

# Solution of the Mind-Body Problem and Mathematics Teachers' Instruction Implementation

Valerius Haule<sup>1\*</sup> Amos Johnson<sup>2</sup>

1. Department of Mathematical Sciences, University of Iringa, P. O. Box 200, Iringa, Tanzania

2. Department of Education, University of Iringa, P. O. Box 200, Iringa, Tanzania. S

\* E-mail of the corresponding author: haulev28@yahoo.com

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## Abstract

Philosophers of mind do not have a common understanding about the mind-body problem breading to three schools of thoughts; dualism, monism and dual-aspect monism. Dualists hold that mind and body are two ontological distinct entities in man. Monists hold that mind and body are not two ontologically distinct entities, they are not independent entities, and that man is one and only one supreme metaphysical being that exists. Dual-Aspect Monism holds that there exists a neutral metaphysical substance in man manifesting physical and mental properties. An attempt to solve the mind-body problem begun in the 4<sup>th</sup> C, BC, when Plato conceived that, mind is an independent substance in man such that mind and its mental properties cannot be described in terms physical scientific means. Descartes attempted to solve the mind-body problem in the 17<sup>th</sup> century, AD and concluded that mind is an independent substance with non-physical characteristics distinct from the physical brain. Through review of the available literature on mind-body problem, it is observed that man is composed of two metaphysical parts: the physical part and non-physical part. The non-physical part is morphological similar in appearance and shape to the physical part existing in a Supreme being in complex monism form, termed as Dual Substances-Monism. Moreover, the solution of the mind-body problem is that, mind and brain are two ontological distinct substances, brain as a real substance in physical man and mind as a non-real substance in non-physical man. Brain and Mind are dually compact as one substance and irreducible in physical context. Moreover, the soul supplies energy and intensity to the non-physical part to enable the brain command the physical part to perform physical actions. The brain accepts commands from the mind for physical execution. This complete cycle is termed as the reciprocate property. In the Mathematics instruction implementation, learning takes place in the reciprocate property; perception of the reality into mind with the control of the brain for mental processing, and then the brain accepts commands from the mind of the processed ideas for execution, the process that develops learners attitude, knowledge, skills and competences.

**Keywords:** Mind, Dualism, Monism, Dual-Aspect Monism, Dual Substance-Monism, Mental Properties, Physical Properties, Physical Man, Non-Physical Man

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## 1. Introduction

According to Concise Oxford English Dictionary (2011), Metaphysics defined as the branch of Philosophy that deals with the first principle of things that exist and that are said to exist. It further describes that Metaphysics has two main aspects: the first aspect considers that what exists lies beyond experience, advocated by Plato and the second aspect considers objects of experience form the only reality, advocated by Kant as argued and reflected in Plato (1952a, 1952b) in Hutchins (Ed), Kant (1984) Boyer (1968) and Kline (1972).

According to Nyirenda and Ishumi (2002), Metaphysics is defined as the systematic study of the ultimate nature of reality; dealing with questions that are beyond our sensory impressions. It is a branch of philosophy that enable us study things beyond reach of our empirical means. That is, statements are said to be metaphysical if they assume the existence of facts that are outside the range of human observation.

A researcher holds on the first strand of Metaphysics as argued by Plato. By holding this view, the researcher believes that what exists lies beyond experience. By holding this view, the researcher believes that what exists lies beyond human experience as the ultimate nature of reality, and they are experiences of non-physical man of an individual, experienced by man's mental faculties of consciousness, thoughts and intelligence through the physical body.

In modern Philosophy, the Philosophy of mind is considered as one of the branches of Metaphysics that studies the nature of mind. The main issue in the study of the Philosophy of mind is the mind-body problem. Among the aspects of mind studied in the mind-body problem are the ontology of mind, nature of thoughts and mind-body relationship (Siegel, 2010, Kim, 1995 & Hart, 1996).

In the Philosophy of mind, there are three main schools of thought in the study of mind: Dualism, Monism and Dual-Aspect Monism. Other schools of thoughts merge from these schools (Kim, 1995 & Hart, 1996). According to the Concise Oxford English Dictionary (2011), dual is perceived as a something consisting of two

aspects, parts or elements related to one another in one way or the other. Therefore, duality in Metaphysics perspectives is perceived as a thing consisting two substances that are ontologically distinct. Thus, dualism is a doctrine that advocates that man is composed of two ontologically distinct substances (Kim, 1995 & Hart, 1996).

According to the Concise Oxford English Dictionary (2011), mono is perceived as something consisting of only one aspect, part or element. The dictionary defines monism as a doctrine which advocates that only one Supreme Being exists, as opposed to dualists views. That is, according to monists, man is one and only one Supreme Being consisting of one and only one Metaphysical aspect: the physical substance (Kim, 1995 & Hart, 1996).

Dual-Aspect Monism is a doctrine that advocates that mental and physical properties are two aspects of the same substance, a neutral substance existing in man. That is man consist of one and only one Metaphysical substance but mind is not a metaphysical substance; that means mind is an Epistemology aspect in dualism properties from areal metaphysical substance. And therefore, Dual-Aspect Monism suggests that mental and physical aspects are the manifestations of the same one aspect; the substance which is itself neither mental nor physical as it is commonly known. And that although mental and physical aspects are ontologically distinct, formulation of Dual-Aspect Monism require the aspects be complementary, inseparable and mutual irreducible (Atmanspacher, 2012 & Velman, 2012).

Dualism is divided into three sub-schools of thoughts: Substance Dualism, property dualism and interactionist dualism. Substance dualism, advocated by Plato and later Descartes, holds a view that mind is a man's independently existing substance. That is, according to Substance Dualists, mind and brain are two ontologically existing distinct substances (Descartes, 1998, Plato, 1995 & Sri Swami, 2006). Property Dualists hold that mind is a group of independent properties that cannot be reduced from brain.

That is, mind and brain are not ontologically distinct substances; rather mind is simply mental properties that are independent within the brain, and emerging from the brain (Sri Swami, 2006). Interactionist dualists hold that mental states casually interact with physical states (Hart, 1996). However, interactionist dualism has been criticized by many contemporary Philosophers with several alternative suggestions (Denneh, 1991, Ryle, 1949 & Stich, 1983). However, Angasi (1975) in line with Macpherson and Haddock (2008) claims that, modern psychologist experiments that cause man see things that are not there provides grounds for rejecting Descartes' argument of interactionism, because scientists can describe man's perceptions better than man himself.

Monism arose in the 5<sup>th</sup> century, BC, advocated by Spinoza in the 17<sup>th</sup> century; arguing that only entities that can be postulated by physical theories exist. And those mental processes will eventually be explained in terms of these entities as physical theories continue to evolve (Sri Swami, 2006, Hart, 1996 & Kim, 1995). Monists hold a view that mind and body are not ontologically two distinct substances. They argue that mind and body are not independent substances; and that one and only one Supreme Being exists. (Hart, 1996 & Magill, 2012).

Three sub-schools of thought emerge under Monism school: Physicalism, Idealism, and Neutral Monism. Physicalists hold that only entities that can be postulated by physical theories exist. They attempt to reduce mental properties to physical properties. They adopt compatible forms of property dualism in their attempt to reduce mental properties to physical properties, and the ontological status of the mental properties remains unclear. Idealists hold that, mind is all that exists and that the external world is either a mental itself or an illusion created by mind (Kim, 1995, Hart, 1996, Spinoza, 1670 & Magill, 2012). Neutral Monists hold that events in the world can be thought of as either mental or physical depending on the network of relationship into which they enter into man (Schneider, 2013, Gibb, *et al*, 2013 & Demirciogba, 2011).

Dual-Aspect Monism is a doctrine that holds a view that there exists a neutral substance in man such that both matter and mind are properties of that unknown existing substance. This neutral substance is itself neither physical nor mental. It is this neutral substance that manifests the mental and the physical. (Spinoza, 1670, Schneider, 2013, DePaul & Baltimore, 2013).

The researcher also does not hold any concrete agreement in one the schools of thoughts: Monism or Dual-Aspect Monism, but hold thoughts on dualism, in Substance Dualism. The researcher also does not believe fully on *Dual-Aspect Monism*, but believes on improved Dual-Aspect Monism, termed as *Dual Substance-Monism*. Therefore, the researcher holds that man consists of two Metaphysical substances existing in complex monism form.

The researcher holds further that brain is a real substance in physical man manifesting physical properties and mind is a non-real substance in non-physical man similar to brain and that manifests mental properties. But both, physical man and non-physical man are compact in complex monism form and mutually irreducible and inseparable in physical context.

Since Metaphysics concerns with the study of the nature of things that exist and that are said to exist: real substance, non-real substance or both; and man is a Metaphysical being, then man must be composed of real substance or of non-real substance, or composed of both, real and non-real substances. This diversity in views on mind-body problem that breeds several schools of thoughts indicates that the mind-body problem has not well been reviewed since the days of Plato, to date, leading to diverse understanding, especially in mind-body

relationship.

One of the main purposes of studying mind-body problem in the Philosophy of mind is to explain the relationship that exists between mind and body. One of the aims of the philosophers of mind is to determine whether mind affects the body and the body affects mind, or not (Kim, 1995). Emergence of several schools of thought in the study of the mind-body problem indicates that Philosophers have no common view on the metaphysical composition of man. This notion necessitates the review of our Philosophy of mind in order to address more accurately the composition of man in relation to the mind-body relationship that has great impact in education.

And learners in the classrooms are Metaphysical beings in the context of learning who may benefit or be affected in teaching and learning processes if the mind – body relationship is not well addressed with more accurate philosophical facts. Otherwise other constraints in education such as theories of learning, domains of learning and the associated pedagogy may not be accurate if the mind-body problem is not well solved philosophically.

So being the case then, how do Mathematics teachers implement instructions to learners whose mind-body relationship in learning process has not clearly been addressed? Which Philosophical assumptions on mind-body relationship should Mathematics teachers apply in implementing instruction if brain-mind relationship is not well addressed neither agreed among Philosophers of mind? This indicates that a genuine review on mind-body problem is required for positive impact in teaching and learning process in Mathematics.

Therefore, Meta-Epistemological approach in the review of mind-body problem intends to identify the metaphysical thing composing to man attributing the physical and the mental properties, describe what composes mind in a widely adopted Metaphysical approach in philosophy. Guided by Anthropological, ontological and theological facts, the metaphysical questions arising from this approach include; first, is man composed of a single metaphysical substance or two substances? Second, is man a monic substance, dual substance, or dual-monic substance? Third, which available literature describes correctly the mind-body problem, especially the mind-body relationship?

The questions arising from epistemological perspectives include; first, is it possible to have a group of properties of non-metaphysical thing? Second, is it possible to have a group of properties of nothing in Metaphysical sense? Third, is it possible to have features, qualities and characteristics (group of properties) of something which is neutral, neither metaphysically real substance nor metaphysically non-real substance? And thus, there must exist either real substance or non-real substance, or both in the scope of metaphysics that has those groups of irreducible mental properties. This article intends to seek for more accurate answers to these Meta-Epistemological questions.

Several literature are available on mind-body problem include the work of Plato (1952a, 1952b), Aristotle (1952), Hart (1996), Kim (1995), Schneider, (2012, Gibb, *et al*, (20113), Demirciogba (2011) and Kant (1984). Despite of the available literature, yet Philosophers of mind do not come into agreement on the common thought about the mind-body problem, breeding to several schools of thoughts. This signifies that more reviews on the mind-body problem is required to provide more accurate philosophical solution to these questions that have implications to the teaching and learning of Mathematics.

Therefore, is found relevant to review the mind-body relationship with different philosophical approach, identify weak points, provide suggestions and describe the implications in instruction implementation in Mathematics learning. Its knowledge provides modern view on the basic composition of man in terms of mind-body relationship, which has great impact on Mathematics teachers' instruction implementation for effective learners learning process.

## 2. Basic Review of Literature

Dualist ideas are traced back from the days of Plato and Aristotle in the 4<sup>th</sup> century, BC. Plato held a view that mind is an independent substance in the body such that mind and its mental properties cannot be described in terms of physical man by physical scientific means (Hart, 1998, Robin, 1983 & Plato, 1952a, 1952b).

In the 17<sup>th</sup> century, AD, Descartes (1998) described mind as an independent substance with non-physical characteristics distinct from physical brain of man. That is, Descartes had the same view as Plato that mind and body are two ontologically distinct substance in man; brain as a real substance and mind as a non-physical substance (Descartes, 1998 & Sri Swami, 2006). Since days of Plato, to date, substance dualists stand on this conclusion on the ontology of brain and mind in metaphysical perspectives (Hart, 1996, Sri Swami, 2006 & Robinson, 1983).

According to Hart (1996), dualism is a school of thought that holds a view that mind and body are two ontological entities of man. They attempt to explain the relationship between mind and body. According to Sri Swami (2006) in line with Hart (1996), the earliest Hindu Philosophy is known since 650 BCE. Formulation of mind-body dualism in Hindu Philosophy begun by dividing the world into real world and spiritual world, and then describing man as a substance in real world and non-physical man as independent substance in spiritual world. This division of the world represented analytical approach to the solution of the mind-body problem, and analytical

approach to the study of the mind-body relationship.

The earliest discussions on dualism are found in the writings of Plato who held that mind cannot be identified or explained in terms of their physical body (Plato, 1995 & Robinson, 1983). The greatest discussion on dualism is that of Descartes in the 17<sup>th</sup> century, AD, who clearly identified mind to possess consciousness and self-awareness abilities in man. It is Descartes who distinguished mind from brain; and justifying that mind and brain are two ontologically distinct substances of man. This conclusion of Descartes on mind-body problem still exists today for dualism school of thought (Descartes, 1998, Hart, 1996 & Robinson, 1983).

In justifying theoretically the existence of mind-brain duality in man, dualists argue that if someone is asked what the mind is, average number of persons would respond by identifying it with their self, their personality, their soul, or with such other entities. And perhaps, majority will deny that mind is simply the brain, in attempting to identify existence of another entity with such properties. Another dualist argument is that, mental events such as feelings have a subjective quality centrally to physical events (Hart, 1998 & Jackson, 1982).

On the other hand, Lewis (1947) questioned Monists that, if all our thoughts are the effects of physical causes, then we have no reason to assume that there are also consequences of a reasonable ground. He argues further that, knowledge is comprehended by reasoning from ground to consequent. Therefore, Lewis concludes, if Monism is correct, there would be no way of knowing this or anything else. In addition, Geulincx and Malebranche suggested that one way of explaining duality in cases of miracles, all mind-body interactions require the direct interaction with God (Hart, 1998).

In the attempt to explain mind-body relationship, Descartes (1998) as later supported by Popper and Eccles (2002), holds a view that mental states such as feelings, beliefs and desires, casually interact with physical states. Due to this view, Descartes (1998) introduced interactionist dualism which is one of the modern forms of dualism.

However, interactionist dualism has been criticized by many contemporary Philosophers with several alternative suggestions (Denneh, 1991, Ryle, 1949 & Stich, 1983). Moreover, Angasi (1975) commented that several scientific discoveries made in the 20<sup>th</sup> century have undermined the access of one's own ideas.

Angasi (1975) argues that, Malinowski has shown that anthropologist have can know man's customs and habits better than the man whose customs and habits they are. Angasi (1975) in line with Macpherson and Haddock (2008) claims that, modern psychologist experiments that cause man see things that are not there provides grounds for rejecting Descartes' argument of interactionism, because scientists can describe man's perceptions better than man himself.

Schmaltz (2002) points out that Nicholas Malebranche believes that causal relations between physical events, or between physical and mental events, are not really causal at all. Body and mind are different substances; and causes are related to their effects by an act of God's intervention on each specific occasion.

Property dualists hold that the world is constituted of just one kind of substance: the physical kind, but there exist two kinds of properties, physical properties and mental properties. They believe that mind is a group of properties that emerge from brain (Hart, 1996). There are several property dualist views, which include: Strong Emergentism, Epiphenomenalism, Non-Reductive Physicalism and Panpsychism (Hart, 1996 & Chalmers, 1996).

Strong Emergentists believe that man's body is well organized. Mental properties emerge in all organized man's body but in a way that cannot be fully accounted for by physical laws. These emergent properties have independent ontological status and cannot be reduced into physical terms from which they emerge. They are independent from the physical properties from which they emerge (Hart, 1996 & Chalmers, 1996).

Epiphenomenalists hold that mental phenomena are casually ineffectual. Mental states do not have any influence on physical states; they are the effects of physical phenomena. They believe that physical events can cause mental events, but mental events can cause nothing (Huxley, 1874, Robinson, 2006 & Jackson, 1986). Non-Reductive Physicalists hold that mental properties are ontologically distinct states from physical properties. And these mental states are non-reductive to physical states (Hart, 1996). Panpsychism holds that all matter has a mental aspect. All matter is composed of dual aspects except that mental aspect differs on complex structures between one matter and the other (Hart, 1996, Robinson, 2006 & Jackson, 1986).

Dual-Aspect Monism is a doctrine on mind-body problem with a view that the mental and the physical are two aspects of the same substance. Dual-Aspect Monism theory suggests that the mental and the physical are manifestations of one substance, the substance which is itself neither mental nor physical contrary to how it is commonly known. Although the mental and the physical aspects are ontologically distinct, formulation of Dual-Aspect Monism requires the aspects to complementary, inseparable and mutual irreducible (Atmanspacher, 2012 & Varmans, 2012).

As related literature shows, since then, to date, no clear description of mind-body problem that has been addressed, explained and be accepted uniquely among Philosophers of mind. Modern and contemporary Philosophers of mind reside in one of the three main schools of thought, dualism, monism or Dual-Aspect Monism. This diversity indicates existence on knowledge gap on the philosophy of mind that lead to diverse views among philosophers of mind. On the other hand, precise description on mind-body problem has great impact in Mathematics teachers' effective instruction implementation in in teaching and learning Mathematics.

### **3. The Discussion**

#### **3.1 Adoption of Philosophical Approach**

Man is a Metaphysical being who can be composed of real substance, non-real substance or both in some complex Monism form. Since Metaphysics and Epistemology are branches of Philosophy, and since Ontology, Anthropology and Theology are the sub-branches of Metaphysics, then mind-body problem can be reviewed Meta-Epistemologically basing on Anthropological, Ontological and theological metaphysics without philosophical distortion, and still have secure foundation on the Philosophy of mind (Nyirenda & Ishumi, 2002).

Implying from Korner (1960), Ernest (1989, 1991) and Nyirenda and Ishumi (2002), one of the main purpose of Philosophy is to reflect and account for the nature of things that exist and that are said to exist. In this way, we are attempting to provide a system into which the Philosophy of mind can systematically establish its truth on mind-body problem by using widely adopted philosophical assumptions without philosophical facts distortion. And therefore, Meta-Epistemological approach attempts to provide systematic secure foundations for knowledge which is for philosophical truth.

According to Nyirenda and Ishumi (2002), Theology is defined as a critical study of religious beliefs, and studies the questions related to God. Ontology is defined as the study of existence. The Ontological questions include the meaning of existence, meaning of existing and what exists. Anthropology is defined as the study of man as an object and as a subject of inquiry. Some of the major questions in Anthropology include the relationship between mind and body, nature of our moral status, and whether man has soul.

According to Concise Oxford English Dictionary (2011), Theology is defined as the branch of Metaphysics that the studies the nature of God and religious belief. Ontology is defined as the branch of Metaphysics that deal with nature of being. It is a set of concepts that shows their properties and relations between them. Physical Anthropology is defined as one of the aspects of Anthropology in Metaphysics that studies human biological and physiological characteristics and evolution.

Epistemology concerns with the theory of knowledge of metaphysical things, real-substances, non-real substances or both. Knowledge of a metaphysical thing is described basing on its inherent features, properties and characteristics (Haule & Johnson, 2023, Ernest, 1991, Plato, 1952 & Aristotle, 1952). Metaphysically, mind is conceived as a non-real metaphysical substance (Plato, 1995 & Descartes, 1998). On the other hand, mental properties, like mental properties, are the Epistemological attributes of a metaphysical thing.

According to Concise Oxford English Dictionary (2007), dual is perceived as something consisting of two aspects, parts or elements related to one another in one way or the other. The aspects existing in duality may be metaphysical things or may be an epistemological attributes or both, a metaphysical thing and an epistemological attribute. That is, mind may be a metaphysical thing or an epistemological attribute of a metaphysical thing. But mental properties must be the properties of a metaphysical thing. Meta-Epistemologically, we cannot have properties of nothing. There must exist a metaphysical thing with such epistemological attributes. Similarly, physical properties are the properties of a physical Metaphysical thing, the physical being. Moreover, the same metaphysical thing may manifest dual epistemological attributes.

#### **3.2 Meta-Epistemological Implication of Schools of Thoughts**

A significant difference between substance dualist and property dualists is that substance dualist holds that mind is an independent substance, which is non-real substance different from the brain, a real substance (Descartes, 1998, Hart, 1996, Haule & Johnson, 2023). Metaphysically, this assertion implies that mind and brain are two distinct entities existing in dualism. That is, mind and brain are two ontologically distinct metaphysical substances existing in duality (Descartes, 1998).

With this assertion, substance dualists suggest existence of a non-physical substance in man containing, different from the physical substance. However, Substance Dualist provide no clear description on whether mind is the only non-physical substance in man or there exist a non-physical substance in man and mind is just a part of this non-physical substance. Descartes (1998) holds that mind is non-extended and non-physical substance, and has ability to distinguish itself from the brain. Descartes (1998) describes mind as non-physical aspect existing in duality with the brain, as a source consciousness and self-awareness, and a seat of intelligence.

Therefore, substance dualist describe mind metaphysically as a non-physical substance and describe mental properties as epistemological attributes of mind. The mental properties include intelligence, consciousness and self-awareness. This notion implies further that, without mind, a Supreme Being is unconscious, unaware of the real world, and no intelligence.

Generally, substance Dualists believe on the existence of duality of two metaphysical substances and two epistemological attributes. They believe that there exists a physical substance, the brain, which manifests an epistemological attribute: the physical properties and there exists a non-physical substance, the mind, which manifests the epistemological attribute: the mental properties,

Contrary to the Substance dualists, Property dualists hold that only one metaphysical substance exists in a Supreme Being, the brain, that manifest two independent properties, the mental and the physical. They believe that

the world is constituted by only one kind of substance, the physical kind, but there are two kinds of properties: physical and mental properties. They believe that; mind is a group of properties that emerge from the brain (Hart, 1996 & Chalmers, 1996).

Metaphysically, property dualists believe that only the physical part of an individual exists in the world. They do not believe existence of a non-physical substance as substance dualists believe. They hold further that, it is the brain, the physical substance that emerges two independent epistemological attributes, mental and physical properties.

Generally, they believe on monic metaphysical substance, the brain and the duality exists on the meta-epistemological attributes: the mental and physical properties.

This notion of Property Dualists implies that a Supreme Being is composed of one and only one metaphysical substance that manifests two independent epistemological attributes: mental and physical properties. It implies further that there exists no non-physical substance in a Supreme Being called mind that manifest the mental properties. So being the case, Property Dualists mean that there exists no non-physical man in a Supreme Being, which is regarded as our true self, and who is capable of surviving the physical death, and manifested as Ghost after death.

As advocated by Spinoza in the 17<sup>th</sup> century that only entities that can be postulated by physical theories exist, Monists hold a view that mind and body are not ontologically two distinct substances. They argue that mind and body are not independent substances; and that one and only one Supreme Being exists. (Hart, 1996, Magill, 2012, Sri Swami, 2006 & Kim, 1995).

Truly, in physical context, man is one and only one living being, the Supreme Being. But the assertion that mind and body are ontologically distinct substances, and that only entities that can be postulated in physical terms exist implies that Monists view mind and brain in only one context of existence. They view mind and brain as one complex physical substance that is inseparable in physical terms, manifesting mental properties that are reduced and can be explained by physical theories. This view is not sufficient enough to deny that there cannot exist a non-real substance in non-real context that are in duality with the real substance, the physical substance.

If mind and brain are not ontologically distinct, then mind and brain are substances of the same nature; meaning they that are both metaphysical substances and they are both real substances as they claim that only physical entities exist. So being the case, they imply that there exist no non-physical part in the Supreme Being which represents our true self, which is a seat of emotions and character, and containing faculties of consciousness and thoughts. This notion implies further that the epistemological attributes such as emotions, character, consciousness, awareness, thoughts and intelligence are manifested by the brain. This view contradicts with other branches of Metaphysics.

Both, Property Monists and Dual-Aspect Monists believe on monism on the metaphysical substances manifesting the dual epistemological attributes: mental and physical properties. A significant difference is that Property Dualists believe that brain is the metaphysical substance that manifests the two epistemological attributes: mental and physical properties. Dual-Aspect Monists believe that there exist a neutral substance other than the brain, which manifests the two epistemological attributes; mental and physical properties.

Dual-Aspect Monism holds that mental and physical properties are two distinct aspects manifested by the same substance, the substance which is itself neither mental nor physical. This view of Dual-Aspect monism is philosophically not clear because of suggestion of the existence of a neutral substance with is itself neither mental nor physical. This implies that, they attempt to argue that in the world, there exist neutral substances that are not metaphysical. That is, they attempt to argue that in the world, there exist neutral substances that are neither real substances nor non-real substances that manifest epistemological attributes such as mental properties.

Generally, Dual-Aspect Monists believe on monic metaphysical substance, a neutral substance, that is neither real nor non-real, and the duality exists on the meta-epistemological attributes: the mental and physical properties that emerge from this unknown metaphysical substance.

### 3.3 Solution of the Mind-Body Problem

Guided by Concise Oxford English Dictionary (2011) and Newbury House Dictionary of American English (2004), soul is defined as the spiritual part of man regarded as immortal, which is emotional with intellectual energy and intensity. Accepting this definition as a precise definition of soul, it then implies that there exists a spirit in man containing soul, such that soul is just a part of it. This begins providing us with an insight of existence of soul in man.

Spirit is defined as non-physical part of man, regarded as their true self, capable of surviving physical death and manifested as an apparition after death; ghost, which is a super natural being. Accepting this definition as a precise definition of spirit, then it is implied that man is composed of physical and non-physical parts: which is the duality in meta-physical form. Second: since it is accepted that spirit is non-physical part of man, and then spirit is a non-substance composing man. This notion implies that man is composed of two ontologically distinct entities existing in a complex Monism form; hence, *Dual substance-Monism*, but not in Dual-Aspect Monism.

Furthermore, accepting that man is composed of physical and non-physical substance entities that are ontologically distinct, then man is composed of two distinct substances. One substance is the real substance and the other is the non-real substance, and they are compact in one super natural being. This implies that man exist in complex *Dual Substance-Monism* form. And therefore, Plato's suggestion that mind is an independent substance is consistent, and that mind and body cannot be described by means of scientific means makes sense because non-physical substances cannot be described neither be experimented by physical scientific means (Hart, 1996, Robin, 1983, Plato, 1952a, 1952b).

Moreover, this justifies thoughts of Descartes of the year 1641 that as an element in non-physical man has ability to distinguish itself from the brain (Descartes, 1998). If mind is just an element on non-physical part of a Supreme Being, with faculties of consciousness and thoughts, then it implies that it is the non-physical man who is containing the faculties of consciousness and thoughts. If that is the case, then mental faculties are contained in non-physical man, in an element similar to brain, called the mind; and therefore, Descartes (1998) are correct and consistent.

Mind is defined as an element of man that enables them to be aware of the world and their experiences; commonly known as faculty of consciousness and thoughts. We notice further from the definitions of mind and spirit that, there exists a non-physical part in man, called a spirit, manifested as ghost after death in form of ghost. This notion raises questions: is a ghost self-conscious and self-aware of the worlds suggested in Hindu Philosophy as explained in Sri Swami (2006)? If a ghost is conscious of itself with self-awareness and intelligence, is it genuine to conclude that it is the spirit that contains mind similar to physical body containing brain?

These definitions of soul, spirit (non-physical part) and mind coincides with views of Plato (1995), Descartes (1998) and the Hindu Philosophy explained in Sri Swami (2006). The coincidence is in the fact that man consist of two ontologically distinct substances: physical and non-physical substances, of which in this article, they are termed as physical man and non-physical man. The physical man contains brain as a real substance and non-physical man contains mind as a non-physical substance. They are morphologically similar in appearance, shape, position, proportions, though different in sizes, each having different characteristics and functions, but both exist compactly in one substance called the super natural being. Again, argument of Plato that mind is an independent substance, a non-real substance, is consistent.

Since mind is an element of non-physical man that enables them to be aware of the world and their experiences; then it implies that consciousness and thoughts are the manifestations of mind in the non-physical man. Therefore, mental properties are the manifestations of non-physical substance in non-physical man called the mind as suggested by Plato.

The same dictionaries define metaphysics as a branch of Philosophy that deals with the first principle of things, real substances and non-real substances. According to Nyirenda and Ishumi (2002), speculation in philosophy attempts to think in the most general and systematic way about anything in the universe. Metaphysical issues such as the nature of human beings are also speculated. They contend further that, there are matters that are beyond the realm of most disciplines, such as, "is a reality a material or spiritual?". Since we cannot collect empirical data on spiritual cases and experiment by scientific means, then speculation activity attempts to fill this philosophical gap.

The major referred texts in theology are the Bible and the Quran. Bible and Quran coincide in biblical Old Testament, and thus the use of biblical Old Testament will not significantly affect the philosophical theology facts. This approach partly matches with Sri Swami (2006) and also partly complies with Geulincx and Malebranche as appears in Schmaltz (2002) who suggested that issues of mind-body problem can as well be approached theologically.

Theological and basing on Old Testament, it is believed that man was created by God in Genesis 1:27. The Bible in Genesis 1:26-27 writes, "26Then God said, "let us make man in our image, according to our likeness; let them have dominion over the fish of the sea, over the birds of the air, and over the cattle, over all the Earth and over every creeping thing that creeps on Earth." 27So God created man in his own image; in the image of God He created him; male and female He created them."

Accepting these two biblical verses as Theological facts, then three facts are noticed. The first fact is that Man was created on the image of God. Throughout the biblical texts, God created man once and only once in Genesis 1:27. God, if He exists, is composed of non-real substance; and so does man created in Genesis 1:27, is not a real substance. These facts imply that man created in Genesis 1:27 is a non-physical man, who is referred to as a spirit similar to the definition of the term "spirit" in the Concise Oxford English Dictionary (2011).

The second fact is that man who was created here is a non-physical part of the living supreme being, regarded as our true self, capable of surviving the physical death, and continues existing as Ghost (super natural being) after death, similar to the definition of spirit in Concise Oxford English Dictionary (2011).

These facts justify the existence of non-physical man as the second part of man in addition to the physical part, and who is ontologically distinct from the physical part. And also, the facts justify that the non-physical man is morphologically similar to a physical man and having remembrances in appearance, shape and proportions

though each entity has different nature, sizes, characteristics and functions. That is, non-physical man and physical man are morphologically similar but they are ontologically two distinct substances, each with different functions, characteristics and properties.

The mental capability, strength and perfection of this non-physical man is written in Genesis 1:28-30. “<sup>28</sup>Then God blessed them, and God said to them, “Be fruitful and multiply; fill the Earth and subdue it; have dominion over the fish of the sea, over the birds of the air, and over every living thing that moves on the Earth.” <sup>29</sup>And God said, “See, I have given you every herb that yields seed which is on the face of the earth, and every tree whose fruit yields seed, to you it shall be for food.” <sup>30</sup>Also, to every beast of the Earth, to every bird of the air, and to everything that creeps on Earth, in which there is life, I have given every green herb for food; and it was so.

These biblical texts precisely describe the perfection of non-physical man created in Genesis 1:27, having ability to multiply, subdue the Earth, power of all living things on Earth, with ability to eat food in his context of existence. The following philosophical facts are noted. First: the created non-physical man was self-conscious, with thoughts and self-awareness as suggested by Plato (1995) and Descartes (1998) and as described in Hindu Philosophy views found in Sri Swami (2006). For if this non-physical man had no such perfections, and then no such obligations would have been given to them. That is the created man was perfect in consciousness, awareness, thoughts and intelligence.

Second: The created man was perfect with ability to multiply, and subdue the Earth, and power over all other created metaphysical things: Supreme Being in non-physical world. Third: since the created man is a non-physical, then our true self is the non-physical man containing mind; mind as one of its element (non-physical organ), functioning as a faculty of consciousness, awareness, and thoughts as suggested by Plato (1995) and Descartes (1998). Fourth: the created non-physical man is morphologically similar to the Supreme Being with similarity in body organs, with similarity between mind and brain as they fit compactly into one another.

From these facts, it is concluded that man created in Genesis 1:27 was a non-physical man, with complete own consciousness and awareness, and with complete own thoughts and intelligence as suggested by Descartes in the year 1641 (Descartes, 1998). This non-real substance man was perfect with ability to multiply, subdue the Earth, eat food and dominates all other created things with supreme power. And this created non-physical man is our true self, and as the second part in the Supreme Being. Since mind is defined as an element of man that enables them to be aware of the world and their experiences; which is commonly known as faculty of consciousness and thoughts, then mind is a component in non-physical man functioning as the faculty of consciousness, awareness, thoughts and intelligence.

Genesis 2:7 describes how the physical body of man was made. Genesis 2:7 writes, “And Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life, and man became a living being.” Several philosophical facts are noted from this verse. First: the non-physical man created in Genesis 1:27 is formed of the dust of the dusts of the ground to make him a living being. Despite of being formed of the dust of the ground, man wasn't a living being yet. That implies, there was required something else, the breath of life (soul) to enable non-physical part become compact and compatible with the formed physical body from the dust of the ground. This notion matches with the definition of soul from the Concise Oxford English Dictionary (2011). Second: The breath of life means the soul of the living being. It implies that, it is the soul that enable physical and non-physical parts be compact and compatible to one another, without it separation of the two entities occur.

As Plato (1995) suggested that mind is an independent substance in man, whose mental properties cannot be described in terms of physical body neither by physical scientific means, non-physical body cannot be described by physical scientific means. It is impossible to justify non-real substances in physical terms by scientific means in the same way as the real substances would have been. Otherwise, separation between the entities could occur if were able to remove the soul from the non-physical man in physical context. Even if separation of the entities was possible, the study of mind, which is a non-real substance, could be impossible because of the scope of science in examining the non-real substances.

Since Concise Oxford English Dictionary (2007) defines soul as the spiritual part of man regarded as immortal, which is emotional with intellectual energy and intensity, it implies that it is the soul that supplies energy and intensity to the two entities to enable them be compact and compatible in Monism form. These facts indicates the existence of *Dual Substance-Monism* in man, but not existing in Dual-Aspect Monism as it is advocated by Spinoza (1670), Schneider (2013) and DePaul & Baltimore (2013).

Third: Since the created man in Genesis 1:27 was perfect, and despite of the man being formed of a physical body in Genesis 2:7, yet our true self, the non-physical part, has energy, intensity and power generated by soul over the non-physical man to enable physical actions. The physical body can be conceived as the complex hardware of the non-physical part, performing all physical functions as commanded by the non-physical man through the brain by supplying energy and intensity. That is, mental commands are accepted by the brain for physical performance.

Based on these facts, it is concluded that, brain performs two major functions: to enable physical medium for mental perceptions and implementation of the mental commands for physical performance, which can be termed



as reciprocation property of mind-brain relationship. These theological facts as well coincides with the Hindu philosophy and the substance dualists views.

Therefore, the researcher holds that man is composed of two substances, the real substance and the non-real substance existing compactly in complex monism form; in *Substance Dual Substance-Monism* complex form. Brain is perceived as a real substance aspect from physical part and mind as the non-real substance aspect from non-physical part, similar to the brain; and that, mind and brain are two ontologically distinct substances that are compact in monism form and mutually irreducible in physical context.

It is therefore concluded that, the created man consisted of non-physical man and physical man. Man's mental states are the effects of our consciousness and awareness with the world: physical and non-physical worlds. For if man is unconscious with the real world, then man is not aware of the real world, and therefore no mental states can be experienced by non-physical man in real world context. On the other hand, if man is unconscious, then the non-physical man is conscious on his world of existence, the spiritual world.

### 3.4 Meta-Epistemological Generalization of the Mind-Body Problem

The claims of Property Dualists that mind is a group of independent properties from brain is philosophically odd and contradicting. For if mind is a group of independent mental properties, and the mental properties are the Epistemological attributes of a metaphysical thing, then directly implies that the brain is an autonomous real substance, existing in two different states: physical and mental state, each with independent properties.

And if this is true, then it is conceived that living man is composed of one and only one substance; the real substance, which is philosophically irrational. This irrationality implies further that there exist no non-physical parts in man who survives the physical death, and continue existing as a supernatural being. If the views of Property Dualists are true, then there is a philosophical contradiction between anthropology, ontology and theology, which can be perceived as irrationality in Philosophy.

The notion of property dualists that the world is constituted with the only one kind of substance, the physical substance is philosophically odd because metaphysics is basically the study of nature of things that exist and that are said to exist. And things that are said to exist not necessarily be the physical substances. For instance, metaphysically, there exist ghosts after the physical deaths, and these ghosts are not the physical substances, they are the non-real anthropological substances with own complete consciousness and intelligence.

Dual- Aspect Monism is a doctrine that advocates that mental and physical are two distinct properties of the same substance. That is man consist of one and only one Metaphysical substance but mind is not a metaphysical substance; that means mind is an Epistemology aspect in dualism properties with the metaphysical substance. And therefore, Dual-Aspect Monism suggests that mental and physical are the manifestations of the same one substance; the substance which is itself neither mental nor physical; the aspects are complementary, inseparable and mutual irreducible (Atmanspacher, 2012, Velman, 2012).

This view that there exists a substance which is itself neither mental nor physical which manifests mental and physical aspects is philosophically odd that need more description. The questions arising here include: does it mean that in man there exists a substance which is neither metaphysically physical nor mental? Does it mean that in a Supreme Being, there exists a neutral substance which is not a metaphysical substance: real substance or non-real substance? Does it mean that, in the scope of Philosophy, there exist neutral substances that are not metaphysical?

Philosophically, physical properties and mental properties are the epistemological attribute of a metaphysical thing. There must exist a metaphysical thing whose epistemological attributes are the properties, whether mental or physical properties.

If Dual-Aspect Monists contend that there exist a neutral substance which is itself neither physical nor mental, then this means there exist no metaphysical thing that manifest the physical and mental properties. And if that is true, then physical properties and mental properties merge from nothing, which is meta-epistemologically odd and irrational.

Generally, it is concluded that a Supreme being is composed of metaphysical dual substances that are ontologically distinct, and functions in dual epistemological attributes; mental and physical properties, which are also ontologically distinct. All our physical actions represent our true self actions through the physical man. The energy and intensity supplied by the soul to a non-physical man enable the non-physical man operate a physical man to the observable physical properties; and that not all mental properties can be observable through physical properties.

## 4. Implications to the Mathematics Teachers' Instruction Implementation

Since mind is a part of non-physical man, and has ability to distinguish itself from the brain, then learning is experienced by mind through physical body with or without senses. An interesting Mathematics learning phenomena is perceived into non-physical man (in mind) for processing to generate knowledge. The generated knowledge is practiced physically to generate skills (Haule & Johnson, 2023, Plato, 1952, Aristotle, 1952, Kant,

1984). The quality of physical performance in doing Mathematics is the competence in Mathematics (Haule, 2023, Cangelosi, 1996).

#### **4.1 Attitude Towards Mathematics Instructions**

Self-consciousness and self-awareness about interesting learning phenomena promote attitude to explore the learning phenomena. There is relationship between conscious sensory experiences and Mathematics learning phenomena (Haule and Johnson, 2023, Cangelosi, 1996, Kant, 1984).

In planning and implementation of Mathematics instructions, Mathematics teachers must integrate learning activities that enable learners' mental states become aware of the learning phenomena which lead learners to curiosity to explore it for natural understanding (Haule & Johnson, 2023, Cangelosi, 1996, Kant, 1984, Bloom, 1964). A Mathematics teacher should develop attitude and maintain it throughout the instruction implementation so as to enable learners mental states have reasonable feeling about learning activities, within the instruction and in overlearning activities, and with or without Mathematics teachers' guidance (Cangelosi, 1996, Bloom, 1964).

Attitude is an important element in educational taxonomy that enable learners see to it that Mathematics learning is meaningful to them, facilitating the acquisition of knowledge and skills (Cangelosi, 1996, Bloom, 1964). A Mathematics teacher must ensure that at least some lower levels of affective domain have been achieved using any methodological strategy. Mathematics teacher must ensure that the rationale of the content is well known to learners and student activities are designed in a way that maintains attitude throughout the instruction implementation (Haule & Johnson, 2023, Cangelosi, 1996, Kant, 1984, Bloom, 1964).

#### **4.2 Knowledge Development in Mathematics Instructions**

Perception and exposition enable non-physical part (mind) of the learner to explore the learning phenomena with or without senses. That is, the exploration of the learning phenomena can be imperially using physical body sense organs or rationally using mental faculties without senses (Plato, 1952, Aristotle, 1952). Mathematics learning experiences that are perceived with or without senses are processed into mind to construct conceptual content in abstract forms: mathematical objects together with comprehensive understanding of associated attributes. Therefore, Mathematical knowledge is acquired in form of comprehended facts, principles and theories underlying on the Mathematical object under study (Haule & Johnson, 2023, Cangelosi, 1996).

In instruction implantation, Mathematics teachers should enable learners describe accurately the attributes of a mathematical object in terms of inherent features and characteristics, together with the guiding theories and principles drawn from the learning phenomena. A mathematics teacher must ensure that the intended knowledge has been acquired by a learner through appropriate methodology (Haule & Johnson, 2023, Cangelosi, 1996, Bloom, 1964).

During Mathematics instruction, a Mathematics teacher should promptly assist learners to construct own knowledge and understanding by enabling them identify, analyze, describe and explain correctly the attributes of a mathematical object by means of correct thinking and judgement (Haule & Johnson, 2023, Cangelosi, 1996, Bloom, 1964).

#### **4.3 Skills Development in Mathematics Instructions**

The acquired knowledge is practiced physically to generate skills execution of mathematical problems. The physical part (brain) receives and accepts commands from the non-physical part (mind) for physical execution. The energy and intensity of the non-physical part is supplied to a physical organ which to execute the commands, and executes the commands. That is, the brain accepts commands from the mind (cognitive) for physical execution (Psychomotor) to generate skills. And the quality of the physical performance of the learner is the competence acquired in doing Mathematics (Haule & Johnson, 2023, Cangelosi, 1996, Kant, 1984, Bloom, 1964).

In the process of generating skills, a learner discriminates and differentiates facts that are required to solve a mathematical problem. Appropriate decisions are made on which facts are relevant to solve a mathematical problem. Correct decisions made and the precision in solving a mathematical problem, not only maintains attitude, but also improves the skills acquired. Competence of learners in solving real life mathematical problems enable them justify the beauty of Mathematics in real life (Haule & Johnson, 2023, Cangelosi, 1996, Kant, 1984, Bloom, 1964).

#### **4.4 Competence Development in Mathematics Instructions**

The competence in Mathematics can simply be referred to as the quality of physical performance in doing Mathematics (Haule & Johnson, 2023, Cangelosi, 1996). In the process of generating skills, accuracy and precision in solving mathematical problems together with the developed habit of doing mathematics enable learners become competent in mathematics. Learners' attitude, knowledge and skills are clear demonstrated in doing mathematics. (Haule & Johnson, 2023, Cangelosi, 1996, Kant, 1984 & Bloom, 1964).

In the process of developing basic learners' competences, a mathematics instruction planned must identify

clearly which activities are for attitude development, knowledge development, skills development and overlearning activates that will develop competences with or without mathematics teachers' guidance (Haule & Johnson, 2023, Cangelosi, 1996, Kant, 1984, Bloom, 1964).

## 5. Conclusion and Recommendations

On the basis of mind-body problem and related literature, it is concluded that, thoughts of substance dualists are consistent and correct. Man is composed of two ontologically distinct substances: the physical and the non-physical substance, existing compactly in one main substance, the Supreme Being. Mind and brain are two ontological substances that resembles in appearance, shape and proportions, though exist in different sizes. The brain performs two main functions, enable perception of the reality for mental processes and accepting the mental commands for physical performance to acquire skills and then competence.

In the right of this study, it is recommended that;

- (a) Mathematics philosophers should review the mind-brain relationship metaphysically basing on Anthropology-Theological approach, Ontology-Theological approach, and in relation to meta-epistemological basis in order to solve precisely the mind-brain relationship in order to understand the real nature of Mathematics learning process in man.
- (b) Mathematics pedagogy experts should review the pedagogy of Mathematics in order to fit it more precisely to the mind-brain relationship.
- (c) Basic philosophy of mind should be included in the philosophy of mathematics in order to determine the application of the philosophy of mind in mathematics teaching and learning process.

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