Factors affecting human intelligence psychology essay

The objective of this context is to discuss human intelligence. To achieve the following sub titles constituted as guidelines for the discussion; anatomy of human of intelligence, theories of human intelligence and factors affecting human intelligence

Anatomy of Human Intelligence

Human nature has intelligence that governs the human mental ability and to as cognitive ability. Despite being a widely studied and debated topic there is still lack of a universal definition for intelligence because of its compound and many-faceted nature i. e it engages multiple areas of the brain, instead of just having one intelligence center. Intelligence facilitates the gaining of knowledge and consequent wide applications in solving problems. The roots of intelligence are biological and it is believed to have evolved over time and is connected to structure of the brain and its development in that the intelligence quotients are related to the brain volume (Frohlich, 2004). According to Sternberg (1981), psychologists and laymen agree that intelligent people are characterized by their capacity for solving problems, their expertise with language and their open-minded nature to innovation.

According to Flinn et al (2004), the evolution of human intelligence has been so rapid compared to other species such that the human brain increased by about 250% in less than 3 million years. This is evidenced by remarkable behavioral changes of the past few generations. They further argue that the high evolution rates leading to greatest complexity in human are due to the demand of their environment citing ecological demands, such as hunting or

climatic variability and selective pressures favoring other species compared to them.

Research on human intelligence has become intense in trying to answer the several questions raised on basic structure and mechanisms of intelligence following the discoveries made in relation to genetics of intelligence and it's functioning in the most recent stages of human development. In trying to classify intelligence, the following three classes were arrived at; social intelligence, natural or potential intelligence and " academic" intelligence. The social intelligence is a practical mode of intelligence used in making day to day life decisions in all fields. Natural or potential intelligence helps in acquisition of knowledge and cognitive abilities essential for easy interaction with the surrounding environment. The third form of intelligence is more of as measure of the cumulative levels of the former two types of intelligence describing the complexity of intelligence and is characterized by the IQ tests. Modern psychology classifies intelligence in two categories namely fluid intelligence and crystallized intelligence. Fluid intelligence is mainly the use of self acquired knowledge through life experiences to solve challenges and crystallized intelligence is more like academic knowledge as it largely depends on long-term memory. However all these different forms of intelligence are dependent and do not operate in isolation (Colom & Pueyo 2000).

Theories of Human Intelligence

In an endeavor to understand human intelligence, there are various theories advanced to explain it. They can be divided into the unilateral construct

based on unitary entity of general intelligence and those based on multiple dissimilar activities. Some of the theories discussed below include Psychometric approach theories, Piaget’s stages of cognitive development, Sternberg’s Triarchic theory of intelligence and Gardner’s multiple intelligences theory.

Psychometric approach to understanding intelligence is the most used and is based on psychometric tests. Some of the theories advanced based on this include; Charles Spearman in 1904 came up with Two-factor Theory of intelligence as a way of measuring general intelligence using Tetrad Differences. His basic inputs were common sense (native capacity) and sensory discriminations. It stated that every test can be divided into a “ g” factor and an “ s” factor. Where the g-factor measures the “ general” factor or common function among ability tests and the s-factor measures the “ specific” factor unique to a particular ability test. This however had its limitations because the g factor showed that any cognitive ability regardless of how different they were had a positive correlation (Spearman, 1904).

Following the shortcomings of Spearman, L. L. Thurstone came up with the Centroid method for modern factor analysis. Modern factor analysis took in seven orthogonal factors referred to as Primary Mental Abilities; verbal comprehension, word fluency, numerical capability, spatial visualization, associative memory, speed of understanding and reasoning to yield multi factors, unlike Spearmans single factor yield (Thurstone, 1934).

Raymond B. Cattel spotted a weakness in the former theories as a result of the use of single generation in trying to measure intelligence. He developed

The Gf-Gc Theory measuring intelligence using fluid intelligence (Gf) and crystallized intelligence (Gc) to account for differences between children/adolescents and adults. The Gf represented the ability to discriminate and perceive relations while Gc represented the ability to differentiate earlier established relations using Gf. He supposed that crystallized intelligence increases gradually to old age where it slowly declines whereas fluid intelligence reaches a peak in adolescents and remains almost constant through adulthood (Carroll, 1993).

J. P. Guilford ventured more into the adulthood intelligence developing a Structure-of-Intellect model (SI model). The model had a 3-D cube shaped model with five categories of how the information is presented on a test, six operation categories of what is done on a test and six product categories of the form in which information is processed on a test. Upon conducting a test and filling all the categories, the point of intersection provides foundation for generating hypothesis of intelligence (Carroll, 1993).

Using re-analysis of several data sets John B. Carrol proposed the Three Stratum Theory. This consists of three different levels of intelligence. The first layer represents narrow abilities that are highly specialized, the second level represents moderate abilities but in several areas and Spearmans concept was a sufficient representation for the third level (Carroll, J. B. 1993).

The latest work using psychometric approach is the Cattel-Horn-Carrol (CHC) Theory. This is an amalgamation of The Gf-Gc theory, Horn theory and The Three-Stratum Theory.

According to Horward Gardner (1999) psychometric tests had ignored other forms of intelligence of equal importance; that our minds handle different tasks using several cognitive mechanisms and not through a single centralized system. He therefore developed Theory of Multiple Intelligences basing his studies on both the normal and abnormal personnel coming up with eight different components of intelligence with the eighth one just added in 1999.

Robert Sternberg came up with Triarchic Theory of intelligence based on three aspects of intelligence. These were creative intelligence (experiential), analytic (componential) intelligence and practical (contextual) intelligence; where analytical intelligence deals with academic brilliance, creative intelligence deals with insights, fusion and reaction to events while practical intelligence deals with acquiring knowledge, understanding and dealing with life challenges. He was of the opinion that general intelligence is only but part of analytic intelligence and therefore cannot give a full insight of intelligence. Following its use in evaluation of individual success in the modern times this has later been named as Theory of Successful Intelligence by Sternberg (Sternberg, 1984, p. 271).

Jean Piaget advanced one of the used theories in the development of school curriculums. He used the development approach in the study of intelligence. His view was that growing up is a process that has stages and every stage bracket has its maximum capabilities. The group stages of development he came up with are Sensimotor stage (0-2 years), preoperational stage (2-7 years), Concrete stage (7-11 years) and formal operational stage (11 years and above). At Sensimotor stage (0-2) intelligence is based on perception and how other objects work, the thoughts occur mentally and cannot be expressed. In the preoperational stage (2-7 years) one learns to speak, image representation of objects with the thoughts being external. Concrete stage (7-11 years) involves logic reasoning and thinking. The formal operational stage (11 years and up) is the final stage of development of human intelligence. His theory suggests that growth of intelligence is continuous process of assimilation and accommodation of new ideas and which lead to expansion of field of applications.

Factors affecting Human Intelligence

Human intelligence is affected by biological factors, environmental factors and ethical factors. Biologically genes pass cognitive abilities from parents to the children through the DNA. This is evidenced by a number of factors that include the correlation of IQs between an individual and the parent, hereditary brain diseases, similar IQs in identical twins, similarity in brain language areas among family members and cognitive skill such as verbal and spatial abilities, reaction times, and even some personality qualities, including emotional reactions to stress. Intelligence is connected to structure of the brain and its development in that the intelligence quotients are related

to the brain volume. Since intelligence is affected by the brains some factors like ratio of brain weight to body weight, the ratio in for instance of brain weight to body weight in a fish is 1: 5000 whereas in humans it is 1: 50. Occasionally brains metabolic activity may lower intelligence for big brains. The size of the frontal lobe critically affects fluid intelligence tests Other factors affecting intelligence related to the brain include location of the grey matter tissue and its volume and the overall thickness of the cortex (Colom & Pueyo, 2000).

Environmental effects are affect intelligence of human population both at individual and group levels. Some environmental factors are either enhanced or suppressed by the genes of the individual. The social set up has impacts on the level of intelligence attained by an individual as it dictates things like what he does, what he values and how he lives. This is attested by the different level of intelligence of different communities living in different locations say urban-rural places. Their different tend to improve one aspect of intelligence compared to the other set up. Occupation of individuals also tends to affect their intelligence depending with the scope pr demand of their job jurisdiction. Education is also a major factor influencing level of intelligence; this will depend on the level of education where highly educated individual is likely to have a high level of intelligence compared to one with low levels of education in general skills and problem-solving and abstract thinking. Another environmental factor affecting intelligence is nutrition, it has been largely converged that prolonged malnutrition during childhood has long-term effects on level of intelligence. Intelligence is also affected by the manipulation of existing normal conditions; eugenics is currently being practiced to improve the human species by improving human genes. This is mainly to correct congenital disorders and cognitive skills. There are also studies being conducted to try coming up with artificial intelligence through increasing IQs and also using machines. There major cognitive skills of interest are reasoning, knowledge, perception and reaction (Flinn, 2005)

Ethical issues also affect human intelligence. In this work the ethical issues discussed are privacy, accuracy and accessibility. Human intelligence is likely to be compromised by wrong information availed to it leading to wrong conclusions or decisions. Lack of information or refrained access to vital information required later translates to lack of knowledge which limits the level of operation of the human intelligence.

Human intelligence is surely a not so well understood phenomenon that still requires more research to give a clear insight and understanding of its complex nature. Simulation and improvement of the advanced theories will be key to any further development in these field