of the propositions of an argument and also in another of its meanings in a second proposition" (Offor 2012: 44). The following are examples of this fallacy:

> Only man is rational
>
> No woman is a man
>
> Therefore, no woman is rational
>
> (Offor 2012: 44).

The word 'man' in the argument above is used in different senses in the two premises of the argument, showing no link between the terms of the conclusion.

> Andrew has faith in the president
>
> He also has faith in telepathy
>
> Therefore, Andrew has faith in both the president and science.

In the above argument the word "faith" is used equivocally in the two premises. In the first premise, the word "faith" is used by Andrew to assert his confidence that the president will do good work during his tenure; in the second premise, however, Andrew is not saying that he has confidence in telepathy but, rather, saying that he believes that some people are capable of using telepathy as an extra-sensory activity. Therefore, there is

no link between the use of the term "faith" in the two premises and the conclusion.

## 5.2 Fallacy of Division

This is a fallacy in which "a mistaken inference is drawn from the attributes of a whole to the attributes of the parts of the whole" Copi et al (2006: 391). There are two varieties of this fallacy and they occur: (1) when you argue fallaciously that what is true of a whole must also be true of its part; (2) when you argue from the attributes of a collection of elements to the attributes of the elements themselves. An example of the first kind of this fallacy is:

> Nigeria is a rich and great country.
>
> Danladi is a Nigerian.
>
> Therefore, Danladi is rich and great.

An example of the second variety of this fallacy is:

> University students study law, physics, commerce, social work and philosophy
>
> Therefore, each university student studies law, physics, commerce, social work and philosophy.

## 5.3 Fallacy of Composition

This fallacy is the reverse of the fallacy of division and it occurs when an inference is mistakenly drawn from the attributes of the parts of a whole to the attributes of the whole. Thus, it "involves an inference from the attribution of some features of every individual member of a class, to the possession of the same feature by the entire class" (Offor

2012: 45). For example, you commit this fallacy when you argue that:

(i)     Every part of the new war plane is light in weight
        Therefore, the new war plane is light in weight.

(ii)    Each departmental library in the university is worth a million   dollars
        Therefore, the university library is worth a million dollars.

# 5.4 Fallacy of Accent

The fallacy of accent is committed when "a phrase is used to convey two different meanings within an argument, and the difference is based on changes in emphasis given to words within the phrase" (Copi et al 2006: 388). In other words, this fallacy occurs when there is a shift of meaning within an argument arising from changes in the emphasis given to its words or parts.  Thus, "the way in which the meaning shifts in the fallacy of accent depends upon which parts of it may be emphasized or accented" (Offor 2012: 45). For example:

Alice was happy and friendly today

Therefore, Alice usually is sad and unfriendly.

Obey will win the Olympic championship!

Therefore, Obey has won several other championships except the Olympic championship.

In each of the two examples above, the stress or emphasis on certain words (that is, the accented part) in the premise shifts or changes the meaning of the argument.

# 5.5 Fallacy of Amphiboly

The word "amphiboly" connotes an ambiguity of expression due to grammatical construction. The fallacy of amphiboly occurs, therefore, when we argue from premises whose formulations are ambiguous because of their grammatical construction. It is a fallacy "in which a loose or awkward combination of words can be interpreted more than one way; the argument contains a premise based on one interpretation while the conclusion relies on a different interpretation" (Copi et al 2006: 387). This implies that a statement may be true on one interpretation and false on another. The argument becomes fallacious "When such a statement is stated as a premise on the interpretation that makes it true and a conclusion is drawn from it on the interpretation that makes it false" (Ibid.). For example:

> The philanthropist donated, along with his ex-wife, Jane, two million Naira to the university.

> Women prefer Democrats to men (Copi et al 2006: 388).

---

**Blue Box**

- **Fallacy of Equivocation** is committed when two or more meanings of a word or phrase are used in different parts of an argument;

- **Fallacy of Division**, a mistaken inference drawn from the attributes of a whole to the attributes of the parts of the whole;

- **Fallacy of Composition** occurs when an inference is mistakenly drawn from the attributes of the parts of a whole to the attributes of the whole;

- **Fallacy of Amphiboly** occurs when we argue from premises whose formulations are ambiguous because of their grammatical construction. It is a fallacy which shows that a statement may be true on one interpretation and false on another.

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> - **Fallacy of Accent**, a shift of meaning within an argument arising from changes in the emphasis given to its words or parts;

# Study Session Summary

**Summary**

In this Study Session, we looked at the fallacies of ambiguity. We explained that these fallacies arise from the imprecise use of language.

# Assessment

**Assessment**

**SAQ 5.1 (tests Learning Outcome 5.1)**

Highlight the fallacies of ambiguity that appear in the following passages:

1. ... the universe is spherical in form ... because all the constituent parts of the universe, that is the sun, moon, and the planets, appear in the form.

2. As such, it often struck me as extremely odd that critics of beauty pageants in India would criticize them as "Western." After an entire lifetime spent in a place discursively constructed as "the West," I have a difficult time remembering if I have even actually seen a beauty pageant there. True, they have originated in the West. However, today in the West they do not carry the kind of status and clout they have come to acquire in south Asia. Indeed, the concept of objectively judging beauty is as widespread in South Asia as it is in the West.  - **(see Copi et al 2006: 394 – 395)**

Assignment

**Assignment**

1) Explain the difference between fallacy of division and fallacy of composition.

2) Give two examples of each of the following fallacies of ambiguity:

   a. Equivocation

   b. Division

   c. Composition

   d. Accent

   e. Amphiboly

# Study Session 6

# Fallacies of Presumption

## Introduction

We have been able to look at some incorrect patterns of reasoning in our discussion of fallacies of relevance and fallacies of ambiguity. In this Study Session, we shall end our discussion of informal fallacies by looking at Fallacies of Presumption. We commit these fallacies when, in an argument, we infer our conclusion from premises whose truth is uncertain or assumed.

## Learning Outcomes

Outcomes

When you have studied this session, you should be able to:

6.1 present the defining feature of fallacies of presumption.

6.2 give at least two examples of each of the fallacies of presumption.

## 6.1 Fallacy of Accident

This fallacy is committed when "a generalization is wrongly applied to a particular case" (Copi et al 2006: 380). Hence, fallacy of accident "begins with the statement of some principle that is true as a general rule, but then errs by applying this principle to a specific case that is unusual, atypical and whose accidental circumstances render the rule inapplicable" (Offor 2012: 46). We commit this fallacy when we appear to be oblivious of the fact that even general rules or

principles do have plausible exceptions. In other words, it would be fallacious argue a case based on the assumption that some rule or generalization applies universally.

## 6.2 Converse Accident or Hasty Generalization

This fallacy occurs when individual cases are generalized. Put differently, this fallacy is committed "when we draw conclusions about all the persons or things in a given class on the basis of our knowledge about only one (or only a very few) of the members of that class" (Copi et al 2006: 378). For example:

> Ayangalu hails from Oyo and is a good drummer
>
> Therefore, people who hail from Oyo are good drummers.
>
> General Babangida, whose birthday fell within the Leo period, possessed great power of dominating his associates.
>
> Therefore, those who are born within the Leo period dominate    their associates.

## 6.3 False Cause

This fallacy mainly has to do with cause and effect relation, the nature of the connection between cause and effect and how the presence or absence of the connection is determined. This fallacyis committed when something, say X, that is not really a cause, is treated as the cause of another, say Y. There are two strands of this fallacy:

a) *Non causa pro causa*: This fallacy occurs when we presume the reality of a causal connection, say between X and Y, that does not really exist.

b) *Post hoc ergo propter hoc*: This fallacy occurs when we presume that an event X is caused by another event Y that occurred immediately before it.

The following examples represent the two strands of false cause fallacy:

The moon was full on Thursday evening.

On Friday morning I overslept.

Therefore, the full moon caused me to oversleep.

Who will doubt that the witch who shrieked yesterday is responsible for the death of this child?

**Reflection**

In fallacy of presumption, "the conclusion depends on a tacit assumption that is dubious, unwarranted, or false".

# 6.4 Begging the Question (*Petitio Principii*)

This fallacy is also referred to as *circular argument* and is committed when the conclusion of an argument is stated in one of the premises. If the truth of what one seeks to prove is already stated or assumed in the premises, then begging the question is the fallacy involved. In other words, "if one assumes as a premise for an argument the conclusion one intends to prove, then one commits this fallacy" (Offor 2012: 47). The following are examples of begging the question:

It is best to have government of the people, for the people and by the people because democracy is the best form of government (Offor 2012: 47).

To allow every man unbounded freedom of speech must always be, on the whole, advantageous to the state; for it is highly conducive to the interests of the community that each individual should enjoy a liberty perfectly unlimited, of expressing his sentiments (Copi et al 2006: 382).

# 6.5 Complex Question

Complex question occurs when we ask a question in such a way as to presuppose the truth of the conclusion irrespective of "whether the obvious question is answered in the affirmative or in the negative" (Bello 2007: 49). Most times, complex question is couched so rhetorically that the speaker seeks no genuine answer. As a deceitful device, especially in dialogues, complex question is posed to suggest the truth of unstated assumptions on which it is built. Let's take the following examples offered by Bello (2007: 49 – 50):

Have you stopped beating your wife?

Did your sales increase as a result of your misleading advertisement?

If you answer "yes" to the question in example (i), then you admit that you are fond of beating your wife; if your answer is "no", then you admit that you still beat your wife. Also, in example (ii), if you give an affirmative answer to the question, then you admit that your advertisement was misleading. If your answer is in the negative, then you admit that you still

practice misleading advertisement. We are warned, therefore, that "the best way to handle a complex question is not to answer it all; simply insist that the questions be separated" (Bello 2007: 50).

## Study Session Summary

**Summary**

No doubt, your studies on informal fallacies have helped you to understand that fallacies are deceptive and can garble good arguments and critical thinking. Thus, "whether they are committed inadvertently in the course of an individual's own thinking or deliberately employed in an effort to manipulate others, each tends not to provide legitimate grounds for the truth of its conclusion"

## Assessment

**Assessment**

**SAQ 6.1 (tests Learning Outcomes 6.1 and 6.2)**

Identify the fallacies of presumption that appear in the following passages:

1) In a motion picture featuring the famous French comedian Sacha Guitry, some thieves are arguing over division of seven pearls worth a king's ransom. On e of them hands two to the man on his right, then two to the man on his left. "I," he says, "will keep three." The man on his right says, "How come you keep three?" "Because I am the leader." "Oh. But how come you are the leader?" "Because I have more pearls."

2) Which is more useful, the Sun or the Moon? The Moon

is more useful since it gives us light during the night, when it is dark, whereas the sun shines only in the daytime, when it is light anyway.

**see Copi et al 2006: 385 – 386**

# Assignment

**Assignment**

1) State one feature of fallacies of presumption.

2) Give two examples of each of the following fallacies of presumption:

   a.  False cause

   b.  Converse accident

   c.  Begging the question

   d.  Complex question

# Part III

# Definitions

In this section of the course, we shall explore the nature of "definition". We shall also examine how divergent definitions of same words evolve in relation to dispute and understanding. We shall also look at types of definitions and their uses; and also examine the rules that applies to constructing definitions

# Study Session 7

# Definitions and Disputes

## Introduction

Definition is a crucial feature of human expression and communication because it is the means by which we make clear our intentions, ideas and the point of view which we try express to others.  The term "definition" may be regarded as any brief or precise statement that describes what a word means or what an expression means. In another light, definition is considered as that which entails the act of describing or stating something clearly, lucidly or unambiguously. In this study session, we shall examine the relation between disputes and definitions.

## Learning Outcomes

Outcomes

When you have studied this session, you should be able to:

7.1 explain the following concepts:

- definition
- dispute
- understanding

7.2 discuss the three major categories of disputes.

## 7.1 Defining Definition

We cannot overemphasize the fact that **definitions** aid human **understanding**. Let us explain this with an example. If I make the following statement that Mr. Olawale is a wise old bird, I

may need to define what I mean by the word "bird". Is it that I am describing Mr. Olawale as a winged-flying animal with feathers or I man something else? Or do I mean to say that Mr. Olawale is a particular kind of person? In order to be able to determine what I am saying, I may need to define the sense of the word "bird" that I mean. This goes to show that definition is the pivot of human understanding.

In philosophical circles, the issue of definition is taken very seriously. In fact, it is popularly believed that most philosophical analysis and deliberations begin with the definition of terms. Philosophical concepts, ideas, ideologies are effectively communicated through the medium of definition. From one philosophical tradition to another, definitions have been used to explain one philosophical position or the other and many disputes have evolved from such definitions. Sometimes, the disagreement may lead to the abandonment of one philosophical position or the other while in some other cases, it may further strengthen the definition which was originally the basis for the disagreement. In a sense, the issue of definitions are inextricably tied with the notion of disputes. In this Study Session, we shall essentially focus on the issue of disputes and how it is related to the issue of definitions.

Disputes are often likened to controversy. Controversy is a state of prolonged public dispute or debate, usually concerning a matter of conflicting opinions or points of view. When people genuinely disagree, whether about beliefs or attitudes, language is the instrument with which that disagreement is normally expressed. But there are some other

disputes which we can call merely verbal; they arise only as a result of some linguistic misunderstanding, often because of disputants differ in their uses of words. Oftentimes, good definitions are needed to resolve disputes. We shall distinguish three categories of disputes in what follows, namely, obvious genuine dispute, merely verbal disputes and apparently verbal but really genuine disputes (Copi et al 2006).

**ITQ**

**Question**

Why are definitions always definitions of symbols?

**Feedback**

This is because only symbols have meanings for definitions.

# 7.2 Categories of Disputes

### 7.2.1 Obvious Genuine Dispute

This is a type of dispute in which the parties involved unambiguously disagree, either in belief or attitude. For instance, if person A's favourite football team is Manchester United and person B's favourite football team is Chelsea Football Club, nothing is likely to resolve their disagreement. This implies that the two individuals (A and B) hold two sets of beliefs that are genuinely dissimilar and as such it might be difficult trying to bridge the divide between them.

### 7.2.2 Merely Verbal Dispute

This is the category of disputes in which the apparent differences between two or more individuals are not genuine: it refers to conflicts that can be resolved simply by coming to agreement on how some word or phrase is to be used. If, for

instance, Tolani and Jude are having a controversy on the nature of philosophy as an inquiry that involves critical analysis, and Jude claims that it is critical analysis that makes philosophy a negative discipline, while Tolani asserts that critical analysis does not make philosophy a negative discipline, then we can assert that they are having a kind of dispute known as **merely verbal dispute**. The merely verbal dispute they are having is on"critical analysis". This presupposes thatthe dispute between the two is due to the misuse of language by one or both of the disputants.

## 7.2.3 Apparently Verbal but Really Genuine Dispute

This type of dispute refers to misunderstandings about the uses of terms which may be involved in controversies. However, when those misunderstanding are cleared up, it often turns out that there remains a disagreement that goes well beyond the uses of words. At times, resolving the ambiguities of terms in such circumstances may help to clarify what is at issue, but will not settle a dispute that really concerns more than language.  Let us illustrate it with an example: suppose person A describes the female university undergraduate students as prostitutes just because they wear skimpy clothes and person B disputes this because, for person B, female university undergraduate students are not prostitutes but are only being trendy and fashionable in line with the prevalent times. At first glance, this dispute between person A and B may seem as an apparently verbal dispute but upon closer look, one would see that the disagreement is based on what the individuals genuinely believe to be the appropriate *criteria* for describing "female undergraduate students". This

explains why this form of dispute is also known as *Criterial Dispute*. Disputes of this kind are called criteria dispute because there is an underlying disagreement about the criteria for the application of some key term of approval or disapproval; and regarding the wisdom or the correctness of the alternative criteria they have in mind, their conflict is genuine.

# Study Session Summary

**Summary**

In this session, we explored the term "dispute" and its relation to definition. We pointed out that the term "definition" may be regarded as any brief or precise statement that describes what a word means or what an expression means;disputes, on the other hand, are often likened to controversy. We also distinguished three categories of disputes, namely, obvious genuine dispute, merely verbal disputes and apparently verbal but really genuine disputes. The first is a type of dispute in which the parties involved unambiguously disagree, either in belief or attitude. The secondis the category of disputes in which the apparent differences between two or more individuals are not genuine: it refers to conflicts that can be resolved simply by coming to agreement on how some word or phrase is to be used. The third category of dispute refers to misunderstandings about the uses of terms which may be involved in controversies.

# Assessment

**Assessment**

**Exercises: (see Copi et al 2006: 434)**

1. Discuss each of the following disputes. If it is obviously genuine, indicate each of the disputers' positions with respect to the proposition at issue. If it is

merely verbal, resolve it by explaining the different senses attached by the disputers to the key word or phrase that is used ambiguously. If it is an apparently verbal dispute that is really genuine, locate the ambiguity and explain the real disagreement involved:

2. DEEPAK: Business continues to be good for food exporters. Their exports so far this year are 25 percent higher than they were this time last year.

   NISHA: No, their business is not so good now. Their profits so far this year are 30 percent lower than they were last year at this time.

3. DEEPAK: Dev finally got rid of that old Ambassador of his and bought himself a new car. He's driving a Honda now.

   NISHA: No, Dev didn't buy himself a new car. It's his neighbour's new Honda that he's driving.

# Assignment

**Assignment**

1) Discuss each of the following disputes. Indicate if it is obviously genuine, merely verbal, or apparently verbal but genuine disputes:

a. **JOHN:** Despite their great age, the plays of Sophocles are enormously relevant today. They deal with eternally recurring problems and values such as love and sacrifice, the conflict of generations, life and death – as central today as they were over two thousand years ago.

**PAUL:** I don't agree with you at all. Sophocles has nothing to say about the pressing and immediate issues of our time: inflation, unemployment, the population explosion, and the energy crisis. His plays have no relevance to today.

b. **JOHN:** Smith is an excellent student. He takes a lively interest in everything and asks very intelligent questions in class.

**PAUL:** Smith is one of the worst students I have ever seen. She never gets her assignments in on time.

c. **JOHN:** Professor Owolabi is one of the most productive scholars at the University of Ibadan. The bibliography of his publications is longer than that of any of his colleagues.

**PAUL:** I wouldn't call him a productive scholar. He is a great teacher, but he has never produced any new ideas or discoveries in his entire career.

# Study Session 8

# Definition Types and Their Uses

## Introduction

In this Study Session, you will explore the various types of definitions. You will also learn about the uses of definitions.

### Learning Outcomes

**Outcomes**

When you have studied this session, you should be able to:

8.1 distinguish between the terms *definiendum* and *definiens*.

8.2 explain at least four types of definition.

8.3 highlight the purpose of a definition.

## Terminology

| *definiendum* | The object/symbol being defined |
|---|---|
| *Definiens* | The symbol (or group of symbols) that has the same meaning as the definiendum or used to explain or describe the meaning of the definiendum |

## 8.1 Types of Definition

### 8.1.1 Stipulative Definitions

Stipulative definitions are sometimes referred to as nominal or verbal definitions. A stipulative definition is that which has a meaning that is deliberately assigned to some symbol. It follows, therefore, that anyone "who introduces a new symbol is free to assign, or stipulate whatever meaning he cares to. Even an old term in a new context may also have its present

meaning stipulated" (Copi et al 2006: 436). It is important to note that terms are introduced by stipulation for the following reasons:

(1)  convenience: stipulation helps to reduce the use of many words in conveying a message because a single word may stand for many words in a message;

(2)  secrecy: some words or terms may not be understood or used  by the general public since only the sender and receiver of the message (who are socialized in the same system) can understand the stipulation;

(3)  economy of expression: through stipulation, a long sequence of familiar words that would be cumbersome to write are replaced by new symbols, thereby saving time and increasing intelligibility. For example, the number equal to a billion trillions is called "zetta" (Copi et al 2006: 437).

(4)  to facilitate discussion: new terms are sometimes introduced to facilitate discussion. The origin of the term "pragmaticism", which has no dictionary meaning before its coinage, will serve a good example here. Charles Sanders Peirce was a founding member of the pragmatic movement and is said to have introduced the term "pragmatism". Peirce's pragmatism did not receive much attention until William James, a member of this movement, popularized it in a series of Study Sessions by adding the practical, humanist perspectives. But Peirce felt that James had distorted his thought by adding new perspectives. Consequently, Peirce abandoned the term "pragmatism" and coined

the term "pragmaticism" to describe his own position, saying that this new term "is ugly enough to be safe from kidnappers" (Lawhead 2002: 467).

One important thing to note about a stipulative definition is that it is neither true nor false. It cannot be said to be accurate or inaccurate, simply because"a symbol defined by a stipulative definition did not have that meaning before it was given that meaning by the definition, so the definition cannot be a report of the term's meaning" (Copi et al 2006: 437). From the foregoing, therefore, a stipulative definition can best be regarded as "a proposal (or a resolution or a request, or an instruction) to use the *definiendum* to mean what is meant by the *definiens*" (Ibid.).

## 8.1.2 Lexical Definitions

A lexical definition is that whose purpose is to explain the use of a definition or to eliminate ambiguity. Another way to put it is that a lexical definition "reports a meaning the *definiendum* already has" (Copi et al 2006: 437).In other words, one can qualify lexical definitions as dictionary meanings. Unlike stipulative definitions, therefore, a lexical definition may be either true or false. For instance, the definition "the word 'bird' may mean any warm-blooded vertebrate with feathers" is true becauseit is a correct report of how the word "bird" is generally used by speakers of English. The definition is false if we consider "the word 'bird' means any two-footed mammal" (Copi et al 2006: 438).This brings out the major difference between lexical and stipulative definitions: while truth or falsity may apply to lexical definitions, stipulative definitions are neither true nor false.

**Reflection**

Why do you keep a dictionary?

### 8.1.3 Precising Definitions

By précising definitions, we mean definitions that are used to eliminate ambiguity or vagueness. In most human conversations, there are some terms that are ambiguous or vague. What does it mean for a term to be ambiguous? A term is ambiguous when it has more than one distinct meaning, vague when there are borderline cases to which the term might or might not apply. Let us look at these examples:

(i)   Persons with disabilities are not expected at the stadium for the gymnastics.

(ii)  The chairman will hold a meeting with all the adults in the community.

In (i), the term "disabilities" in the sentence is vague since we are not sure whether albinos, those who use glasses, and so on, can be subsumed under the term. The term "adults" in (ii) also faces the same problem: at what age do we refer to someone as "adult"?

A précising definition differs fromstipulative definitions "in that its *definiendum* is not a new term, but one whose usage is known, although unhappily vague" (Copi et al 2006: 440). It also differs from lexical definitions because, in resolving borderline cases, a précising definition "goes beyond the report of normal usage with the definition given" (Ibid.).

## 8.1.4 Theoretical Definitions

This type of definition applies to the formulation of an idea or belief about something arrived at through speculation or conjecture. Thus, a theoretical definition of a term "attempts to formulate a theoretically adequate or scientifically useful description of the objects to which the term applies" (Copi et al 2006:442).Theoretical definitions aim for theoretical truth and that is why scientists or philosophers criticize one another's definitions in order to establish which of the various definitions at issue context is most satisfactory.

It must be stated that a theoretical definition of a term is not the final word. In other words,"as the knowledge about some subject matter increases, one theoretical definition may be replaced by another" (Ibid.). For instance, Socrates contested the theoretical definition of the term "justice" offered by Thrasymachus who, in Plato's *Republic*, defined justice as "the interests of the stronger". Today, we have different theoretical definitions of "justice", implying that theoretical definitions often change with increase in knowledge about some subject matters.

## 8.1.5 Persuasive Definitions

A persuasive definition is a type of definition that is intended to influence attitudes and stir emotions. Thus, its concern is different from the four previous definitions whose main concern has to with the informative use of language. Persuasive definitions "are commonly used in the fields of politics, religion, advertisement and even law" (Offor 2012: 59). For instance, politicians often use emotive language, especially during campaigns, with a view to stirring the

emotions of their listeners. We are warned, however, to be on guard against persuasive definitions because "emotive colouration may ... be injected subtly into wording that purports to be a correct lexical definition, and appears on the surface to be that" (Copi et al 2006:443).

### 8.1.6 Ostensive Definitions

When a term is difficult to define verbally, speakers often resort to the use of ostensive definitions. An ostensive definition conveys the meaning of a term by pointing out instances of the term, either because the term will not be understood (as with children and new speakers of a language) or because of the nature of the term (such as colours or sensations). It is also referred to as "definition by pointing" because it is usually accompanied with gestures. For example, when defining "red" by pointing out red objects like roses, the use of ostensive definition is involved. It must be added that ostensive definition assumes the questioner has sufficient understanding to recognize the type of information being given. Thus, Ludwig Wittgenstein asserts that "ostensive definition explains the use – the meaning – of the word when the overall role of the word in language is clear."

# 8.2 Purposes of Definitions

**Tip**

> In understanding the uses of definition, we need to get clear on two commonly used technical terms about definition: *definiendum* and *definiens*. The object/symbol being defined is called the *definiendum*; while the symbol (or group of symbols) that has the same meaning as the *definiendum* or used to explain or describe the meaning of the *definiendum* is called the *definiens*.

Definitions of terms are sought for many reasons or purposes. The purposes of definitions can be appreciated by looking at

the various definitions that we have discussed in this Study Session.

In our discussion of **stipulative definitions**, for instance, we can draw such purposes as convenience, secrecy, economy of expression and even increase in vocabulary;

**lexical definitions** mainly help to increase our vocabulary;

**précising definitions** serve the purposes of eliminating ambiguity, reducing vagueness and helping to resolve our differences;

in **theoretical definitions**, we learn to explain theoretically by giving a theoretically adequate characterization of the object being defined;

**persuasive definitions** are mostly employed to influence attitudes by "eliciting positive or negative feelings in the minds of our hearers" (Offor 2012: 61);

**an ostensive definition** is employed when it is difficult to define a term verbally.

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**Blue Box**

- *definiendum* - the object/symbol being defined.
- *definiens* - the symbol (or group of symbols) that has the same meaning as the definiendum or used to explain or describe the meaning of the definiendum.
- Six types of definition
   **stipulative definition** is that which has a meaning that is deliberately assigned to somesymbol;
   **lexical definition,** a report – which may be either true or false –of the meaning adefiniendum already has in actual language use;
   **précising definitions** are used to eliminate ambiguity or vagueness;
   **theoretical definition** applies to the formulation of an idea or belief about something arrived at through

speculation or conjecture;

**persuasive definition** is a type of definition that is intended to influence attitudes and stir emotions; and

**ostensive definition** conveys the meaning of a term by pointing out instances of the term, either because the term will not be understood or because of the nature of the term.

## Study Session Summary

**Summary**

In this Study Session, we started by looking at the two commonly used technical terms about definition: *definiendum* and *definiens*. We went to discuss six types of definition and their purposes.

## Assignment

**Assignment**

1. Give three reasons why terms are introduced by stipulation.
2. State one central difference between lexical and stipulative definitions.
3. State one purpose precising definitions serve.
4. What definition do such terms as "yotta", "g factor", Charles Pierce's "pragmaticism" exemplify?
5. Which of the definitions help to resolve borderline cases by going beyond the report of normal usage?
6. We have discussed six types of definitions above. Find an example of each type and explain, in each case, the purpose it is intended to serve.

# Study Session 9

# Rules for Definitions

## Introduction

In this study session, we will examine some of the rules that have been propounded in constructing good definitions. These rules are otherwise known as "genus and difference".

## Learning Outcomes

**Outcomes**

When you have studied this session, you should be able to:

9.1 apply rules in construction definitions.

## 9.1 Genus and Difference

There are five rules that have been traditionally laid down for constructing good definitions. These rules are to guide us in defining a term and show whether the definition given to the term is good or bad. A good definition, therefore, "requires the thoughtful selection of the most appropriate genus for the term in question, as well as the identification of the most helpful specific difference for that term" (Copi et al 2006: 453).

**Rule 1:** *A definition should state the essential attributes of the species.*

By essential attributes of the species, we mean those attributes which constitute the conventional criterion of defining a term or specie. In other words, if the essential attributes of a species

are absent in the definition that we give to the species, then such a species is not properly defined. Also, we violate this rule if we "define a term using, as its specific difference, some attribute that is not normally recognized as its attribute, even though it may be part of that term's objective intension" (Copi et al 2006: 453). This means thata definition should state the conventional intension of or the set of characteristics that belong to the term being defined.Let us consider the following definitions:

(i) Father is "the head of a family".

(ii) Man is "a being that moves about in search of food, water and shelter" (Offor 2012: 61).

A look at the two definitions above will reveal that, in each case, the *definiens* is not stating the essential or conventional attributes of the *definiendum*. In other words, in defining the term "father", for instance, one expects the conventional attributes like "male", "parent" to feature in the *definiens*.

**Rule 2:** *A definition must not be circular.*

A circular definition is "a faulty definition that relies on the knowledge of what is being defined" (Copi et al 2006: 453). This implies that a definition must not be repetitive. If, for instance, the *definiendum* itself appears in the *definiens*, then the definition is said to be circular because it is not explaining the meaning of the *definiendum*and therefore fails in its purpose. As a matter of fact, you'll be breaking this rule if you use any of the synonyms of the *definiendum* in the *definiens*.Consider the following definitions:

(i) Teacher is "a person who teaches in a school".

(ii)     Calculator is "a machine used in calculating mathematical operations".

In each of the two definitions above, the *definiendum* appears in the *definiens*, thereby violating Rule 2 and rendering the definition "circular".

**Rule 3:** *A definition must be neither too broad nor too narrow.*

When in a definition the *definiens* denotes more things or fewer things than are denoted by the *definiendum*, then the definition is too broad or too narrow respectively.A historical violation of this rule was recorded in Plato's Academy at Athens. Plato's successors in the Academy at Athens once settled on the definition of "man" as "featherless biped".To show that the *definiens* was too broad, their critic, Diogenes, plucked a chicken and threw it over the wall into the Academy. Of course, there was a featherless biped – but no man! (Copi et al 2006: 454). What this suggests is that a definition ought to be precise in order not to confuse people about the information it is trying to convey. This rule is violated in the following definitions:

(i)     Bird is "any two-footed vertebrate".
(ii)     Cat is "any flesh-eating mammal".

**Rule 4:** *Ambiguous, obscure, or figurative language must not be used in a definition*

Ambiguous definitions do not allow for clear communication of ideas. In our last Study Session, we have pointed out that ambiguous word or expression is capable of more than one

interpretation. It can also be vague, indistinct or difficult to classify. Therefore, ambiguous terms should be avoided in the *definiens*in order to allow the definition to explain the *definiendum*. In other words, if the *definiens* is itself ambiguousthe purpose of the definition is defeated, though one may not rule out the fact that what is obscure to amateurs may be perfectly familiar to professionals. It is instructive to state here that the use of metaphors in the *definiens* may also lead to obscurity and garble the meaning of the *definiendum*. This rule is violated in the following definitions offered by Copi et al (2006):

(i) Net is "anything reticulated or decussated at equal distances with interstices between the intersections".

(ii) Oratory is "a conspiracy between speech and action to cheat the understanding".

**Rule 5:** *A definition should not be negative where it can be affirmative.*

This refers to the fact that we should not use language to obfuscate the facts because it is what a term does mean, rather than what it does not mean, that the definition seeks to provide. A definition is supposed to explain what a term or the *definiendum* means, rather than what it does not. Thus, a definition should not be negative where it can be affirmative. This implies the awareness that there are some terms whose definitions are essentially negative. For instance, employing the affirmative definition will not help in explaining the term "orphan"; rather the term is best defined as "a child who does not have parents". The foregoing is clearly suggesting that we

should endeavour to "identify the attributes that the *definiendum* has, rather than those that it does not have" (Copi et al 2006: 455). The following definitions violate this rule:

(i)     Couch is "a piece of furniture that is not a bed or a chair or a stool or a bench" (Copi et al 2006: 454).

(ii)    Lion is "a cat that is not a tiger or a leopard".

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**Blue Box**

- Rule 1 suggests that a definition should state the conventional intension of or the set of characteristics that belong to the term being defined.
- Rule 2 states that a definition must not be circular. If, for instance, the definiendum itself appears in the definiens, then the definition is said to be circular because it is not explaining the meaning of the definiendum and therefore fails in its purpose.
- Rule 3 showed that a definition is too broad or too narrow when the definiens denotes more things or fewer things than are denoted by the definiendum.
- Rule 4 states that the use of ambiguous terms, obscure, figurative, or metaphorical language in the definiens may lead to obscurity and garble the meaning of the definiendum.
- Rule 5states that a definition is supposed to explain what a term or the definiendum means, rather than what it does not.

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# Study Session Summary

**Summary**

In this Study Session, we looked at rules for definition by genus and difference with a view to showing thoughtful selection of the most appropriate genus for any term to be defined. We identified five rules that have been traditionally laid down for constructing good definitions and explained them one after the other.

# Assessment

**SAQ 9.1 (tests Learning Outcome 9.1)**

Criticize the following in terms of the rules for definition by genus and difference. After identifying the difficulty (difficulties), state the rule (or rules) violated. If the definition is either too narrow or too broad, explain why.

1) Number is category of the human mind which is applicable only to the finite beings of the world.

2) Alteration is combination of contradictorily opposed determinations in the existence of one and the same thing

3) "Cause" means something that produces an effect.

**see Copi et al 2006: 455 – 456**

# Assignment

Criticize the following in terms of the rules for definition by genus and difference. After identifying the difficulty (difficulties), state the rule (or rules) violated. If the definition is either too narrow or too broad, explain why.

(i)     Knowledge is true opinion.

(ii)    Life is the art of drawing sufficient conclusions from insufficient premises.

(iii)   "Base" means that which serves as a base.

(iv)    Youth is the springtime of love.

(v)     Noise is any unwanted signal.

(vi)    Tiger is "any cat that is not a lion or a leopard".

# Part IV

# Critical Thinking

…

# Study Session 10

# Logical Puzzles

## Introduction

Logical puzzles are exercises in reasoning. A puzzle is a problem that requires skill or ingenuity for its solution. In this sense, a puzzle can be regarded as a problem or an enigma that tests the ingenuity of a solver. Although puzzles are often contrived as a form of entertainment, they also help greatly in developing our natural ability to use good arguments in resolving our problems. In this study session, you shall look at a number of logical puzzles with a view to sharpening further your ability to use good arguments in resolving problems.

### Learning Outcomes

When you have studied this session, you should be able to:

    10.1  apply puzzles to proffer solutions in logic.

Outcomes

## 10.1 Exercises in Reasoning

According to A.G.A Bello (2007: 64):

> A logical puzzle consists of a specific question or a series of questions, accompanied by a mass of information or propositions given as true in the statement of the puzzle. The solution to a logical puzzle consists in finding answers to the questions posed, and proffering arguments whose premises are contained in the statement of the puzzle, and whose conclusions are the answers to the questions.

As a matter of fact, successful resolution of puzzles can be a significant contribution to research, especially in the field of sciences. This is why it is appropriate to say that "the process of attempting to solve a logical puzzle resembles the scientific process" (Ibid.: 65). Bello offers a "rough" idea of this process thus:

> One is confronted with a mass of data. From these data one can perhaps draw a few elementary inferences immediately. Usually, however, it is necessary to formulate tentative or working hypotheses to guide the search for a solution. The appropriateness or correctness of these hypotheses must then be carefully checked by testing their consequences for consistency with the original data. If inconsistencies appear, the tentative assumptions must be rejected and others put in their place, until finally a consistent setoff conclusions emerges. These conclusions must then be tested for uniqueness to determine whether there are others equally acceptable (Ibid.).

The import of Bello's assertion is that solutions to puzzles often require that we recognize patterns and create a particular order. Let's look at a few examples of logical puzzles to corroborate the foregoing.

| **Activity 10.1** |
| --- |
| **Puzzle 1** |
| In a certain bank the positions of accountant, manager and cashier are held by Aderupoko, Fayomobo and Gesinwale, though not necessarily in that other. The following facts are known about them: the cashier who was an only child, earns the least; Gesinwale, who married Fayomobo's sister earns |

more than the manager. What position does each man hold? (Bello 2007: 66).

**Solution**

In attempting to solve this puzzle, we can draw some inferences from the clues given above:

1. Since Gesinwale earns more than the manager, Gesinwale cannot be the manager. And since Gesinwale earns more than the manager, he cannot be the cashier either, for the cashier earns the least; therefore Gesinwale is the accountant.

2. Next, we can infer that since Fayomobo has a sister, Fayomobo is not an only child. Therefore Fayomobo is not the cashier either. Since Fayomobo is not the accountant either (from 1), Fayomobo is the manager.

By elimination, Aderupoko is the cashier.

The above puzzle is no doubt an easy one to solve. Let's look at other ones that require greater skills.

**Activity 10.2**

**Puzzle 2**

Ademola, Adeyinka, Adeola and Adeolu are all lecturers in the same university. One is a specialist in Philosophy, one a specialist in Mathematics, one a Law specialist, and one a Medical scientist, though not necessarily in that order. The following facts are known about them:

(a) Ademola and Adeola once had an argument with the Law specialist.
(b) Adeyinka and the Medical scientist have been to the house of the Mathematician.
(c) The Medical scientist who once treated Adeola in his private clinic is also having an appointment with Ademola.
(d) Ademola has never seen Adeolu before.

What is each man's area of specialization?

**Solution**

The first step in solving this puzzle is to set out the information in an array, as follows:

|  | Specialist in philosophy | Law specialist | Medical specialist | Mathematician |
|---|---|---|---|---|
| Ademola |  |  |  |  |
| Adeyinka |  |  |  |  |
| Adeola |  |  |  |  |
| Adeolu |  |  |  |  |

In the above puzzle, the following inferences can be drawn to help solve the puzzle: for each inference drawn, we then fill in the spaces by elimination, using 'Y' to indicate 'YES' and 'N' to indicate 'NO', as follows:

i.     Neither Adeola nor Ademola can be the law specialist since they once had an argument with the law specialist [from (a)];

|  | Specialist in philosophy | Law specialist | Medical specialist | Mathematician |
|---|---|---|---|---|
| Ademola |  | N |  |  |
| Adeyinka |  |  |  |  |
| Adeola |  | N |  |  |
| Adeolu |  |  |  |  |

ii.     Adeyinka is not the medical scientist and is not the mathematician [from (b)];

|  | Specialist in philosophy | Law specialist | Medical specialist | Mathematician |
|---|---|---|---|---|

| Ademola | | N | | |
|---|---|---|---|---|
| Adeyinka | | | N | N |
| Adeola | | N | | |
| Adeolu | | | | |

iii.     Neither Adeola nor Ademola is the medical scientist [from (c)]. Since Adeyinka also is not the medical scientist [from inference (ii)], then it follows that Adeolu is the medical scientist;

| | Specialist in philosophy | Law specialist | Medical specialist | Mathematician |
|---|---|---|---|---|
| Ademola | | N | N | |
| Adeyinka | | | N | N |
| Adeola | | N | N | |
| Adeolu | N | N | Y | N |

iv.     Adeyinka is the law specialist, drawing from inferences (i) and (iii);

| | Specialist in philosophy | Law specialist | Medical specialist | Mathematician |
|---|---|---|---|---|
| Ademola | | N | N | |
| Adeyinka | | Y | N | N |
| Adeola | | N | N | |
| Adeolu | N | N | Y | N |

v.     Ademola is not the mathematician because Adeyinka (the law specialist) and Adeolu (the medical scientist) have been to the house of the mathematician before and Ademola has never seen Adeolu before.

Therefore, Ademola is the specialist in philosophy. By elimination, Adeola is the mathematician.

|  | Specialist in philosophy | Law specialist | Medical specialist | Mathematician |
|---|---|---|---|---|
| Ademola | Y | N | N | N |
| Adeyinka | N | Y | N | N |
| Adeola | N | N | N | Y |
| Adeolu | N | N | Y | N |

From the above, it is clear that Ademola is the specialist in Philosophy, Adeyinka is Law specialist, Adeola is the Mathematician and Adeolu is the Medical specialist.

To save time and space, however, it must be stated that drawing a chart might as well take care of the above array of information. Once you draw the chart, you can use the information provided in the puzzle to guide the search for solution. This means that your inferences can come after the spaces on the chart have been completed by method of elimination and serve as your justification for each of the steps taken in the process. Let's look at the following example to drive home our point:

## Activity 10.3

**Puzzle 3:** In a certain supermarket the position of buyer, cashier, clerk, porter and manager are held, though not necessarily respectively, by Miss. Adire, Miss. Bobo, Mr. Dayus, Mr. Kayode and Mr. Manua. The following facts are known about them:

1. The cashier and the manager were room-mates in a secondary school.
2. The buyer is a bachelor.
3. Mr. Manua and Miss. Adire have had only business contacts with each other.

4. Mrs. Dayus was greatly disappointed when her husband told her that the manager had refused to give him a raise.

5. Mr. Kayode is going to be the best man when the clerk and the cashier are married.

What position does each person hold? (Bello 2007: 70 – 72)

**Solution**

Let us set out the information in array, using 'N' for 'NO' and 'Y' for 'YES' as follows:

|  | Buyer | Cashier | Clerk | Porter | Manager |
|---|---|---|---|---|---|
| Miss Adire | **N** | **N** | **N** | **N** | **Y** |
| Miss Bobo | **N** | **Y** | **N** | **N** | **N** |
| Mr. Dayus | **N** | **N** | **N** | **Y** | **N** |
| Mr. Kayode | **Y** | **N** | **N** | **N** | **N** |
| Mr. Manua | **N** | **N** | **Y** | **N** | **N** |

From the chart, we know that Miss Adire is the manager, Miss Bobo is the cashier, Mr. Dayus is the porter, Mr. Kayode is the buyer, and Mr. Manua is the clerk. Having completed the chart we now produce the following arguments to justify our answers:

6. From the information given, we can make the following immediate inferences:

(i)  There are three males and two females.

(ii)  The buyer is a man, being a bachelor.

(iii) Either the cashier or the clerk is a man.

(iv)  The cashier and the manager are either both men or both women.

Now, to the other arguments:

7. If the cashier is a man, then the manager must be a man. If the manager is a man, then it is either Mr. Dayus, or Mr. Kayode, or Mr. Manua. It cannot be

Mr. Dayus because of statement (4). It can neither be Mr. Kayode nor Mr. Manua since one of them has to be the buyer (2), and the other has to be the clerk or the cashier (5). Since the manager is neither Mr. Dayus nor Mr. Kayode nor Manua, it follows that the manager is not a man. The manager is therefore a woman, from which it follows that the cashier is also a woman. Therefore, the clerk is a man.

8. Since the clerk is a man, then it is either Mr. Dayus, or Mr. Kayode or Mr. Manua. It cannot be Mr. Dayus, who is married (4). It cannot be Mr. Kayode either, for he is going to be the bestman when the clerk and the cashier are married (5). Therefore, the clerk is Mr. Manua.

9. The cashier is a woman, but it cannot be Miss Adire, because she has only business contacts with Mr. Manua (3). Therefore, the cashier is Miss Bobo.

10. The buyer is a man, but it cannot be Mr. Dayus (2) and (4), or Mr. Manua (8). Therefore, the buyer is Mr. Kayode.

11. The manager is not Mr. Dayus (7), or Mr. Manua (7) and (8), or Mr. Kayode (7) and (10), or Miss Bobo (9). Therefore, the manager is Miss Adire.

12. By elimination, the porter is Mr. Dayus

# Study Session Summary

**Summary**

In this Study Session, we defined a puzzle as a problem that requires skill or ingenuity for its solution. We added that, although puzzles are often contrived as a form of entertainment, they also help greatly in developing our natural ability to use good arguments in resolving our problems. We looked at a number of logical puzzles and proffered solutions to them. During the exercise, it was clear that we arrived at each of the solutions through reasoning, not through guessing.

# Assessment

**SAQ 10.1 (tests Learning Outcome 10.1)**

Alonzo, Kurt, Rudolf and Willard are representative artists of great talent. One is a dancer, one a painter, one a singer and one a writer, though not necessarily in that order. The following facts are known about them:

a) Alonzo and Rudolf were in the audience the night the singer made his debut on the concert stage.

b) Both Kurt and the writer have had their portraits painted from life by the painter.

c) The writer, whose biography of Willard was a bestseller, is planning to write a biography of Alonzo.

d) Alonzo has never heard of Rudolf.

What is each man's artistic field?

# Assignment

Each of the following is an exercise in reasoning. You are to concern yourself, not only with finding an answer to the question, but also with constructing arguments to prove the correctness of your answer.

1. In a certain flight, the position of pilot, co-pilot and flight engineer are held by Nat, Giwa, and Tam, though not necessarily in that order. We have the following facts about them: the co-pilot, who was an only child, earns the least. Tam, who is married to Giwa's sister, earns more than the pilot.

   What position does each person hold?

2. On a certain train, the crew consists of the brakeman, the fireman, and the engineer. Their names listed alphabetically are Aderupoko, Ijimere, and Obotunde. On the train are also three passengers with corresponding names: Mr. Aderupoko, Mr. Ijimere and Mr. Obotunde. The following facts are known about them:

   i)   Mr. Ijimere lives in Ibadan.

   ii)  The brakeman lives halfway between Ibadan and Lagos.

   iii) Mr. Aderupoko earns exactly N20,000.00 a year.

   iv)  Obotunde once beat the fireman at *ayo.*

   v)   The brakeman's next-door neighbor, one of the three passengers mentioned, earns exactly three

times as much as the brakeman.

vi) The passenger living in Lagos has the same name as the brakeman.

What was the engineer's name?

3. The employees of a small finance company are Mr. Gbada, Mr. Danjuma, Mrs. Taiwo, Miss Bridget, Mr. Idowu, and Miss Aishat. The positions they occupy are manager, assistant manager, cashier, stenographer, book-keeper and clerk, though not necessarily in that order. We have the following information about them:

i)   The assistant manager is the manager's grandson.

ii)  The cashier is the stenographer's son-in-law.

iii) Mr. Gbada is a bachelor.

iv)  Mr. Danjuma is twenty-two years old.

v)   Miss Bridget is the book-keeper's step-sister.

vi)  Mr. Idowu is the manager's neighbor.

Who holds each position?

4. In a certain small secondary school, the subjects of biology, Economics, English, French, History, and Mathematics are taught by just three men, Memedu, Ahmadu, and Obaro, each of whom teaches two subjects. The Following details are also true of them:

i)   The Economics teacher and the French teacher are next-door neighbours.

ii)  Memedu is the youngest of the three.

iii) The men ride to and from school together; Obaru, the Biology teacher, and the French teacher each

driving one week out of three.

iv) The Biology teacher is older than the mathematics teacher.

v) When they can find a fourth person, the English teacher, the Mathematics teacher and Memedu usually spend their lunch hour playing ludo.

What subjects does each man teach?

# Notes on Self Assessment Questions

**SAQ 1.1**

(i) Premise: "Untouchability" is abolished and its practice in any form is forbidden.

Conclusion: The enforcement of any disability arising out of "Untouchability" shall be an offence punishable in accordance with law.

(ii) Premise: We are all sinners.

Conclusion: We ought to forbear to judge

(iii) Premise: Light moves at a finite speed

Conclusion: Looking at objects that are millions of miles away is actually looking a light that was emitted many years ago.

(iv) Premise: The education of parents directly impacts the ability of their children to succeed in school.

Conclusion: It is an urgent necessity that this generation of Nigerian youth is properly educated.

(v) Premise I: In 1988 AIDS was the infectious disease that killed most people around the world.

Premise II: The AIDS epidemic is not abating.

Conclusion: Unquestionably, no more important goal exists in medical research today than the development of an AIDS vaccine.

**SAQ 2.1**

1) Socrates was Greek. (premise)

Most Greeks eat fish. (premise)

Socrates ate fish. (conclusion)

2) All men are mortal. (premise)

Socrates was a man. (premise)

Socrates was mortal. (conclusion)

1) Here, even if both premises are true, it is still possible for the conclusion to be false (maybe Socrates was allergic to fish, for example).

2) As you can see, the premises are true (and they are), then it simply isn't possible for the conclusion to be false. This is a classical example of deductive argument.

## SAQ 2.2

(i) A valid argument with one true premise, one false premise, and a false conclusion:

Solution:

Premise:      Of all the rivers in the world, the Ganges in the largest. [False]

Premise:      Varanasi is on the banks of the Ganges River. [True]

Conclusion: Therefore Varanasi is on the banks of the largest river in the world [False]

(ii) A valid argument with two false premises and a true conclusion

Solution

Premise:      In all countries of the world, the largest city in the capital. [False]

Premise:      Canberra is the largest city in Australia. [False]

Conclusion: Therefore Canberra is the capital of Australia. [True]

## SAQ 4.1

1) The Appeal to Emotion (*argumentum ad populum*). The fallacy is quite common in advertisements. The uses of words like "love", "affection" and "family" are used as such words are not usually associated with  banks and it is an appeal to the emotions of people to  try to tell them that ICICI is a friendly bank.

2) Argument Against the Person (*argumentum ad hominem*), 'Abusive'.

SAQ 5.1

1) Composition. It cannot be inferred from the fact that the parts have a specified shape that the whole has that same shape.

2) Equivocation. The words "West" and "Western" are being used differently in different statements.

## SAQ 6.1

1) Begging the question (*Petito principia*)

*Petitio principii.* This is a blatant use of begging the question, as no premises are ever given, rather is claimed that there is no argument, that the conclusion itself is sufficient. Hence, the conclusion is definitely assumed in its statement as the only statement in the argument. There may be self-evident truths which do not require arguments, and in that case the simple statement of the conclusion may not beg the question; but as appealing as this statement may be, especially to lovers of cognac, it is simply not self-evident.

2) A fallacy of false cause lies behind the humor in this passage. The answer to the query supposes, mistakenly that the light in the daytime is caused by something other than the sun!

## SAQ 7.1

1) A merely verbal dispute. The ambiguous phrase "business... good" is used by Deepak in the sense of increased *sales*, and by Nisha in the sense of increased *profit*. There may be disagreement in attitude towards fruit exporters, Deepak approving and Nisha disapproving, but this is not at all clear from their words.

2) An obviously genuine dispute. Deepak affirms and Nisha denies that *Dev bought himself a new car*.

## SAQ 9.1

1) Violates Rule 1 as it does not state the essential characteristic of "number", as it says what number is applicable to, not what it essentially is. It violates Rule 3, as

it is too broad, since there may be many other categories of the human mind that are applicable only to the finite beings of the world. It may even be too narrow as there are infinite numbers, both denumerable and non denumerable.

2) Obscure, violates Rule 4. Also it fails to state the essence of alteration, which is *changing over time*, and thus it violates Rule 1.

3) Circular, since "produces" is synonymous with "causes"; violates Rule 2.

## SAQ 10.1

Let us set out the information in array, using 'N' for 'NO' and 'Y' for 'YES' as follows:

|          | Dancer | Painter | Singer | Writer |
|----------|--------|---------|--------|--------|
| Alonzo   | Y      | N       | N      | N      |
| Kurt     | N      | N       | Y      | N      |
| Rudolf   | N      | N       | N      | Y      |
| Willard  | N      | Y       | N      | N      |

Inferences:

(i)     Neither Alonzo nor Rudolf is the singer since they were in the audience the night the singer made his debut on the concert (from a).

(ii)    Kurt is not the writer and not the painter since he and the writer both had their portraits painted from life by the painter (from b).

(iii)   Willard is not the writer because he had his biography written by the writer (from c).

(iv)    Alonzo is not the writer because the writer is planning to write his biography (from c).

(v)     By elimination Rudolf is the writer.

(vi)    From d, Alonzo has never heard of Rudolf (who has been identified as the writer).

(vii)   By elimination, Alonzo is the dancer. So none of the others can be the dancer.

(viii)  By elimination, Kurt is the singer, leaving only Willard and one artistic field.

(ix)    Therefore, by elimination, Willard is the painter.

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