**SEMESTER I MODULE: IV**

**INTELLIGENCE: COGNITIVE VARIABLES IN LEARNING**

* 1. **Intelligence – meaning & definition**

Binet defined intelligence as “adjustment or common sense, initiative, ability to adapt oneself to judge well, understand well, rea

son well”. According to Wagon -“Intelligence is the capacity to learn and adjust to relatively new and changing conditions.” David Wechsler: “Intelligence is the aggregate or global capacity of an individual to act purposefully, to think rationally, and to deal effectively with his environment.” From the definitions it is clear that an intelligent has the following characteristics: adaptation to novel situation, abstract and rational thinking, purposive behavior, economy and efficiency of performance, ability to retain and retrieve past knowledge.

**Intelligence Quotient (I.Q.):**  The term was initiated by the German Psychologist William Stern and put into wide practice by Terman. It appeared to Stern that if a child was 6 years old (Chronologically) but could do what an 8 years old normally does he could be either 8/6 or 1.33 as bright as the average. He made the ratio, M.A / C.A measure of the rate of mental development of an individual. The ratio was given the name Intelligence Quotient, I.Q. To do away with decimal point the ratio was again multiplied by 100 and thus the formula to calculate I.Q. was known as

 I.Q. = Mental Age x 100

 Chronological Age

**Mental Age:** The term was used by Binet first of all. It expresses the individual’s general ability as measured by the test at any given time. It compares one child’s intelligence with the average children of the same chronological age mental age is only a statement of the child’s mental maturity at the time the test is given.

The following classification of I.Q.’s has been formulated by Terman and has been generally accepted by psychologists.

**I.Q. Category**

Below 70 Mentally defectives

70 - 75 Borderline or feeble minded

75 - 90 Dull and Backward

90 - 95 Below Average

95 - 105 Average

105 - 125 Superior

125 - 140 Very Superior

140 - and above Genius

Of the mentally defectives: 40 - 70, Morons

 20 - 40, Imbeciles

 0 - 20, Idiots

IQ always are based on the individual’s interaction with the environment. They never measure innate intelligence exclusively.IQ change in the course of development. IQ scores are used as predictors of [educational](https://en.wikipedia.org/wiki/Education) achievement, [special needs](https://en.wikipedia.org/wiki/Mental_Retardation), job performance and [income](https://en.wikipedia.org/wiki/Income). They are also used to study IQ distributions in populations and the correlations between IQ and other variables.

**4.1. Emotional Intelligence (EQ), Spiritual Intelligence (SQ) Strategies for promoting EQ and SQ**

**Emotional Quotient (E.Q) and Emotional Intelligence**

Besides intelligence a person is born with some innate emotional intelligence in terms of one’s level of emotional sensitivity, emotional memory, emotional processing and emotional learning ability. General intelligence is not subject to decline with life experiences, but emotional intelligence can be either developed or destroyed depending upon the types of environmental experiences one gets in ones future life. I.Q remains same. Unhealthy environmental influences or lessons taught by the parents, teachers, and other models may lead to the declining or damaging of one’s innate or previously held level of emotional intelligence. The first use of the term "emotional intelligence" is usually attributed to Wayne Payne's [doctoral thesis](http://en.wikipedia.org/wiki/Doctoral_thesis), *A Study of Emotion: Developing Emotional Intelligence* from 1985.However, prior to this, the term "emotional intelligence" had appeared in Leuner (1966). [Stanley Greenspan](http://en.wikipedia.org/wiki/Stanley_Greenspan) (1989) also put forward an EI model, followed by Salovey and Mayer (1990), and [Daniel Goleman](http://en.wikipedia.org/wiki/Daniel_Goleman) (1995). Emotional intelligence (EI) refers to the ability to perceive, control and evaluate emotions. Some researchers suggest that emotional intelligence can be learned and strengthened, while others claim it is an inborn characteristic.

Peter Salovey and John D. Mayer have been the leading researchers on emotional intelligence. In their influential article "Emotional Intelligence," they defined emotional intelligence as, "the subset of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (1990). EI is "The ability to perceive emotion, integrate emotion to facilitate thought, understand emotions and to regulate emotions to promote personal growth." EI also refers to an individual's self-perceptions of their emotional abilities. Emotional intelligence is the ability to recognize one’s own emotions, understand what they're telling, and realize how ones emotions affect people around. Emotional intelligence also involves our perception of others: when we understand how they feel, this allows us to manage relationships more effectively. People with high emotional intelligence are usually successful in most things they do. Because they're the ones that others want on their team. They make others feel good, they go through life much more easily than people who are easily angered or upset.

According to Daniel Goleman EI include a wide array of competencies and skills that drive leadership performance. Goleman's model outlines five main EI constructs as follows:

1. Self-awareness – the ability to know one's emotions, strengths, weaknesses, drives, values and goals and recognize their impact on others while using [gut feelings](http://en.wikipedia.org/wiki/Feeling#Gut_feeling) to guide decisions.

2. Self-regulation – involves controlling or redirecting one's disruptive emotions and impulses and adapting to changing circumstances.

3. [Social skill](http://en.wikipedia.org/wiki/Social_skill) – managing relationships to move people in the desired direction

4. Empathy - considering other people's feelings especially when making decisions

5. Motivation - being driven to achieve for the sake of achievement.

Salovey and Mayer proposed a model that identified four different factors of emotional intelligence and they are:-

1. Perceiving Emotions**:** The first step in understanding emotions is to accurately perceive them. In many cases, this might involve understanding nonverbal signals such as body language and facial expressions.

2. Reasoning With Emotions: The next step involves using emotions to promote thinking and cognitive activity. Emotions help prioritize what we pay attention and react to; we respond emotionally to things that gather our attention.

3. Understanding Emotions: The emotions that we perceive can carry a wide variety of meanings. If someone is expressing angry emotions, the observer must interpret the cause of their anger and what it might mean. For example, if your boss is acting angry, it might mean that he is dissatisfied with your work; or it could be because he got a speeding ticket on his way to work that morning or that he's been fighting with his wife.

 4. Managing Emotions: The ability to manage emotions effectively is a key part of emotional intelligence. Regulating emotions, responding appropriately and responding to the emotions of others are all important aspect of emotional management.

Emotional quotient is defined as a relative measure of one’s emotional intelligence possessed by him at a particular period of his life. I.Q Scores are often used for selection, classification, and promotion of individuals in various programmes, courses, and job placements etc. The importance of I.Q is replaced by the concept of emotional intelligence and its measure (E.Q). Researches and experiments revealed that a person’s emotional intelligence measured through his E.Q may be a greater predictor of success than his or her I.Q.

Daniel Goleman model of EQ includes four categories of competencies (demonstrated skills of EQ). These are shown in the figure below along with a list of the competencies that go with each quadrant. Goleman have shown that these are the EQ competencies most related to success in any career. According to this model there is a developmental sequence to development of EQ skills. One must develop SELF-AWARENESS first to be able to develop Social Awareness or Self-Management. Relationship Management comes last. In Self-Awareness the person need to be able to know that the emotion he/she feel and identify it when it arises. If the person could fee and recognize his own emotions then he can recognizes it in others (Social Awareness). Then he is able to control the emotions (Self-Management) and effectively handle conflict (Relationship Management).

**1. Self-Awareness**

- Emotional Self Awareness

- Self Confidence

- Accurate Self-Assessment

**3. Social Awareness**

- Empathy

- Organizational Awareness

- Service Orientation

**2. Self- Management**

- Self Control

- Initiative

- Transparency

- Optimism

- Adaptability

-Achievement Orientation

**4. Relationship**

**Management**

- Developing Others

- Inspirational Leadership

- Influence

- Change Catalyst

- Conflict Management

- Teamwork and Collaboration

**Emotionally Intelligent person is –**

* Sensible to his own feelings and emotions
* Understand or identify other’s emotions
* Incorporate the perceived emotions in thought
* Have proper understanding of nature, intensity, outcomes of emotions
* Proper control and regulation over emotions
* Know, feel, use, communicate, monitor the emotions
* Tackling of emotional upsets in a healthy way
* Adequate self-concept & self-respect
* Can exercise his/her emotions on correct time- to correct persons – at correct place-with correct intensity.

**To promote Emotional Intelligence:** The emotional intelligence CAN be taught and developed.

* Observe how I react to people. Look honestly at the thinking pattern and interaction methods with other people. Try to put yourself in their place, and be more open and accepting of others perspectives and needs.
* Analyze the work environment. Give others a chance to shine – put the focus on them, and don't worry too much about getting praise for yourself.
* Do a self-evaluation. Be aware of our weaknesses and accept that you're not perfect and that you could work on some areas to make yourself a better person. Have the courage to look at the self honestly
* Examine the reaction to stressful situations. Becoming upset, blame others or become angry etc are showing the emotional ill health. The ability to stay calm and in control in difficult situations is highly valued. So keeping emotions under control when things go wrong is helpful to grow in emotional maturity.
* Take responsibility for one’s actions. Apologize directly if needed.
* Examine how your actions will affect others before you take those actions.

**Importance of EQ:**

1. E.Q is more powerful than I.Q where as I.Q contributes 20% of success in life, the other forces contribute the rest.

2. E.Q is the best predictor of success in life.

3. E.Q can be increased and thus make their life more healthy, enjoyable and successful in the future.

4. E.Q helps us to lead a productive and happy life.

5. School children can succeed in their academics more by social and emotional measures than by I.Q.

6. In working situations too E.Q helps more than I.Q. A person with low E.Q may suffer in dealing with one self and getting along properly with others.

7. E.Q helps a person in all spheres of life through its various constituent components namely knowledge of emotions (self-awareness) managing the emotions, motivating oneself, recognizing emotions in others (empathy), and handling relationships.

[Alexithymia](http://en.wikipedia.org/wiki/Alexithymia) from the Greek words *lexis* and *thumos* (literally "lack of words for emotions") is a term coined by Peter Sifneos in 1973 to describe people who appeared to have [deficiencies](http://en.wiktionary.org/wiki/deficiency) in understanding, processing, or describing their emotions. Viewed as a spectrum between high and low EI, the alexithymia construct is strongly inversely related to EI, representing its lower range.

**A teacher could promote EI in following manner-**

* Teach the art of managing emotions using class room situations
* Use emotions as the motivating factor not as an obstacle
* Teach lessons of empathy
* Practice social skills
* Give chances to develop affective skills
* Teach some techniques to overcome the emotional “ups & downs”
* Teacher as a model & companion for emotional maturity

**Spiritual Intelligence and SQ**

Spiritual Intelligence is “The ability to act with Wisdom and Compassion while maintaining inner and outer peace (equanimity), regardless of the circumstances.” Spiritual intelligence is an innate human intelligence that is readily made available to us if we are willing to ask for it and practice it. It is the manifestation of behaviors, skills and choices that show a strong, dependable connection to something “bigger than me”. This intelligence as is considered as the highest of 4 intelligences – all of which are critical for being effective in this level of physical reality. The other three intelligences are: physical intelligence, emotional intelligence and mental or intellectual intelligence. Dana Zohar & Ian Marshall introduced the spiritual intelligence in the year 2000, as the intelligence to solve problems of meaning and value of life. It is the ultimate intelligence because it is about the growth of human being, moving on in life, having an aim, healing ourselves, discovering freedom, understanding ourselves as the manifestations of the ultimate reality. It is the ability and behaviour to develop & maintain a relationship with the ultimate.SI gives meaning in life, help us to find a moral & ethical the real values and its meaning, and help us to relate with the creator.

**Signs of high SQ:**

* Flexibility
* Self-awareness
* Ability to face, use, find meaning in sufferings
* Thinking holistically
* Do not become a cause of harm to others
* Ability to ask fundamental questions
* Ability to work against convention

**SQ Competencies are:**



**Different Intelligences in its developmental sequence:**

SQ: Inner Wisdom Guided By Compassion, Equanimity (Inner &Outer Peace)

EQ: Managing Ourselves Our Relationships Well

IQ: Rational & Reasoning Intelligence

PQ: Body Awareness & Skillful Use

* 1. **Theories of Intelligence-Two Factor theory(Spearman), Structure of Intelligence(Guilford), Multiple Intelligence (Howard Gardner**

**1.Spearman’s Two-Factor Theory:** Charles Spearman in 1904 proposed that intellectual abilities consist of two factors general ability or common ability known as ‘G’ factor and group of specifics abilities known as ‘S’ factor, ‘G’ is universal inborn ability. It is general mental energy. It is constant in the sense that for any individual in respect of all the correlated abilities, it remains the same. The amount of ‘G’ differs from individual to individual. It is used in every life activity Greater the ‘G’ in an individual and greater the success in life. ‘S’ is learned and acquired in the environment. It varies from activity to activity in the same individual. Individuals differ in the amount of ‘S’ ability. For example an individual’s performance in Hindi is partly due to his general intelligence and partly to some kind of specific ability in language which be might possess i.e. G+S, or in Mathematics his performance will be due to G + S1 in drawing it will be due to G+S2 and so on. The factor G will enter in all specific activities. The total ability or intelligence of such an individual will be expressed by the following equation: A = G+S+S1+S2+......

**2. Thurston’s Group Factor Theory (PMA):**

Louis L.Thursone (1887-1955) was of view that intelligence could not be regarded as a unitary thing. He proposed that intelligence consist of a number of primary abilities which different people have in varying amounts. Using a method of factor analysis he identified the following factors as Primary Mental Abilities (PMA).Numerical ability, verbal fluency, verbal comprehension, rote memory (ability to memories verbal materials), perceptual speed(ability to find out similarities & differences),spatial relations, inductive reasoning and deductive reasoning.

**3. Guilford’s Structure of Intellect:** The most prominent multifactor theorist J.P.Guilford developed a three-dimensional structure of intellect model as a way of organizing intellectual factors in to a system. His "Structure of Intellect" model organized these various abilities along three dimensions: **content**, **product**, and **Operation (process)**. He sought to develop tests for each combination of the possibilities on these three dimensions, expecting that a person could be high on some of these abilities while being low on others. In *The nature of human intelligence* (1967) and *Way beyond the IQ* (1977), he lays out the results of his efforts and the modified model which

evolved from his research.

By **content** he meant that different people seemed to pay more attention to and think more effectively about different kinds of information, such as:

* **Visual** information directly from the senses or from imaging
* **Auditory** information directly from the senses or from images
* **Symbolic** items such as words and symbols which generally convey some meaning
* **Semantic** meanings often, but not always, associated with words
* **Behavioral** information about the mental states and behavior of observed individuals.

This type of content was added to the model based on abilities that emerged from his testing. An artist might excel at processing visual information, but be poor at processing words, numbers and other symbolic content. A researcher who excels at processing symbolic content such as words and numbers and semantic meaning, might be very poor at processing behavioral data and thus relate poorly with people.

The **products** dimension relates to the kinds of information we process from the content types:

* **Units** refers to the ability to perceive units in a content area. This might be symbolic units such as words, visual units such as shapes, or behavioral units such as facial expressions.
* **Classes** refers to the ability to organize units into meaningful groups and to sort units into the right groups.
* **Relations** pertains to the ability to sense the relationships between pairs of units.
* **Systems** consist of the relationships among more than two units.
* **Transformations** is the ability to understand changes in information, such as rotation of visual figures, or jokes and puns in the semantic area.
* **Implications** refers to expectation. Given a certain set of information, one might expect certain other information to be true.

With the two dimensions of **content** and **product** we can sort out all the kinds of information people can think about. People can talk about the implications of a symbolic series, the relationship of two sounds, or behavioral transformations such as changes in emotions.

The **operations** dimension describes what the brain does with and to these types of information:

* **Cognition** has to do with the ability to perceive the various items. For example, the cognition of semantic units has to do with one's ability to recognize words, i.e. one's vocabulary. Cognition of Behavioral Transformations would be the ability to perceive changes in the expressions of an individual.
* **Memory** has to do with the ability to store and retrieve various kinds of information. People differ in their abilities to remember not only from other people, but also among various kinds of information. Some people who are poor at remembering faces (behavioral units) may be excellent at remembering puns (semantic transformations).
* **Divergent production** has to do with the ability to access memory. It refers to the ability to find large numbers of things which fit certain simple criteria. For example, the ability to divergently produce visual units includes the ability to list a great many images which include a circle. Divergence in behavioral transformations would include the ability to revise stories about people. Divergence in Symbolic Implications would include the ability to list various equations which can be deduced from given equations.
* **Convergent Production** is the search of memory for the single answer to a question or situation. This area includes most areas of logic type problem solving. It differs from divergence in the constraint of one right answer. It seems likely that performance on convergent tasks is actually the result of divergent production and evaluation, but it is an often tested for skill, and the one most often associated with IQ.
* **Evaluation** is the ability to make judgments about the various kinds of information, judgments such as which items are identical in some way, which items are better, and what qualities are shared by various items.



These three factors combine to identify 150 different skill areas. Guilford’s model may be described as a model of the ‘intellect rather than intelligence’. Every intellectual operation involves the above mentioned three categories. One factor from each category involved in any intellectual activity. For example, if one person reading a newspaper article relating to a topic of interest, the operations like reading, memory of the past knowledge related to the reading material, the comparative analysis and evaluation of the vies explained in earlier article etc: comes in to action. In this process we use the images, numerical data, and other forms of contents. At the end of reading the person may arrive at new ideas, findings, conclusions and other products. The person may appreciate the implications which are the product. Thus the three categories are involved in the intelligent activity. But the importance of each category and its elements vary for each intellectual activity.

**4. Gardner’s Theory of Multiple Intelligence:** According to Howard Gardner’s theory (*An Education for the Future*-1983), human intelligence has multiple factors. These factors are present in all people though not of equal measure. Some factors are stronger in some persons.

Factors:

1. Verbal/ Linguistic Intelligence: Abilities to read, write, bring out literary products, and communicate fruitfully come under this factor. This domain can be improved/ developed through language games and teaching others.

2. Logical/ Mathematical Intelligence: Abilities like rational thinking and finding patterns and relationships come under this factor. Finding mutual relationship, explaining things in an ordered way and arithmetical operations improve this factor.

3. Visual/ Spatial Intelligence: This factor is strongly potent in designers and architects. Modeling, using clay/pulp, making artistic material, picturisation for stories are helpful in the growth of this factor.

4. Bodily - Kinesthetic Intelligence: Dancers and actors who express various moods through body movements, sports/gymnasts - come under this. Dancing, aerobics, sports, games related to learning etc. help to develop this factor.

5. Musical Intelligence: Ability to distinguish the different music, aspects of music, and the ability to hum or enjoy music denote this factor. Using musical instruments, singing along with singers and attending to the rhythm silently help to grow this factor.

6. Interpersonal Intelligence: Those in whom this factor is well developed express leadership quality and mix with others in better way. They can understand the thinking of others and carry out discussion for compromise successfully. Role play, watching group working and training can develop this factor.

7. Intra Personal Intelligence: Ability to know ones self is time basis of this factor are able to recognize their strength and weakness and do soul searching. True and analytical diary writing, critically evaluating other’s ideas and actions etc. will develop this factor.

8. Naturalistic Intelligence: Interest in plants and animals and spiritual phenomena are characteristic of those high in this factor. Observing and enjoying nature increases this factor.

 Gardner mentions about existential intelligence which concerns with ultimate life issues like the significance of life, meaning of death, life after death and the like. Spiritual and Moral intelligence are also added to the multiple intelligence later.

* 1. **Intelligence Tests: categories, uses limitations**

Intelligence Tests

 Individual Tests Group Tests

Verbal Tests Performance Tests Verbal Tests Non-Verbal Tests

Individual Tests: In which only one individual is tested at a time.

Group Tests: In which a group of individual is tested at the same time.

Verbal Tests: These tests make use of language. Here the instructions are given in words individuals are required to use language as well as paper or pencil for giving responses. The test content is loaded with verbal material.

Non-Verbal or Performance Tests: These tests involve such activities in which the use of language is not necessary. The use of language is eliminated from test content and response except in giving directions. The characteristics of performance tests are:

1) Tests contents are in the form of material objects.

2) What an individual has to do is indicated by the tests either through oral instructions or by pantomime or signs.

3) Individual’s responses depend upon what he does or performs rather than by anything he says or writes.

4) Generally these tests are individual tests. It is necessary to supervise the individual tested at work and give him necessary direction.

**Examples** Individual Verbal Tests: Stanford - Binet Scale

Individual Performance Tests: (1) The Pinter Patterson Scale (2) The Arthur Point Scale (3) Alexander’s Battery of Performance Tests, (4) Bhatia’s Battery of Performance Test.

The Group Verbal Intelligence Tests: (1) Army Alpha Test (2) Army General Classification Test.

The Group Non-verbal Intelligence Tests: (1) Army Beta Test. (2) Chicago Non-Verbal Test. (3) Ravens Progressive Matrices Test.

Description of an Intelligence Test:-

Bhatias Battery of Performance Test: It is an Indian made test which consists of 5 subtests. 1. Koh’s Block Design Test

2. Alexander’s Pass-along Test

3. Pattern Drawing Test

4. Immediate Memory Test for Digits

5. Picture Construction Test

**Uses of Intelligence Tests**:

i. Selection (1) Admission to a special educational programme (2) Identification and offer of scholarship to gifted students (3) Selecting students for assigning responsibilities (4) Selection of trainees for a job.

ii. Use in Classification: Homogeneous grouping as back ward, average and bright in a classroom and provision of enrichment programmes to gifted and remedial programme for the backward.

iii. Used for Promotion: Promoting students to the next grade, people in their profession.

iv. Provide Guidance

v. Improving teaching learning process

vi. Used in setting proper level of aspiration

vii. Used for Diagnosis (1) exceptional children (2) mental retardation (3) diagnosis the causes of problematic behaviour (4) arranging suitable educational programmes to meet individual differences.

viii. Used in research

**Limitations:**

1. Intelligence tests and students: These tests label some students as superior and the others as inferior. Superior students feel over confident and result in mis behaviour which can turn them into problem children. Inferior students feel disappointed and this will lead to failure.

2. Intelligence test and teachers: Teachers, after knowing the IQ of the child make a permanent idea of the child’s potentialities and abilities. He may put the entire responsibility of a pupil’s failure on her/his inferior intelligence and for a bright pupil s/he can think that s/he would be able to do her/himself.

3. Gives birth to Segregation and Conflicts:

1. No intelligence tests can be claimed as completely free of practice or coaching effects. So it is unjust to deny or uphold the right of admissions or job opportunities to the people only on the basis of these tests.

b) Intelligence tests touches only the cognitive domain. They leave untouched many important aspects like interests, attitudes, motives etc.

c) We cannot depend, accept intelligence test result as the only measure of an individual’s ability to learn because the test results depend on many factors in the testing conditions.

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