Unit -4

INTELLIGENCE & CREATIVITY

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Meaning of Intelligence

1) Ability for adjustment or adaptation: According to this point of view, intelligence is the general mental adaptability for new problems and new situations of life.
2) Ability to learn: This view point emphasizes the ability to learn i.e. one's intelligence is a matter of the extent to which he is educable.
3) Ability to carry on abstract thinking: Here emphasis is laid on the effective use of concepts and symbols in dealing with situations.

Definitions of Intelligence

A very comprehensive and widely accepted definition of intelligence has been given by Wechsler, which states "Intelligence is the aggregate or global capacity of an individual to act purposefully, to think rationally and to deal effectively with the environment".

Characteristic of an Intelligent Person

(i) learns fast and with ease.
(ii) displays good adjustment in behaviour and has the capacity to solve the problems he encounters.
(iii) adjusts his behaviour according to the demands of the goals which he seeks to attain.
(iv) generally acts in pursuit of the welfare of the society.
(v) is capable of handling any trying situation and win over it..
(vi) has the ability to analyse any problem, thoroughly.

Types of Intelligence

According to Thorndike, intelligence is of three kinds:

1. Social Intelligence: It refers to the knack of getting along with people.. Socially intelligent person makes friends easily and understands human relations.
2. Mechanical Intelligence: It is the ability to deal effectively with machines or mechanical contrivances.
3. Abstract Intelligence: It is the ability to deal with symbols (both verbal and numerical), diagrams, formulae etc.

Theories of Intelligence

1) Unitary Theory or Monarchic Theory

According to this theory. If one has a fund of intelligence he can utilise it to any area of his life, the intelligence of a person gets stamped in all what he thinks and acts. But in our practical life we see contrary to this.

2) Spearman's Two-factor Theory

Spearman proposed his two-factor theory of intelligence in 1904. The first factor was a general capacity which was basically a reasoning factor.. According to this theory every different mental ability involves a general factor (G), which it shares with all other mental activities and a specific factor (S), which it shares with none.

3) Thorndike's Multifactor Theory

According to the theory, intelligence is said to be constituted of a multitude of separate factors or elements, each being a minute element or ability (and hence this theory is known as atomistic theory of intelligence). Thorndike distinguished four attributes of intelligence. They are:

a) Level: This refers to the difficulty of a task that can be solved.

b) Range: This refers to the number of tasks at any given degree of difficulty that we can solve.

c) Area: It refers to the total number of situations at each level to which the individual is able to respond.

d) Speed: This is the rapidity with which an individual can respond to items.

4) Thurstone's Group-factor Theory

The analysis and interpretations of Thurstone and others, led them to the conclusion that certain mental operations have in common a 'primary' factor, which gives them psychological and functional unity and which differentiates them from other mental operations. These mental operations, then, constitute a group.

From further analysis, Thurstone and his colleagues concluded that seven Primary Mental Abilities (PMA). Emerged clearly enough for identification and used in test design. They are:
Space visualisation, Perceptual speed, Numerical ability, Verbal comprehension, Word fluency, Rote memory and Reasoning.

5) Guilford's Structure of Intellect

Guilford suggests that mind is composed of atleast three major dimensions-Process of operation, material or content, and product.

1. Six Operations: (i) Cognition; (ii) Memory recording; (iii) Memory retention; (iv) Divergent thinking; (v) Convergent thinking; (vi) Evaluation.
2. Five Contents: (i) Visual content; (ii) Auditory content; (iii) Symbolic content; (iv) Semantic content; and (v) Behavioural content.
3. Six Products: (i) Units; (ii) Classes; (iii) Relations; (iv) Systems; (iv) Transformations; and (vi) Implications.

6) Howard Gardner's Theory of Multiple Intelligence

The Theory of Multiple Intelligence" (1983) has listed eight types of intelligence. According to him, intelligence as measured at present through the use of intelligence tests, is narrowly conceived.

Gardner's Eight Types of Intelligence

i) Linguistic Intelligence Ii) Logical mathematical Intelligence
Iii) Spatial Intelligence Iv) Kinaesthetic Intelligence
V) Musical Intelligence, Vi) Interpersonal Intelligence
vii) Intra-personal Intelligence, Viii) Naturalist Intelligence

Measurement of Intelligence

Difficulty in Measuring Intelligence

To quote Samdiford, "the harder the task a person can perform, the greater is his intelligence. Secondly, more of tasks that an individual can do, the more intelligence he has, and thirdly, the quicker the response of an individual to the given task, the greater his intelligence is".

Some of the Standardised Intelligence Tests

Stranford-Binet Test of Intelligence

Alfred Binet, a French Psychologist, is known as the father of intelligence testing. To devise test items for estimating intelligence, Binet started with certain assumptions regarding certain functional aspects of intelligence.

A) Intelligence does not refer to one or two narrow abilities but a complex variety of abilities and so testing intelligence should involve a variety of tests assessing higher order mental functions. Tests of perceptual and muscular skills are useless.

B) Intelligence is best displayed by general information and knowledge and is independent of school learning. So Binet chose items which a normal child of a particular age could answer from its out-of-school experience.

C) Intelligence increases in amount as age increases. So Binet introduced simpler items for younger children and more difficult and complex items for older children.

Concept of Mental Age

The Mental Age is defined as "an expression of the extent of development achieved by the individual, stated imaturity of the performance that can be expected at any given age". Mental age generally refers to mental maturity of a person corresponding to his level of performance in an intelligence test, irrespective of his chronological age.

Concept of Intelligence Quotient (I.Q.)

Intelligence Quotient is an index of intelligence. It is a comparative index showing how a particular child performs when compared with others of the same chronological age. I.Q. Is computed as a ratio between Mental age (M.A.) and chronological age. However C.A. Is taken as 16. for persons whose ages are 16 and above as most psychologists believe that growth of intelligence stops at 16 after reaching maturity

$IQ = MA \div CA \times 100$

I.Q. Value 100 refers to normal (average) intelligence; values above 100 indicate high intelligence and values below 100 refer low level of intelligence.

Wechsler's Adult Intelligence Scale (WAIS)

Wechsler adopts a general intelligence approach. This view supported that individuals have different measures of intelligence and not of the same kind of intelligence. Sub-tests measure the different ways the intelligence may manifest itself. The test consists of 11 sub-tests six of the tests. Are grouped together to form a verbal scale and five comprise performance scale.

Classroom Teacher Assessing the Intelligence of his Students

a) First of all, a suitable standardised intelligence test should be selected, with the help of psychologists if needed.
b) The manual of the test should be carefully read and understood w.r.t. Administration, scoring and interpretation.
c) Next, a suitable testing climate has to be created in which the pupil would be able to take the test without fear or nervousness and perform the best of his intellectual abilities.

Basal Age
Basal age is that age, all the test items meant for which are solved by the child successfully.

Types of Intelligence Tests

Individual and Group Tests
Individual tests of intelligence can be used to test only one subject at a time. If many are to be tested, each has to be done so separately and individually resulting in enormous expenditure of time and energy. To get over these obvious limitations of individual testing, group tests of intelligence were developed. These group tests are paper and pencil tests and there is a time limit for completing the test.

Advantages of Group Tests of Intelligence
As many can be tested at the same time, they are economical.
They permit shy and socially withdrawn subjects to display their best in test situations.
Administration of group tests is also comparatively easy. Stencil scoring as well as mechanical devices help in quick and accurate scoring of large number of test papers in a very short time.

Limitations of Group Tests of Intelligence

1) They are not of much use in attempting an in-depth study of a single person's intelligence.
2) Paper and pencil group tests often resemble class or school examinations and children who have developed negative attitude towards examinations may transfer such attitudes to mental tests.
3) Group tests have a time limit and hence bring pressure of time and tension on the tests.
4) Children who have reading difficulties may have problems in comprehending what is expected of them in such tests and their scores may be lower than what they should really be.

Verbal and Performance Tests

The early tests of intelligence were verbal or linguistic in nature. So to take such tests, knowledge of language of the test is necessary. The verbal tests of intelligence have certain disadvantages. Some may give wrong responses not because they lack sufficient intelligence but because of misunderstanding of the language items in such tests. To get over these limitations performance tests of intelligence were devised. Performance tests of intelligence assess the behaviour arising out of intelligence and involve doing certain standardised tasks using ordinary materials like cubes, beads, etc. With which one is familiar.

Limitations of Performance Tests

1) Administering and interpreting performance tests of intelligence requires specially trained personnel.
2) They cannot predict scholastic achievement.
3) Performance test materials are costly.
4) Many factors other than intelligence seem to help success in performance tests.

Uses of Intelligence Tests

1) Intelligence tests help in providing educational and vocational guidance.
2) They give the most valuable objective Information regarding level and quality of mental abilities of children.
3) They help in classifying students into homogeneous groups of ability or performance.
4) They help in diagnosing the causes for backwardness.
5) They help in predicting future progress.

Limitations of Intelligence Tests

1) It is really difficult to say that intelligence tests have cent per cent validity and they measure only native mental capacity.
2) Socio-cultural differences, lack of interest or coaching, test unreliability and many other factors make us careful in not fully accepting the computed I.Q. As a true indication of pupil's mental worth.
3) Intelligence tests are also culture-specific and not completely culture-fair.

Culture-fair tests

Certain tests devised by Cattell which consists of items of classification, completion of series, matrices and spatial perception and the progressive matrices of Ravan appear to be culture-free and applicable to children of different cultures as well as socio-economic levels.

Meaning of 'Creativity'

Creativity is the capacity of the individual to discover or produce new ideas. It may also include restructuring or rearranging the old idea. Ausubel defines creativity as "a rare capacity for developing insights, sensitivities and appreciations in a circumscribed content area of intellectual or artistic activities".

Nature (Characteristics) of Creativity

1. The end product of creative thinking should be something tangible such as a poem, a piece of music, a scientific theory or a new mechanical or electrical contrivance.
2. Everyone possesses creative powers to some degree.
3. Although creative abilities are natural endowments, yet they are capable of being nourished or nurtured by training or education.
4. Any creative expression is a source of joy and satisfaction to the creator. There is perfect individuality in one's creative expression.

Stages in the Process of Creative Thinking

1.Preparation: In the preparation stage, the problem is defined and explained. It means orientation with the problem and involves purposeful study, discussion with others and acquisition of facts.
2.Incubation: This stage is characterised by overt behaviour. During this stage one can make rest or sleep or do even some other problem.

3.Illumination: Incubation leads to illumination. During this stage, there is the sudden appearance of the solution to the problem

4. Verification: Then comes the final stage, that of verification. During this stage, we determine whether the solution is the correct one or not; sometimes the solution needs some modification. This is the evaluation of the solution of the problem.

Differences Between Intelligence and Creativity

1. It has been established that convergent thinking is the basis of intelligence, whereas divergent thinking forms the basis of creativity. Divergent thinking is stimulus free and often goes beyond the data i.e. Divergent thinking searches for many possible responses for a given stimulus. Convergent thinking on the other hand is stimulus bound and is limited to the data given.

2. It has been observed that highly creative persons are usually found to possess intelligence to a high degree but it is not essential for an intelligent person to be creative. One may possess high intelligence without having creative abilities.

3. In intelligence testing, the speed and accuracy of the cognitive behaviour is emphasized while in creative tests novelty, flexibility, originality, fluency and elaboration are given more weightage.

Identification of the Creative Children

i. Making use of tests of creativity;

ii. Making use of non-testing devices like observation, interview, rating scale, personality inventory, check lists, etc.

Use of Tests of Creativity

Verbal items are like the following:

1. Unusual uses of ordinary things like a tin can or a card board box
2. Possible consequences of an impossible event [(eg.) if sunlight is a liquid)
3. Producing ideas for improving a toy to increase the fun for children

Non Verbal items include

a. Picture construction test
b. Incomplete figures to be completed
c. Using cut-outs repeatedly to produce new figures.

Use of Non-testing Techniques

i. Keen observation
ii. Indulge in activities with total devotion
iii. Keen desire to listen others

Fostering Creativity among Children

Gallagher makes the following suggestions for the development of creativity of pupils:
i. Organise the curriculum primarily on the basis of concepts rather than facts; :
ii. Allow more individual assignments under competent supervision;
iii. Bring the students in contact with the best talent and knowledge available from the teaching staff.

Torrance suggests five steps for fostering creativity among pupils :
1. Be respectful of unusual questions.
2. Be respectful to imaginative unusual ideas.
3. Show your pupil that their ideas have value.
4. Occasionally pupils do something for practice without the threat of evaluation.
5. Evaluate with causes and consequences. Instead of saying, "this is good" and "that is bad", point out the consequences that this and that lead to and children evaluate the goodness or badness of various results.

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