Evolution Of Concept Of Intelligence

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Abstract
This review paper focuses on the different theories of intelligence and their relevance. It analyses the conceptual framework underlying the theories of prominent researchers across the world. It critically examines the different factors that impact intelligence and define intelligent behavior. It sheds the light on emotional intelligence as major determinant of success and well-being and traces its evolution. The paper also highlights the definitions and concepts of intelligence in the twenty first century. It also gives a new direction to the assessment of intelligence.

Key words: intelligence, intelligent behavior, factors, abilities, emotional intelligence

1.Introduction
The word intelligence is derived from the Latin verb ‘intellegere’ which means understanding. According to the Webster's dictionary, intelligence is the ability to retain knowledge, use reasoning to solve problems or have above average brain power. The Oxford dictionary defines it as “the ability to acquire and apply knowledge and skills.” In other words, it refers to the ability of thinking, reasoning, and acquiring and applying knowledge. [28] The present study is a modest attempt to trace the evolution of the concept of intelligence. The researcher strives to highlight the conceptual framework proposed by the different researchers in the past. The key purpose of this paper is to find out the relevance of these frameworks in the present times.

The prime focus is to analyze whether a person is born intelligent, whether intelligence can be acquired, whether it manifests itself in particular situations or whether it is a complex combination of two or more of the above.

2.Literature Review
The concept of intelligence has been a major topic of research and discourse since time immemorial. The ancient thinkers and philosophers had diverse views. Towards the twentieth century, it started gaining prominence as a measurable quantity. The developments in the conceptual framework are discussed in the present paper.

2.1 Ancient- Greek, Latin, Islamic and Indian Philosophy
Firstly, Plato suggests that “intelligence is that which distinguishes the different social classes, and is unevenly endowed by God. So fixed and innate to the individual was this endowment.” Also, his student Aristotle had a similar view on the issue of “intelligence”. However, he was more egalitarian compared to Plato. Aristotle claimed that people were very similar to each other in terms of their intellects. What made humans different from animals was this intellect. [15] Ancient Greeks described wisdom or intelligence is Phronesis. It dealt with practical action, implying both good judgement and excellence of character and habits, or practical virtue. Phronesis was a much discussed in the ancient Greek philosophy. Because of its practical connotation and orientation, it was often translated as "practical wisdom", and sometimes (more traditionally) as "prudence", from Latin prudentia. According to Thomas McEvilley, the best translation of the concept could be "mindfulness". [40] It is beneficial to examine the concept of “intellect” also from Islamic tradition. Avicenna being one of the most famous Islamic philosophers, theorized about “intellect” and brought the theory of “active intellect” in philosophy.

Ahmed (2011) gives Avicenna’s definition of mind in his book. Avicenna postulates that “The mind is a capacity of the soul that prepares (it) for acquiring knowledge”. [1] This definition of “mind”
shows similarity to today’s definition of “intelligence” in modern psychology. In other words, mind is understood as a capacity and not a stable part of humans.

Also, Arslan (2011) suggests that actually Avicenna’s philosophy is very similar to that of Aristotle. Both of them mention “the active intellect”. Humans have both “passive” and “active” intellect. Passive intellect alone does not include any action. Therefore, active intellect is the one converting passive intellect to an action and generating the knowledge. [4]

The concept of active intellect might be explained more. Alper (2010) explains Avicenna’s “active intellect” as “transcendental intellect” also. [2] More clearly, knowledge might be based on senses and thoughts. However there is another dimension which exceeds these dimensions. Human alone is not able to reveal the knowledge. The thing giving the knowledge to the humans and generate this knowledge on humans is “active intellect” [15]

According to Avicenna, intellect itself has a potential to gain knowledge. However, when there is no active intellect, it cannot know anything actively. Again regarding this issue, Kabadayı (2006) explains that “for Avicenna, the active intellect gives natural things their forms. Hence, the material intellect is illuminated by the light of the active intellect and recognizes the general only if it looks upon the particular representations which are in the imagination.” [24] As it is seen, active intellect is necessary for actively knowing something. It is understood by the term itself “active”. There is a world perceived by our senses and active intellect serve the purpose of interpreting and processing the knowledge coming from there. When it is thought as processing information, it is very similar to the construct of “intelligence” used today.

2.2 Contemporary World, Indian

2.2.1 Contemporary World

Serpell (2011) conducted a four decade of multi method research in Zambia. The primary focus was a cultural study of indigenous ideas in a rural Chewa community in eastern Zambia. He concluded “that, within this culture, children’s intelligence was construed as an amalgam of cognitive alacrity and social responsibility.” [34]

Sternberg and Grigorenko (2004) have investigated concepts of intelligence in Africa, Alaska and Russia. They measured the Kenyan children’s ability to identify the natural herbal medicines, where they come from, what they are used for and how they were dosed; this ability was of prime importance as it reflected their knowledge and ability necessary for survival. They also measured practical intelligence with a test of tacit (informally learned) knowledge as acquired in rural Alaskan Yup’ik communities. [37]

Thus, in terms of the skills that mattered most to the children’s everyday lives, the test of practical intelligence was distinctly preferable. Study in Russia also concluded that practical intelligence (related to physical and mental health) was related to successful adaptation to the environment and hence an individual’s ability to achieve one’s goals in life. [37]

In the studies carried out by Berry (1997) and Sternberg & Kaufman (1998), intelligence may be conceived in different ways in different cultures. [6 and 38] Yang & Sternberg (1997a) reviewed Chinese philosophical conceptions of intelligence. [45] The Confucian perspective emphasizes the characteristic of benevolence and of doing what is right. As in the western notion, the intelligent person expends a great deal of effort in learning, enjoys learning and persists in life-long learning with a great deal of enthusiasm. The Taoist tradition, in contrast, emphasized the importance of humility, freedom from conventional standards of judgment and full knowledge of oneself as well as of external conditions. The difference between eastern and western conceptions of intelligence persists even in the present times. In the words of Yang & Sternberg (1997b) [46], contemporary Taiwanese Chinese conceptions of intelligence identified five factors (i) a general cognitive factor, much like the g-factor in conventional western tests; (ii) interpersonal intelligence (i.e. social competence); (iii) intrapersonal intelligence; (iv) intellectual self-assertion: knowing when to show that you are smart; and (v) intellectual self-effacement: knowing when not to show that you are smart. In a related study, Chen (1994) found three factors underlying Chinese conceptualizations of intelligence: non-verbal reasoning ability, verbal reasoning ability and rote memory. [9]
2.2.2 Contemporary Indian

Srivastava and Mishra (2007), have identified the concept and meaning of intelligence according to Suktis (aphorism, maxim, epigram or apophthegms), Hindi proverbs, and the views of the common people in different parts of India. [35] They suggested a multifaceted concept of intelligence which they termed as cognitive competence, social competence, entrepreneurial competence and emotional competence.

They elaborated the factors as follows:

1. **Cognitive competence**
   - Readiness to learn
   - Sensitivity to context
   - Comprehension
   - Learning (from past experience)
   - Problem solving
   - Planning
   - Reflection
   - Communication

2. **Social competence**
   - Observing norms
   - Serving elders

3. **Entrepreneurial competence**
   - Practical orientation
   - Commitment
   - Patience
   - Hard work
   - Vigilance
   - Resourcefulness
   - Goal directedness
   - Moderation
   - Secrecy

4. **Emotional competence**
   - Self respect
   - Confidence
   - Trustworthiness
   - Open mindedness
   - Self to other orientation

The ‘Panchatantras’ and the ‘Jataka’ tales are full of illustrations of intelligent and socially acceptable behaviours. They focus on how constructive thoughts and actions bring happiness, peace, prosperity and overall well being of the society.

The Bhagavat Gita demonstrates that intelligence is not an abstract concept. It is the person’s response in terms of appropriate action as demanded by the situation.

It needs to be emphasized that the Indian concept of intelligence is contextual.

2.3 Twentieth century

The twentieth century witnessed a lot of research in the western world pertaining to the meaning, conceptualization and measurement of intelligence. It was realized that it was a measurable ability of human beings. Hence it was treated as a construct which could be clearly defined and measured.

There have been massive transformations in the study of intelligence which have widened the conceptual framework. Some of these theories / models proposed by researchers across the world are discussed in the following paragraphs.
2.3.1 Spearman’s Theory (1904)

In the year 1904, Charles Spearman, the English psychologist proposed his theory, known as the two factor theory or the Eclectic Theory. According to his theory, intellectual abilities comprise of two factors:
1. General ability- known as the “g” factors and
2. Specific ability- known as the “s” factors.

He held that an underlying major factor which he called general intelligence existed and formed a basis of all intellectual abilities. He believed that the levels of general intelligence could predict levels of specific abilities.

The general and specific abilities differ from person to person. This theory had major implications for teachers and trainers who assumed that the specific abilities can be developed in the individuals if they possessed the basic general abilities.

2.3.2 Burt Model (1909)

Sir Cyril Burt, a British psychologist is credited for his work on Factor Analysis in psychological testing and the effect of heredity on intelligence and behavior. He made use of Charles Spearman’s model of general intelligence to assess the performance of school children in a battery of tests. According to him, the mind is in the form of model that resembles an inverted tree. The two major divisions were, first, the intellectual characteristics or the “g” factors and the other, the practical or the behavioral characteristics. He has also penned a book called ‘The factors of the mind- an introduction of factor analysis in Psychology’.

![Figure 2.1](image-url)  
**Figure 2.1**  
Burt’s Conception Of An Idealized Hierarchical Model For Aptitude Factors, With Successive Dichotomization At Different Levels Of Mental Generality  
(Source: Burt, C.L., 1955) [7]

2.3.3 Stern’s Model (1911)

William Stern was a German psychologist and philosopher. He proposed the Unifactor theory, also known as the general capacity theory. It is paralleled to Spearman’s theory of ‘Abilities of Man’. These theories were in contradiction to the present theories which show that “the function of intelligence is divisible into several units more or less uncorrelated and therefore each needing a separate measurement of its own.”

He has also coined the term ‘intelligence quotient’ [44].
Stern further believed that all persons are endowed with the “g” factor, though in different amounts. This factor is brought forth in any problem solving situation, and its efficiency depend on the environmental factors.

2.3.4 Edward Thorndike Model

Edward Thorndike was an influential American psychologist who is often referred to as the founder of modern educational psychology [11].

He proposed the “multiple theory of intelligence”. He proposed that intelligence could be described as possessing an altitude (or level), width (or types) and area (or how many) of capabilities. His theory is also known as the three dimensional theory.

He later expanded the list and proposed that there were four general dimensions of abstract intelligence [41]:

- **Altitude**: the complexity or difficulty of tasks one can perform (most important)
- **Width**: the variety of tasks of a given difficulty
- **Area**: a function of width and altitude
- **Speed**: the number of tasks one can complete in a given time

He also elucidated that intelligence involves three mutually independent abilities [41]:

- **Abstract intelligence** - the ability to verbal and symbolic thinking
- **Mechanical intelligence** - the ability to effectively control your body and manipulate objects
- **Social intelligence** - the ability to communicate with people, understand and perform in social relations

His theory was a major challenge to Charles Spearman’s single, general intelligence factor “g” theory. His enunciation of “social intelligence” was breakthrough which later led to the development of the concept of Emotional Intelligence.

Thorndike along with his students used objective measurements of intelligence on human subjects as early as 1903. He developed methods for measuring a wide variety of abilities and achievements. In the 1920's he developed a test of intelligence that consisted of completion, arithmetic, vocabulary, and directions test, known as the CAVD. This test was intended to measure intellectual level on an absolute scale. The logic underlying the test predicted elements of test design that eventually became the foundation of modern intelligence tests and thus turning to a more practical aspect of measuring abstract intelligence [20].

Thorndike believed that a measure of intelligence should consider the cultural background of the individual.

2.3.5 Thurstone Model (1938)

According to Thurstone (1924/1973), “intelligence, considered as a mental trait, is the capacity to make impulses focal at their early, unfinished stage of formation. Intelligence is therefore the capacity for abstraction, which is an inhibitory process.” [42]

In the year 1938, Louis Leon Thurstone and his wife, Thelma G. Thurstone published an article titled “Primary mental abilities” [21]. Their theory of Primary Mental Abilities, a model of human intelligence challenged Charles Spearman’s then-dominant paradigm of a unitary conception of intelligence. They are credited with many significant contributions in the areas of psychology, including psychometrics, statistics, and the study of human intelligence.

Thurstones’ found that intelligent behavior does not arise from a general factor propounded by Spearman, but rather emerges from seven independent factors that they called primary abilities. These abilities were word fluency, verbal comprehension, spatial visualization, number facility, associative memory, reasoning, and perceptual speed (Thurstone, 1938). He, later analyzed mental test data from samples comprising of people with similar overall IQ scores and found that they had different profiles of primary mental abilities. This further supported his model and suggested that his work had more practical application compared to Spearman’s unitary theory [21].

However, when Thurstone administered his tests to an intellectually heterogeneous group of children, he failed to find that the seven primary abilities were entirely separate; rather he found
evidence of “g”. Thurstone proposed an elegant mathematical model that resolved these apparently contradictory results, and the final version of his theory was a compromise that accounted for the presence of both a general factor and the seven specific abilities. This compromise helped lay the groundwork for future researchers who proposed hierarchical theories and theories of multiple intelligences (Ruzgis, 1994) [31].

### 2.3.6 Guilford’s Model (1955)

Joy Paul Guilford, an American psychologist is best remembered for his psychometric study of human intelligence. According to him, intelligence is “A systematic collection of abilities or functions for the processing of information of different kinds in various ways.” [22]

He proposed the “Structure of Intellect theory” popularly known as the SI theory. His model includes three dimensions, namely a Content dimension, Products dimension, and Operations dimension. These are represented as a cube with each of the three dimensions occupying one side. Each ability, occupying one cell in the three-dimensional figure is defined by varying degrees of the three parameters. The Content dimension includes five categories namely, visual, auditory, symbolic, semantic, and behavioral. The Products dimension includes six categories namely, units, classes, relations, systems, transformation and implications. Operations include five components including cognition, memory, divergent production, convergent production, and evaluation.

![Figure 2.2](https://www.instructionaldesign.org/theories/intellect/) [39]

The main advantage of Guilford’s SI Theory is that it is an open system that allows for newly discovered categories to be added in any of three directions [19].

### 2.3.7 Vernon’s Model (1965)

Philip Ewart Vernon, was a British-born Canadian psychologist and author of great eminence and repute. His domain of study focused on the contributions of environmental and genetic factors to intellectual development. He continued to analyze the effects of genes and the environment on both individual and group difference in intelligence. His conclusions are summarized in two books: Intelligence and Cultural Environment (1969) and Intelligence: Heredity and Environment (1979) [30].

He proposed the hierarchical model with the “g” factor (as proposed by Spearman) at the top. The “g” factor branched into two main groups: the verbal-numerical-educational on the one hand (known as v-ed factor) and the spatial-practical-mechanical-physical on the other (known as k-m factor). These two may be further subdivided into several factors. The v-ed subdivides into verbal and
numerical while the k-m splits into space ability, manual ability and mechanical information. These were further divided into specific factors which were of very narrow scope and of trivial importance as considered by Vernon.

### Figure 2.3
Vernon’s Model Of Intelligence
(Source: Author’s self drawn)

2.3.8 Cattel’s Fluid and Crystallized Theory
Raymond Cattell, a psychologist proposed the concepts of fluid and crystallized intelligence. He further developed the theory with his student John Horn. The Cattell-Horn theory of fluid and crystallized intelligence explains that intelligence is composed of different abilities that interact and work together to produce overall individual intelligence. According to them, fluid intelligence refers to the ability to reason and think flexibly while crystallized intelligence refers to the accumulation of knowledge, facts, and skills that are acquired throughout life [31].

It is to be noted that crystallized and fluid intelligence are believed to be separate neural and mental systems. Most IQ tests attempt to measure both the varieties. For example, the Wechsler Adult Intelligence Scale (WAIS) measures fluid intelligence on the performance scale and crystallized intelligence on the verbal scale and the overall IQ score is based on a combination of these two scales [13].

2.3.9 Gardner’s Theory (1983)
Dr. Howard Gardner, professor of education at Harvard University, proposed the theory of multiple intelligences. He suggested that the traditional notion of intelligence, based on I.Q. testing, was far too limited in its scope. Instead, Dr. Gardner proposed that eight different intelligences accounted for a broader range of human potential in children and adults. These intelligences were:

- **Linguistic intelligence** (“word smart”)
- **Logical-mathematical intelligence** (“number/reasoning smart”)
- **Spatial intelligence** (“picture smart”)
- **Bodily-Kinesthetic intelligence** (“body smart”)
- **Musical intelligence** (“music smart”)
- **Interpersonal intelligence** (“people smart”)
- **Intrapersonal intelligence** (“self smart”)
- **Naturalist intelligence** (“nature smart”)

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Dr. Gardner argued that our schools and cultures focus most of their attention on linguistic and logical-mathematical intelligence. His findings have found major implications in the curriculum designed by schools. It suggested that teachers be trained to present their lessons in a wide variety of innovative ways using music, cooperative learning, art activities, role play, multimedia, field trips, inner reflection, and much more in order to enhance students’ learning [14].

2.3.10 Sternberg’s Triarchic Theory (1985)
Robert J. Sternberg is an American psychologist and psychometrician. He proposed the triarchic theory of intelligence.

The triarchic theory describes three distinct types of intelligence that an individual can possess. Sternberg calls these three types practical intelligence, creative intelligence, and analytical intelligence.

Figure 2.4
Sternberg’s Triarchic Theory

As depicted in Figure 2.4, he emphasized how the three types of abilities worked together to create intelligent behaviour.

He emphasized that all these three abilities are present in individuals in different degrees and contribute to the intelligence.

It may be noted that he placed sufficient emphasis on dealing with day-to-day or routine tasks as an important contributing factor to intelligence. This was a part of one’s social skills.

In 2004, he put forth that “intelligence cannot be fully or even meaningfully understood outside its cultural context” and “to understand, assess, and develop intelligence, we need to take into account the cultural contexts in which it operates.” He suggested that we create “culture-relevant tests” in order to assess the potential of the respondents [36].

2.3.11 Anderson’s Theory
John Robert Anderson, a Canadian-born American psychologist, widely known for his cognitive architecture, ACT-R (Adaptive Control of Thought - Rational), a theory dealing primarily with memory structure. He was also a pioneer in the research on intelligent tutoring systems (ITS), computer systems that provide immediate and customized instruction or feedback to learners [23].
His study focused on the cognitive stages of the participants while solving mathematical problems. These stages included encoding, planning, solving and response. The study determined how much time participants spent in each problem solving stage while solving a mathematical problem.

ACT (Adaptive Control of Thought) is a cognitive architecture based on the assumption of a unified theory of mind. The goal of this cognitive theory is to explain the manner in which human cognition works and what the structures and processes of human memory, thinking, problem solving, and language are. The core of ACT is a production system with a pattern matcher that works on memory and perceptual-motor modules via buffers. The current version of adaptive control of thought (ACT-R) is based on the principle of rationality of the human mind. Simulations with ACT-R allow for predicting typical measures in psychological experiments like latency (time to perform a task), accuracy (correct vs. false responses) and neurological data (e.g., FMRI-data) [43].

In another study, he tried to examine the decomposition hypothesis, that is the manner in which complex tasks are can be broken down into a set of information processing components. His study used a cognitive model that predicted behavioral and activation patterns for specific regions in the brain.

He developed the intelligent tutoring systems that focused on the neural processes of students while they are solving algebraic equations or proofs.

2.3.12 Eysenck’s Theory

Hans Jürgen Eysenck, a German psychologist worked under the guidance of educational psychologist, Sir Cyril Burt in London.

Eysenck's research on intelligence focused on the role of “g” in the brain. It brought out clearly that “g” is not a place or thing but a distinctive ‘property of the brain as a whole’. The brain has many components and processes but works as a unit. Intelligence, he proposed, is a function of how efficiently that unit processes information. Eysenck and his colleagues continued to test their theories of what makes some brains more efficient, especially speed of processing. The EEG provided them a non-invasive method to observe the brain in action. According to them, the parameter- average evoked potentials (AEPs) showed that brighter brains respond faster to stimuli (have shorter latencies). To test the speed hypothesis, Eysenck used Spearman’s “g” as a theoretical basis for designing the tasks to assess more complex choice reaction time (CRT) tasks [18].

His other contributions include his belief regarding genetic factors and race as a basis of intelligence.

2.3.13 Ceci’s Biological Theory (1990)

Stephen J. Ceci, an American psychologist, argued that traditional conceptions of intelligence ignored the role of society in shaping intelligence and underestimated the intelligence of non-Western societies. He proposed a “bio-ecological” framework of individual differences in intellectual development that was intended to address some of the major deficiencies of existing theories of intelligence. His prime focus was on alternative interpretations of phenomena that emerge when implicit assumptions of intelligence researchers were challenged [8].

2.3.14 Emotional Intelligence

The term emotional intelligence (later coined EQ) was first defined by Salovey and Meyer in the year 1990 [33]. Their initial definition described EI as the “ability to monitor one’s own and other’s feelings and emotions, to discriminate among them, and to use this information to guide one’s thinking and behavior.”

They later refined their earlier definition of EI as “the ability to perceive emotions, to assess and generate emotions so as to assist thought, to understand emotions and emotional meanings and to reflectively regulate emotions so as to promote both better emotion and thought” [26]. They proposed a four branched model of EI as depicted in the following figure
In the year 2008, Mayer, Salovey and Caruso defined EI as follows:

"Emotional Intelligence includes the ability to engage in sophisticated information processing about one’s own and other’s emotions and the ability to use this information as a guide to thinking and behavior. That is, individuals high in emotional intelligence pay attention to, use, understand, and manage emotions and these skills serve adaptive functions that potentially benefit themselves and others" [27].

They also developed the most widely used ability-measurement is the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT).

Their work has since been considerably expanded by Goleman in 1995 and 1998, who identified that IQ is actually less important for success in life and work than EQ – a set of skills that are not directly related to academic ability [16] and [17]. Goleman identified five domains of emotional intelligence, namely:

• Self awareness
• Self regulation
• Motivation
• Empathy
• Social skills

According to Petrides & Furnham (2001), two conceptually different approaches dominate the current study of Emotional Intelligence: the trait and the ability approach [29]. The trait approach conceives EI as dispositional tendency, such as personality traits or self-efficacy beliefs. The trait model is conceptually distinct from conceptions of EI as personality because as it considers EI as a mixture of traits, competences, and abilities (e.g., Bar-On, 2006 [5]; Goleman, 1998[17]).

Both the trait approach and the “mixed” models share the same measurement methods of EI, namely self report questionnaires. On the other hand, the ability approach conceptualizes EI as a cognitive ability based on the processing of emotion information, and assesses it with performance tests [29].

Fiori, M., & Vesely, A. (2017) suggested a new direction in the study of EI. They introduced a distinction between a crystallized component of EI, based on knowledge of emotions, and a fluid component, based on the processing of emotion-information [12].

2.4 Twenty-first Century

Shane Legg & Marcus Hutter (2007) believed that most views on intelligence share the following key features:
• Intelligence is a property of an agent.
• The agent interacts with an external environment.
• Related to success with respect to some goal.
• The environment is not fully known to the agent.

The last feature implies that the agent must be able to learn and adapt to unknown environments based on experience. Hence they give their informal definition of intelligence as it “measures an agent’s general ability to achieve goals in a wide range of environments.” [25]

Dr. Alexander D. Wissner-Gross, an award-winning computer scientist, inventor, entrepreneur, investor, and author defined intelligence in a novel manner with the help of a mathematical equation. He has expressed pure intelligent behavior in every situation as follows [3]:

\[ F = T \cdot \nabla S^\tau \]

The intelligence is the force \( F \) that acts in the direction of the space of possible "actions" that tries to increase (or maximize) the number of options \( S^\tau \) (a quantity that he refers to as the entropy) we will have at a future time \( \tau \). Here, \( T \) is an unspecified coefficient, much like \( \tau \) itself.

The equation embodies a philosophical principle. It states that intelligence is behavior that is motivated by the need to keep as many options open. It attempts to reach states that maximize the freedom to act. Putting it in technical terms, if you build a system that moves its state in the direction of the causal entropic force the system will move towards a state that maximizes the causal entropy (where, causal entropy is a path integral of the probability of a system evolving from its current state to new states).

On examining the formulation more carefully, we may interpret that the causal entropic force or intelligence causes the system to evolve towards the state with lots of highly probable future states.

**Conclusion**

We may conclude that a fundamental component of intelligence is a cognitive ability as elucidated by Stern (“g” factor). The presence of this component can be detected in early childhood as commonly referred to in a Hindi proverb (poot ke padaav paalne mein dikh jaate hain) which means that the child’s capabilities can be deciphered when he/she is in the crib.

The next aspect can be analyzed as the specific abilities or the practical abilities. These abilities are shaped by the influence of the outside world i.e. the parents, teachers, caregivers, siblings and the environment. The ancient Greek philosophers referred to it as “phronesis”. Avicenna believed it to be “passive intellect”. This component of intelligence is sharpened and polished as a result of influences from the environment and consists of the basic skill set essential for survival. There are numerous references to this in various ways in Greek philosophy, Indian folklore and has been extensively studied by Sternberg and Grigorenko (2004), Berry (1997), Yang and Sternberg (1997) and Chen (1994). Srivastava and Mishra (2007) called this as the “entrepreneurial competence” comprising primarily of practical orientation, commitment, hard-work and resourcefulness.

Spearman (1904) has referred to it as the “s” factor or the specific factor. Burt called it the mechanical intelligence positioned under the category of “practical” level. Thorndike and Guilford referred to it as the collection of abilities for the processing of information. Vernon has also conceptualized that the “g” factor branched into the practical aspects which he called as the v-ed and k-m factors. Reference to this is also made in Cattel and Horn’s theory. The “crystallized” component being the knowledge that is acquired as a cognitive endowment or learned through experiences or through interactions with others. The “fluid” part is the ability or deftness to use this knowledge in day-to-day life or for practical purposes.

Since skill or ability is acquired from the environment, culture or values of the surroundings play an important role in honing these skills. It is of importance to note that what may be considered as intelligent behavior in one part of the world may be considered as illogical or out of place in another. Hence the assessment of intelligence in two different cultures becomes difficult. In other words, the framework or context should be carefully predefined before the assessment.
According to the recent research, Legg and Hutter define it as the “ability to achieve goals in a wide range of environments”. It must be emphasized here that the presence of intelligence can be judged only by the ability of achievement of goals or targets. When the achievement of goals is of prime importance, the speed and accuracy of achievement cannot be underemphasized.

According to Wissner-Gross, intelligent behavior is manifested in keeping as many options open as possible. In other words, the greater the number of paths or alternatives that may be visualized to achieve the goals, the higher is the level of intelligence.

According to research in the field of emotional intelligence, the perception of emotions of self and others and the management of the same is of vital importance, perhaps higher than that of intelligence quotient. As organizations achievements are built on teamwork, this element is of great significance both for the individual and the organization as a whole.

Hence, we may club the three elements, namely (1) speed and accuracy, (2) number of alternatives and (3) ability to work in teams as a measure of intelligence. It may be emphasized that an individual’s success and happiness depends on these three pillars. An assessment of intelligence should take into account these three factors. In addition there should be a mechanism to assess these factors in specific cultural context.

![Figure 3.1](https://motls.blogspot.com/2014/02/an-equation-of-intelligence.html)

**Figure 3.1**

**Foundation and pillars of intelligence**

(Source: Author’s self drawn)


40. Thomas McEvilley(2002). The Shape of Ancient Thought: Comparative Studies in Greek and Indian Philosophies, p. 609