Developing Learners' Perceptual Abilities for Scientific and Technological Development

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Abstract

Education in general places emphasis on technological as well as self development. These aspirations are believed to be attainable through the study of school subjects, since these subjects represent various aspects of knowledge. Such a study largely takes place formally through teaching and learning in a classroom setting. It appears that since education in general (particularly in this era of scientific and technological advancement) places great emphasis on self and technological development as desirable outcomes of education, the focus is placed on both rational and empirical knowledge. But in as much as science and technology are essentially for man and his development in the world, the empirical knowledge derived from the sciences could not be under estimated, but such knowledge would necessarily entail rationality, since man needs to be rational in order to be able to function meaningfully in the world. One would believe that every school subject require the use of reason to teach and learn. Such reasoning is based on data received through empirical or rational means. For the learning of these subjects to facilitate self development and the development of science and technology much would depend on the use of sensation and reason to teach and learn them. This clearly emphasized the place of perceptual abilities in promoting the teaching and learning, since perception as shall be discussed in the paper comprises of sensation and reason. The paper examines the place of perception in knowledge acquisition and consequently emphasis the need to develop the learners' perceptual abilities for successful learning to take place, particularly in the area of science and technology.

1. Introduction

It is in the identification of perceptual knowledge as one type of knowledge that provides the starting point for this discussion. Perceptual knowledge here is referred to as knowledge based on the criterion of perception. Perception can be regarded as a criterion for knowledge only in the sense that it is indispensable to having experience. Knowledge and experience have their basis in it and our experience often make reference to some perceptions. Hence, perception could be said is crucial to acquisition of knowledge and experience. We therefore examined the concept of perception taking sensation as paramount factor. The examination looks into the behavioral interpretations of the term as a behavioral activity and examines some the relationship between perception and learning, factor influencing perceptual abilities, philosophical and psychological theories of the concept and the importance of perception in the process of knowing or whether it is the very act of knowing. The implications of this discussion in promoting teaching and learning, particularly science and technology subjects, was later drawn.

2. Perception as a Behavioral Activity

Perception is the definition given to the awareness derived from sensual contact with objects of external world. Such interpretation also bears upon previous knowledge or experience. This is when we consider the difference, given by Sperling [1], between sensation and perception. According to him, sensation is simply "the act of registering a stimulus by a sense organ", while perception is the "act of interpreting stimulus registered in the brain by one or more sense mechanism". This is therefore the connection

between activities of perception and sensation. But one question may arise: is sensation distinguishable from perception? Actually it is impossible to experience sensation without perception. If you hear a strange language for instance notwithstanding your inability to understand the meaning of the word spoken, there is the tendency in you to associate the sound you hear with some familiar words in the language (s) you understand. So if you see a photograph of an unknown person, the tendency is there to perceive the image in the similar different from that of a known person. Whatever sensation we have is projected into some facet of our past experience. Perception could consist in such projection as well as build up from present sensation. Therefore in behavioral terms sensation and perception are two rightly related activities. Perception depends on what we sense, what we expect and the context of our experience. Our learning experiences very much influence our perception because they influence the way we interpret our sensations. Perception is therefore conceived as a gateway to experience and knowledge.

3. Perception and Learning

What is learning? In any discussion on learning, what readily comes to mind is acquisition of knowledge and experience as well as response to some desired behavior, among other things. These ideas give us insight into the fact that learning is an experiential activity.

Okoye N.N defined learning as a change of behavior resulting from experience [2]. According to him learning is a concept that belongs to two disciplines of education and psychology. The educationist understands learning as working tool for knowledge while the psychologist associates it with behavioral change. Again M. Oakeshott gave another definition of learning which is more analytical than Okoye's. He defined learning as:

The comprehensive activity in which we come to know ourselves and the world around us. It is a paradoxical activity, it is doing and submitting at the same time. And its achievements range from merely being aware to what may be called understanding and being able to explain [3].

Both definitions see learning from both epistemological and psychological perspectives and implicitly associate learning with perception since perception is both an epistemological and

psychological term. One would also observe that both the epistemological and psychological conceptions of learning associate learning with experience and knowledge. One could therefore establish a relationship of learning with perception on the ground that both concepts have experience and knowledge as their focus.

However, this is not to take perception as synonymous with learning, since not every case of perception guarantees learning. This is because it is the mind alone that is essential involved in perception through the agency of sensory modalities while it is the entire organism that is involved in learning since the change of behavior that is the index of learning involves the entire organism. It is noteworthy to say that not all that is perceived by the mind may result in learning. For example, a person may perceive his bedroom and the contents from time to time. It is not every instance of his perception of it that brings about change in his behavior. Even though every instance of his perception of the room may be taken as a renewal of his cognitive encounter with the room, yet such an encounter does not always generate a new behavior. Also the contention that the achievement of learning is manifest in awareness and understanding is not always applicable to perception. As we may understand it, achievement of perception consists only in awareness and interpretation of the object awareness. Such interpretation may not always depict understanding and ability to explain what is perceived. More can be said on the relationship between perception and learning but let it suffice for us to uphold that perception is related to learning as a behavioral activity that is centered on experience and knowledge and perception could be a stepping stone to learning when it leads the perceiver to a change of behavior.

Since perception is established as a behavioral phenomenon several factors that influence human behavior make their mark on perception. Such factors include heredity, emotional state, intellectual disposition, personality traits, among others. We shall examine some of these factors briefly.

4. Factors influencing Perception

4.1. Heredity

A definition of heredity by Durojaye offers us a starting point for examining the influence of

heredity on perception. He defined heredity as “transmission of potentialities for physical, mental or other characteristics from parents to offspring at conception” [4].

Although this definition does not clarify whether the concept is a ‘process’ word or a ‘product’ word, what is of interest to our discussion is the notion that through heredity a child acquires certain characteristics and propensities from their parents. From this, one would believe that heredity makes its mark on a person’s intellectual capacity.

The influence of heredity on human perception is due to the combined action of a number of genes. Durojaye again testified to this view in his claim: particular characteristics of a child’s body or of his behavior are determined by the combination of pairs of genes, one member of each pair having come from the mother and the other member from the father [5].

It is believed therefore that during conception a person derives his or her genetic makeup from the parents. It is from this genotype that the individual inherits his or her perceptive capabilities. As children vary according to genetic characteristics so there are variations in respect of their perceptive abilities. For example an insane person is more likely to perceive every person as insane and hence relate with each one accordingly while a non-insane person would perceive other sane people as normal. Also a mentally retarded person would perceive differently from a person who is mentally alright. Even if the mentally retarded person enjoys the use of all his sense and mental faculties, his mental retardation would make an adverse mark or interpretation of his sense data during the process of perception. The perception, whether it takes place from within or outside the perceiver bear the mark of his heredity any characteristics and this reflects on the experience of the perceiver.

4.2. Personality Traits

Personality is a concept usually applied to human beings in relation to their behaviour. Personality can be assessed at two levels. There is the level of generality which can be understood simply as the extent to which the individual exhibits the elements that characterize him as a human being. There is also the level of individuality. This borders on individual

uniqueness, our concern is mainly with the second level.

Personality traits are abstractions from an individual's behaviour certain situations and such abstractions portray his characteristics and predictive of his behaviour in similar situations. Personality enfolds thinking, imagining, intelligence, abilities, and temperament, among others. Its influence on one's perception is determined by the extent to which each of the elements makes its mark on one's intellectual and emotional development. Perception essentially consists of interpretation of sense data; such interpretation inevitably bears upon a person's cognitive and temperamental exposition. For example, a hot-tempered student may perceive a meticulous and firm teacher as wicked and uncompromising, while a cool-tempered student may perceive the same teacher as disciplined and assiduous.

Personality traits, one believes, constitute one of the factors that bring about variations among human beings and consequently human perceptions. But there are similarities of personality characteristics, among two or more persons. A human being, one would say, is to some extent like every human being while to some extent he is like no other human being. Human perception can similarly be described. Two or more persons can perceive alike and thereby possess the same knowledge or experience of a phenomenon while they may perceive another phenomenon differently and thus have a different experience of it, hence it is possible for two or more persons to perceive the same phenomenon in spite of the variations in personality traits.

4.3. Emotional Disposition

Akin to personality traits as factors that influence perception is emotional disposition. Many individual differences and consequent perceptual differences could be traced to behaviour resulting from emotional states of a person. Emotional states quite often develop from perception and in turn may influence other perceptions, As Okoye would say:

Emotions are generated by the autonomic nervous systems as a reflex response to our perceived stimulus. Such emotions may be adient (approachable) in which case they sustain activities which push us towards an admired

stimulus. They may also be abient (avoidant) in which case they sustain activities which pull us away from a dreaded or disliked stimulus. [6]

This definition presents emotion as essentially a reflex response to a perceived stimulus. But we would wish to object to it that emotion is not the response to a stimulus but rather the internal force generated within an organism to respond to a perceived stimulus. The distinction drawn between 'adient' and 'abient' emotions seems to justify this position. The emotional state of a person is therefore determined by the nature of the stimulus a person receives.

5. Psychological Theories of Perception

Gestalt Theory: The Gestalt psychologists postulate the theory that in our perception, we organize stimuli along the lines of certain natural tendencies which might be related to an organizing and grouping function in the brain. Notable among the theorists are Max Wertheimer and W. Kohler, among others. The Gestalt view of perception is valuable in the sense that it highlights the simultaneous nature of perception in relation to sensation. The natural tendencies along which we organize our stimuli result from our learned experience. This theory helps to establish the inseparability of perception and sensation from knowing. As Miller puts it, the difference in sensation and perception lies not in what we experience as such but in the way we describe what we experience. He says: "Sensation and perception correspond to two languages people have for talking about their experience" [7].

One may ask, if perception bears upon previous learned experience, what of sensation, since sensation and perception are conceived as inseparable? In an answer to this question, one would assert that sensation is not influenced by previous learned experience. It is a process of contact of the sense with phenomena in the world only perceptions could be influenced by learning. In his own theory, J.J. Gibson, distinguished between what he called "Literal" perception and "Schematic" perception.

According to him, Literal perception is the cautious attentive approach to information attainment and the causal, familiar approach is the schematic perception. He said [8]: In the course of practical behavior, literal perception takes time and effect. The percept is reduced to a cue for

action. But perception can become literal whenever the observer needs to discriminate... One can always look at a thing carefully if there is a reason to do so.

On the other hand, schematic perceptions are not merely less detailed they are usually more meaningful too. When an observer becomes cautious and attentive in interpreting perceptions, there is the tendency to jettison the meaningful aspects of perception, but if he tries to eliminate all interpretation and expectations that the cautiousness brings to him, his perceptual world will shatter. One would say that the explanation given to literal and schematic perception is not lucid enough to justify the distinction made between the two classes of perception. For instance, there is no justification for saying that schematic perceptions are more meaningful than literal ones. The contention that the cautious and attentive observer would jettison the meaningful aspects of his perception has no basis. Perception in whatever the form it takes can be exact or inexact depending on the mental sets of the perceiver.

In his own discussion on perception, Peter Mckellar made a division of perception into what he called "primary" and "secondary" perceptions [9]. The main difference between the two types of perception lies in the fact that in secondary perception, information is communicated through intermediaries. Examples of primary perception are seeing human face, hearing human voice and the examples of corresponding secondary perception are seeing photography of human faces, or hearing recorded human voice.

In primary perception, a person gains impression of the object of perception through direct sensation of the object itself but in secondary perception, a person receives impression of the object through sensation of another object that bears the impression. A useful deduction to make on this classification is that primary perceptions are more than secondary ones.

The impression received from seeing a human face is more reliable than the one received from seeing a photograph of the human face. The former presents the human face in its natural form while the other can be deceptive due to age of the photograph or actual manipulation by the photographer.

However, secondary perception enlarges the possibility of extending the scope of human

experience. Through secondary perception therefore, we gain experience of geographically distant places or historically remote events and people.

Sigmund Freud, in his psycho-analytic thought about perception again, made a twin classification of the structure of the human mind [10]. These he name 'Ego' and 'Id'. The 'Ego' refers to the aspect of personality concerned with perception of the external world usually through exteroception. But the "Id" refers to the seat of emotions and instinctive urges. One could see from this classification that the notions of "Ego" and "id" indicate to us that a perceiver himself is part of the perceptual process. This point may be related to R.P. Power's contention that perception brings about information in the Freudian sense is focused on the perceiver [11]. There is the object of perception clearly distinguished from the perceivers unless the perceiver makes himself the object of the perception.

In general, the various theories of perception help to clarify what perception is and the various forms it can take. The examination of these theories leads us to these conclusions: Firstly, perception is a behavioural phenomenon which is geared towards the attainment of information. Secondly perception is empirical since it is concerned with experiential approach to knowledge. Thirdly, perception comes from within and outside the perceiver. We shall now examine some philosophical theories of perception to see their relevance to these psychological theories.

6. Some Philosophical Theories of Perception

Carneades Theory (c 213-129 B.C): Carneades was one of the leaders of the Platonic academy. His theory of perception as quoted in Christolm [12] which he described as a theory "Concerning evidence of the senses" is stated in the followings theses: First: Having a perception of something F tends to make acceptable the proposition that something is an F.

At the surface level, this appears too obvious to dispute, but a close examination of the statement reveals to us that in view of the difference in people's perceptual capacities the statement may not always be tenable. If we consider a situation when a person suffers some

trauma in his senses such a person is likely to make wrong perception. What he claim to perceive may not always be what is. Thus not every perception of something F makes acceptance the proposition that the thing is F. However, the statement emphasizes the subjective nature of perception.

The second postulate states:

Consider a set of propositions, each one having same presumption in its favour for S: If each of the set is also such that the conjunction of all the other members of the set tends to confirm it, then the members of the set are all acceptable for S.

This theory states that some of our perception concur and reinforce each other. Each of these perception attests to the same fact and none of them casts any doubt on any of the others. If we apply this directly to perception, one would say that in a set of perception, say of John's book, the book is perception in terms of its size, shape, print, title, and other element that make up that particular book. Once these elements concur, perception of such concurrence would enable us to confirm that it is the book. But one would critically say that even though the concurrence of the elements could certify that it is the book, yet it could certify that it is another copy of a book which share similar features with John's book. One therefore requires some further previous knowledge of some facts, about the book to certify that it is John's book. This theory has failed to establish this fact.

The third postulate is on perception tests. It states:

Concurrent proposition that survive such "close scrutiny test" are more reasonable than those that do not.

In testing perception, according to Carneades, we scrutinise the condition under which it occurred. A perception is provable if we take care of the following:

Our sense organ and
Our own state of mind

Thus in scrutinising any particular perception, we appeal to other perceptions and to independent information or beliefs. Such information or beliefs would show whether our senses are not

deceiving us. Again, Carneades does not tell us the nature of independent information and beliefs that we have to appeal to in order to scrutinize a perception. Going by this law of scrutiny, it therefore remains for us to verify the authenticity of such independent perceptions or beliefs, if any, that would prove the worth of other perception. One could see that Carneades is expressing scepticism about the validity of perceptions. If that is case, perception would therefore not be a reliable channel of information or knowledge. But it would not be tenable to uphold this view absolutely since perception as could be seen can reliably offer objective knowledge.

7. George Moore's Sense - Datum Theory

Moore's sense-datum theory begins with what he understood as the most primitive way to have knowledge of existence of material objects. His attention was therefore focussed on what he called "knowledge by means of the senses" [13]. Admittedly, he claimed that a means of knowing is not the only way to have knowledge of material things, but he insists that the evidence of the sense is the evidence upon which all our other ways of knowing material object seems to be based. His sense-datum theory is based primarily on the primary of sensation in knowledge acquisition. According to Moore, sense datum is what we directly apprehend in a material objects. Examples of sense data are colour, size, and shape, among others. This submission must glaringly apply to the growing child.

Moore's sense-datum theory of perception can be summed up in these propositions.

- a. That absolutely no part of the sense-data which I ever apprehend (perceive) exists at all except at the moment when I am apprehending it.
- b. That no two people ever apprehend (perceive) exactly the same datum
- c. That none of the sense data apprehended by one person can ever be situated either in the same place with or at any distance in any direction from those apprehended by any other person.

What the first proposition states is that only at the moment when I am perceiving material objects do what I perceive exist. Outside the moment of perception, these elements do not exist. Outside the moment of perception, these elements do not exist.

One could fault this view by asserting that it is not the perceiver that brings into existence whatever he perceives. A Perceiver perceives an existent and his perception is defined in terms of the elements of the existents that are given to his senses. If I perceive a person, say Olu, for instance, the existence of Olu does not depend on any perception of him. It would therefore be absurd to uphold the view that Olu ceases to exist when I do not perceive him. Limitations to perception can only be expressed in respect of individual act of perceiving not about the existence of what is perceived. A person can only perceived an object when the object is within the scope of his sensation but the object remains in existence even when it is not perceived.

The second proposition states that no two people ever apprehend exactly the same sense-datum. Moore allows that two or more people's perceptions of an object can be alike but that they cannot be exactly the same. This proposition logically derives from the first proposition. If the existence of an object is limited to individual perception, then an individual perceives object in his own way. Granted that individual characteristics make a mark on individual perceptual ability, yet the contention that two people cannot apprehend the same sense-datum has no sufficient basis. Let us take a typical classroom situation for example. Two or more pupils perceive the teacher in terms of his height, voice, skin colour, among other characteristics as well as perceive other things in the classroom. It does not make sense for instance to expect the teacher to function as disseminator of knowledge to pupils if no two pupils can perceive the same thing, either about him or about his teaching, in the same way.

The third proposition states that none of the sense-data apprehended (perceived) by one person can ever be situated either in the same place with or at any distance in any direction from those apprehended by any other person. That is to say that any sense-datum apprehended by a person, Say Olu, cannot possibly be on the same place as any sense-datum apprehended by a person, say, Tunde. Again this proposition follows from the other two. But it can be faulted in this way: Let us imagine a house by the roadside. It would be incongruous to deny the possibility of two people perceiving the house from the road or perceiving any part of the house from the same place.

In general, these three propositions seek to establish the theory that sense-data exist only in the mind of the person who apprehends them. But care needs to be taken to distinguish between sense-data and the objects they represent since sense-data are better understood as mental representations of existents.

In a critique of the sense-datum theory, R.E. Tully [14] writes: To see an item as a material object involves a context comprising the observer, his environment, the object itself and its background and his context is more other than the common sense frame-work of observers and the world they inhabit.

Granted that these factors mentioned make up the content for perceiving a material object, it becomes difficult to understand and accept Moore's propositions. Tully continued: The juxtaposition between observer and sense datum... is wholly artificial.

This conclusion, to the Writer's mind makes sense. All in all Moore's theory raised the question: What is that we really perceive? Is it the material object or the representation of the object? One would expect that the reaction of the sense-datum analyst would be to reject the question as unnecessary since it appears as if one is asking for the obvious. But this is not so, since Moore's theory raises the question without providing an answer to it. This question would be answered only if our concept of perception is clarified. There is a need to believe that we perceive a common world wherein sense data belong to it as much as material objects. Our judgement at perception is such that we can identify what we experience as both a sense-datum and a material object. It is simply a matter of language at two different levels of use.

R.E. Tully again expresses this view. He says: "No sense-datum could acquire such a status without itself becoming a material object, which is only to say that the expression "sense datum" would have become an alternative name for material object".

This implies therefore that we perceive material objects as well as their representations and that perception itself is a mental representation of these objects. For example, it is possible to perceive a person as well as his photograph or an artistic painting about the person. Again Charles Worth [15] puts this idea in his own way: "We are aware rather of the environmental object, event or situation, through

or by means of the qualitative dimension". The qualitative dimension referred to here is the sense is the sense data. One can conclude therefore that there can be no sense data without the perception of objects since data are qualitative elements of the objects and one cannot perceive objects in isolation from the data they offers to the senses.

8. Thomas Reid's Theory of Perception

Reid's theory upholds that there are sensations and that whenever some instance of perception occurs, then some sensation is experienced [16]. Although Reid has not made it clear whether such sensations merely accompany perception or whether they are intrinsic to it some of his writings indicate the first view. The perception theory as it were, places perception as antecedent to sensation. But actually sensation precedes perception.

The second view, however, is more tenable in the sense that every perception has sensory content since perception as the interpretation of sense data requires that such data are made available before they can be interpreted. This does not rule out the facts that one perception can generate other sensations and perceptions. Concerning the object of perception and the existential nature of perception, Reid writes: "Perception, as we here understand it, has always an object distinct from the act by which it is perceived; an object which may exist whether it is perceived or not" [17]. This apparently opposes the view that perceptual data exist only in the minds of the perceiver, a view postulated by the sense-datum theories, what is being perceived, according to Reid are "the various qualities of objects" and that these qualities exist independent of perception. Also the contention is made that the physical objects themselves exist independent of perception.

Sensations are understood by Reid as affections or feelings which inhabit in the mind while perception is always directed to something external. This again can be criticised by drawing out attention to the fact that sensations cannot be distinguished from perception in the way Reid tries to do it. We need to bear in Mind that both sensation and perception express conditions of mind with regard to external object. The first makes a representation of object in the mind while the later interprets the representations.

In general much of Reid's writings on this issue have centred on clarification of the term, sensation and perception and the antecedence of one to the other. To sum up, examination of the philosophical theories reveals that perception depicts an encounter of the mind of perceiver and requires the use of sense organs and reason; that sensation is antecedent to and causally connected with perception in the process of seeking knowledge.

From these discussions therefore, one would understand that perception is crucial to acquisition of knowledge and experience. Because, in any discussion of learning what readily comes to mind is acquisition of knowledge and experience as well as response to some desired behaviour, among other things. Okoye N.N. defined learning as a change of behaviour resulting from experience [18]. This definition sees learning from both epistemological (philosophical) and psychological perspectives and implicitly associates learning with perception since perception is both an epistemological and psychological term. One would also observe that both the epistemological and psychological conceptions of learning associate learning with experience and knowledge. One could therefore establish a relationship of learning with perception on the ground that both concepts have experience and knowledge as their focus.

9. Conclusion and Implications for Educationists

From this discussion one would postulate that every act of perception creates some emotional states for the perceiver. This is because every act of perception creates in the perceiver some internal forces that motivate him to some behaviour. Such emotional states may make positive or negative influences on further perceptions. For example, a particular emotional state may motivate a person to utilize his perceptions to make a good relationship with other people while some emotional states could generate a bad relationship.

Some emotional states appear to be composed of simpler emotions which reinforce or contradict each other. The emotional state of jealousy, for instance seems to be composed of such emotions as strong and possessive love for a particular person or thing together with the aspiration to enjoy this love, the fear losing the love; and anger

towards any person that may stand in the way of achieving this aim. These are amongst other possible emotions.

For example, a little child may be jealous of his mother's new baby when he fears that his mother would withdraw her love for him and give all her care and affection to the baby. From the example given, one would expect that the emotional state of jealousy in the child would affect his perception of the mother and the new baby. The child, for instance may perceive the mother as unloving towards him, and the new child as a rival. Also the child could perceive others in the family or household as neglectful or tolerant depending on the degree of affection he receives from them.

Some emotional states of a person may manifest in complex, simply understood, is a powerful determinant of actions which is completely unconscious in the sense that the person who has it is ignorant not only of its impulsive power but of its very existence though it may be evident to every one else. C.G. Jung put it in the following words: "A complex is an organized group or constellation of feelings, thoughts perceptions and memories that exist in personal unconscious" [19].

He further contended that a complex has a nucleus that acts as a kind of magnet that attracts or constellates various experiences. These are as many complexes as are objects of human thoughts and experiences. One pertinent point to highlight is that complexes are emotional states of a person in which he is drawn to an object of attraction or withdrawn from an object of aversion

A boy who suffers from Oedipus complex may centre his thoughts on his mother and direct his affections and feelings towards her. Whatever the mother says, feels or does would mean a great deal to the person as he continues to carry the mother's image in his mind. There is the tendency even perceive every other woman as similar in characteristics or different from his mother, he may also acquire the mother's sense of value and takes it as a yardstick for assessing other values. Thus the emotional complex for the mother makes its impact on his perception of people and things.

Conversely a person with persecution complex may see almost everybody around him as a threat to his physiological and mental stability. His action to people and events is determined by his perceptions of such people

events he comes in contact with. Such perceptions are inevitably guided and influenced by his prejudice resulting from his persecution complex. Other complexes, which are commonly referred to as "Inferiority" and 'Superiority' complexes, make their marks on the perception of their possessors.

In general perception under any of these influences could take place from within or outside the perceiver. As these factors influence perception so they influence the experiences and knowledge that accrue from these perceptions. This happens as the behavioural factors influence the retention of objects of perception as well, as predispose the mind to discern the truth of knowledge in what is perceived. Such factors as heredity, personality traits and emotional dispositions amongst others predispose the individual minds to taking in sensual stimuli and interpreting these stimuli to gain experience and knowledge.

For example, it is possible for two or more people to be exposed to the same sensual stimuli and make different-perceptions of them. For instance, two or more people may watch a play, and at the end of the drama each one may give various stories and impressions of the play. This way each of them demonstrates his own perceptions of the play. It could happen that some may give the same story and impression of this play. This occurs if two or more people share the same mind on what they perceive. But when some give diverse interpretations of the play, such interpretations are based on their various perceptions of the play. Such variety in perception could be influenced by any or some of these behavioural factors. Again one would explain further that these behavioural factors guide the mental sets of the perceivers in the sense that they determine the object of focus for the perceivers. Since these factors are believed to constitute the basis for individual differences among human beings, they inevitably are responsible for variations in human perceptions. Our analyses of the perception theory would be summed up in these postulates:

- (a) Knowledge results from the encounter of the mind on the truths of experience.
- (b) Knowledge requires the mind to be. It does not exist outside a mind.
- (c) Truth is a necessary condition for knowledge.

(d) Experience is the essence of knowledge and it is attained through perception.

The implication of this study on teacher education is that it shows concern on the intellectual development of the teacher as it manifests in his ability to learn and to teach. It seeks to emphasize the need for a teacher to be groomed in the management of his perceptions to learn and to teach. In order to produce highly skilled and efficient teachers, teacher education should therefore be given a boost. This would entail grooming teachers in various approaches to teaching but with greater interest should the approaches that encourage rational thinking to derive the true knowledge. This is a skill that takes time and experience to acquire and teacher needs to acquire this skill before he can assist others to do so. Therefore This paper would suggest the need for teachers and other professional curriculum planners to give attention to teaching through active involvement of teacher and learner in both perceptual and rational development of learners. Teaching would be more effective when facts and concrete objects of learning about the world are explored empirically and subjected to critical examination during teaching and learning, particularly in science and technology related subjects/ areas.

10. References

- [1] Sperling, A.P. Psychology made Simple, W.H. Allen, London, 1971
- [2] Okoye, N.N. Learners Characteristics and Human Learning in School. In Social Psychological Factors of Human Learning in School, Ezewu E.E. (ed), Onitsa, Leadway books, 1987.
- [3] Oakeshott, M. (1967). Learning and Teaching, in R. S. Poters (ed). The Concept of Education. London, Route Ledge and Kegan Paul. P. 156.
- [4] Onyemeachi, M.B. (1987). "Factors affecting Learning", seminar paper presented to department of Teacher Educationn, University of Ibadan P.1
- [5] Onyemeachi, M.B. (1987). "Genotype Factors affecting Learning", seminar paper presented to department of Teacher Educationn, University of Ibadan P.1
- [6] Okoye, N.N. Learners Characteristics and Human Learning in School. In Social Psychological Factors of Human Learning in School, Ezewu E.E. (ed), Onitsa, Leadway books, 1987.
- [7] Miller, G. Psychology, the Science of Mental Life, Penguin Books, London, 1962.
- [8] Gibson, J.J. The Perception of the Visual World, Allen and Unwin, London, 1952.

- [9] Mckeller, P. Experience and Behaviour, penguin Book, Harmondsworth, 1968.
- [10] Freud, S. The Neo-Psychoses of Defence, Early Psycho-analytic Publications, Hargarth, 1962
- [11] Power, E.J. in Coleman J.S. Introductory Psychology, Routeledge and Kegan Paul, London, 1977.
- [12] Chrisholm, R.A. Theory of Knowledge, Prentice-Hall, New Delhi, 1987.
- [13] Moore, G.E. Some Main Problems of Philosophy, Allen and Unwin, London, 1969.
- [14] R.E. Tully, "Sense Data and Common Knowledge", Radio Documents addresses, Lectures, Vol. XX No. 2, December, 1978.
- [15] M. Charlesworth, Sense Impression: A New Model, Mind, Vol. 88, 1979.
- [16] Reid, L. Inquiry into the Human Mind, in The Works of Thomas Reid, Sir William Hamilton (ed), 6th ed., Machmillan and Stewart, Edinburgh, 1963.
- [17] Reid, L. Essays on the Intellectual Powers of Man, B. Brody (ed.), M.I.T. Press, Cambridge, 1969.
- [18] Okoye, N.N. Learners Characteristics and Human Learning in School. In Social Psychological Factors of Human Learning in School, Ezewu E.E. (ed), Onitsa, Leadway books, 1987.
- [19] Jung, C.G., (1953). 'The Psychology of Unconscious' in collected papers. Vol. 7, Princeton, University Press.