

Human Learning and Intelligence

~ Unit 1 : Complete Notes ~

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1.1 Human Learning : Meaning, Definition & Concept Formation

All learning begins from **perceptions**, directed to the brain through one or more of the five senses — sight, hearing, touch, smell & taste. Learning occurs most rapidly when information reaches us through more than one sense at a time.

The ability to learn is one of the most outstanding human characteristics — learning is continuous throughout a person's lifetime. To define learning we must look at what happens to the individual — a person's way of perceiving, thinking, feeling & doing may change as a result of a learning experience.

Learning = a change in behaviour as a result of experience. This change can be physical & overt, or it can involve complex intellectual / attitudinal changes that affect behaviour in subtler ways.

Definitions

Gates — Learning is the modification of behaviour through experience.

Crow & Crow — Learning is the acquisition of habits, knowledge and attitudes. It involves new ways of doing things, and operates in an individual's attempt to overcome obstacles or adjust to new situations. It represents progressive change in behaviour and enables one to satisfy interests / attain goals.

Nature & Characteristics of Learning

- Learning is change in behaviour
- The change caused is relatively permanent
- Learning is a continuous, life-long process
- Learning is universal
- Learning is purposive & goal directive
- Learning involves reconstruction of experience
- Learning is product of activity & environment
- Learning is transferable from one situation to another
- Helps in proper growth & development
- Helps in balanced development of personality
- Helps in attainment of teaching-learning objectives
- Helps in proper adjustment & realisation of goals of life
- Learning does not necessarily imply improvement
- Helps bring desirable change in behaviour
- Learning is comprehensive, with a wide scope

Factors Influencing Learning

A. Learner-related factors

- Learner's physical & mental health
- Basic potential of the learner
- Level of aspiration & achievement motivation
- Goals of life
- Readiness & will power

B. Teacher-related factors

- Mastery over subject matter
- Art & skill of teaching
- Personality traits & behaviour of teacher
- Level of adjustment & mental health of teacher
- Type of discipline & interaction maintained

C. Content-related factors

- Nature of the content of learning experience
- Selection of content / learning experience
- Organisation of content / learning experience

D. Process-related factors

- Methodology of providing learning experience — e.g. linking new learning to the past, correlating learning across areas, using max. no. of senses, revision & practice, feedback & reinforcement, psychological methods
- Teaching-Learning environment & resources — socio-emotional climate, availability of material & facilities, conducive environment

Concept Formation

Concepts are mental representations that, in simplest form, can be expressed by a single word — e.g. plant/animal, alive/dead, table/chair (Carey, 2000). A concept may also be a set of ideas described by a few words. Through language, individual concepts connect into more complex structures — e.g. "babies crawl", "birds fly".

Two concepts can combine to form a new one that stands by itself, e.g. *density* = matter per volume. More complex concepts can describe a whole idea, e.g. "the theory of natural selection"; or, using maths, very abstract theories like the "big-bang model of the universe."

Concepts help us make deductions and explain complex ideas — they act like **building blocks** of more complex/abstract representations.

1.2 Learning Theories

A learning theory = a body of principles, advocated by psychologists & educators, that explain how people acquire skills, knowledge and attitudes. Most agree learning can be explained by three broad approaches: **Behaviourism**, **Cognitive theories** and **Social Constructivism**.

A. Behaviourism

A theory of learning based on the idea that **all behaviours are acquired through conditioning** — conditioning occurs through interaction with the environment. Also called Behavioural Psychology.

B.F. Skinner — 'Learning is a process of progressive behaviour adaptation.'

Three types of learning under behaviourism:

- Learning by Association — **Classical Conditioning**
- Learning by Consequences — **Operant Conditioning**
- Learning through Observation / Modeling

(i) Pavlov — Classical Conditioning

Classical conditioning: a reflexive, automatic learning in which a stimulus acquires the capacity to evoke a response that was originally evoked by another stimulus — an unrelated **unconditioned stimulus** becomes associated with a **conditioned stimulus**, producing a **conditioned response**.

Contributors: Ivan Pavlov (1849–1936), John B. Watson (1878–1958)

Pavlov's Dogs: While studying digestion, Pavlov noticed dogs salivated even before meat powder was presented — merely at the sight of the handler or a clicking sound. He paired meat powder with a bell; after repeated pairings, the bell alone triggered salivation.

- Meat powder = Unconditioned Stimulus (UCS)
- Salivation to meat = Unconditioned Response (UCR)
- Bell (initially neutral) → becomes Conditioned Stimulus (CS)
- Salivation to bell = Conditioned Response (CR)

Watson & Little Albert (1921): An 11-month infant was conditioned to fear a white rat by pairing it with a loud, jarring noise (UCS). Albert developed fear of rats — showing classical conditioning can create phobias in humans.

Five Key Principles of Classical Conditioning

1. **Acquisition** — initial stage where a response is first established & strengthened; a neutral stimulus is repeatedly paired with a UCS until the subject responds to the (now) conditioned stimulus.
2. **Extinction** — occurrences of the conditioned response decrease/disappear when the CS is no longer paired with the UCS.
3. **Spontaneous Recovery** — reappearance of the conditioned response after a rest period, even after extinction; if CS & UCS remain unassociated, extinction after recovery is rapid.
4. **Stimulus Generalization** — tendency of the CS to evoke similar responses even from stimuli merely similar to it (e.g. Little Albert fearing all fuzzy white objects, not just the rat).
5. **Stimulus Discrimination** — ability to differentiate the CS from other, unpaired stimuli, responding only to the true CS.

(ii) Edward Thorndike — Trial & Error

Thorndike (1874–1949) laid the foundation of operant conditioning within behaviourism. While classical conditioning is about associations between events, **operant conditioning is learning from the consequences of behaviour.**

Puzzle Box Experiment: A hungry cat placed in a box had to find a way out to reach fish kept outside. Through trial & error the cat eventually hit the lever that opened the door. Over repeated trials, escape time reduced steadily as the cat learned the favourable consequence of pressing the lever.

Law of Effect: Behaviour followed by pleasant consequences is likely to be repeated; behaviour followed by unpleasant consequences is likely to stop. Responses producing satisfaction in a situation become more likely to recur; those producing discomfort become less likely.

Thorndike's Three Main Laws

1. **Law of Readiness** (Law of Action Tendency) — learning occurs when an action tendency is aroused through preparatory adjustment/attitude. Readiness = preparation for action; without it learning cannot be forced (e.g. a typist must be mentally prepared to start practising).
2. **Law of Exercise** — drill/practice increases efficiency & durability of learning. Connections strengthen with practice and weaken when discontinued (also called "law of use & disuse"). Applies to driving, typing, singing, memorising tables, music, etc.
3. **Law of Effect** — trials/steps leading to satisfaction stamp in the connection; dissatisfaction/annoyance/pain weakens or stamps out the connection. Satisfying responses are learnt & selected; unsatisfying ones are eliminated. Teaching must therefore be pleasing — greater satisfaction, stronger the motive to learn.

Thorndike's Five Subordinate Laws

- **Law of Multiple Response** — the organism varies/changes response until an appropriate behaviour is hit upon (e.g. Thorndike's cat trying many ways before hitting the latch).
- **Law of Set/Attitude** — learning is guided by the total set/attitude of the organism, determining what will satisfy or annoy it (e.g. a cricketer must set himself to score a century to actually do so).
- **Pre-potency of Elements** — learner reacts selectively to essential features and neglects irrelevant ones — enables analytical & insightful learning (an early hint of "insight," later emphasised by Gestaltists).
- **Law of Response by Analogy** — learner uses old experience while learning a new situation (e.g. learning to drive a car is aided by earlier skill of riding a bicycle/motorcycle because balance & steering transfer).
- **Law of Associative Shifting** — a response of which the learner is capable gets associated with a new stimulus to which he is sensitive (e.g. a cat trained to "stand up" on command by first pairing the command with a dangled fish, later dropping the fish).

Principles of Thorndike's Learning

- Learning involves trial & error / selection & connection
- Learning is a result of formation of connections
- Learning is incremental, not insightful
- Learning is direct, not mediated by ideas

(iii) B.F. Skinner — Operant Conditioning

Behaviours that are **reinforced** tend to continue; behaviours that are **punished** eventually end. Skinner is called the "father of Operant Conditioning," building on Thorndike's Law of Effect, introducing the term **Reinforcement**.

Contributors: B.F. Skinner (1904–1990), Ivan Pavlov (1849–1936)

Difference from Classical Conditioning: In operant conditioning, a *voluntary* response is followed by a reinforcing stimulus, making the response more likely (e.g. studying for an exam). In classical conditioning, a stimulus automatically triggers an *involuntary* response.

Skinner Box: Similar to Thorndike's puzzle box, Rats pressing a lever received food; over trials they learned the lever-food association and spent more time procuring food. Skinner found response rate depended on what happened *after* the behaviour, not before — calling these **operant behaviours**.

Superstitious Pigeon: Pigeons fed at fixed 15-second intervals developed odd repeated actions — believing (falsely) their action caused the food, showing how behaviour can be shaped by coincidental consequences.

Skinner's Three Types of Operant Responses

- **Neutral operants** — responses that neither increase nor decrease probability of a behaviour recurring.
- **Reinforcers** — responses that increase probability of behaviour recurring (positive or negative).
- **Punishers** — responses that decrease likelihood of a behaviour recurring; punishment weakens behaviour.

Examples of Operant Conditioning:

- Parents rewarding a child's good grades with candy/a prize
- Teacher awarding points to calm, well-behaved students
- Food given to a lion each time it presses a lever

Positive & Negative Reinforcers

Positive reinforcers — favourable outcomes given after the desired behaviour (praise, rewards).

Negative reinforcers — removal of an undesired/unpleasant outcome after the desired behaviour; response strengthens as something negative is removed. (Goal of both: increase behaviour.)

Positive & Negative Punishment

Positive punishment — an unfavourable outcome is given to weaken the response.

Negative punishment — a favourable outcome is removed after undesired behaviour. (Goal of both: decrease behaviour.)

Four Important Principles in Operant Conditioning

- **Principle of Immediacy** — verbal immediacy (calling on students, asking how they feel) & non-verbal immediacy (smiling, gesturing, relaxed body language, moving around class).
- **Principle of Deprivation/Satiation** — Deprivation = not having access to something highly desirable; Satiation = opposite, having too much of it.
- **Principle of Contingency** — a future event/circumstance that is possible but cannot be predicted with certainty.
- **Principle of Size** — the "cost-benefit" determinant: if size/amount of the consequence is large enough to be worth the effort, the consequence will be more effective on behaviour.

B. Cognitivism

Cognitive theory focuses on *what happens inside the student's mind* — learning is not just a change in behaviour but a change in how a student thinks, understands or feels. The word "cognition" comes from the Latin *cognoscere* — "to know / recognize / conceptualize." It refers to mental processes by which an organism learns, remembers, understands, perceives, solves problems and thinks.

Piaget's Theory of Cognitive Development

Piaget's (1936) theory explains how a child constructs a mental model of the world — how the infant, then the child, develops into an individual able to reason using hypotheses.

Three basic components:

- ***Schemas*** — building blocks of knowledge; a cohesive, repeatable action sequence with tightly interconnected component actions governed by a core meaning.
- ***Adaptation processes*** that enable transition between stages: ***Assimilation, Accommodation, Equilibration.***

Assimilation — translating incoming information into a form one can already understand; using an existing schema for a new object/situation (e.g. a toddler seeing a bald man with frizzy side-hair shouts "Clown, clown!").

Accommodation — adapting current knowledge structures for new experiences, when the existing schema fails and must change (father explains the man is not a clown).

Equilibration — balancing assimilation & accommodation to create stable understanding. ***Equilibrium*** = schemas handle new info via assimilation; ***Disequilibrium*** = new info cannot be fitted into existing schemas.

Piaget's Four Stages of Cognitive Development

1. **Sensorimotor Stage** (Infancy, birth–2 yrs) — understands world through senses & actions. Main achievement: **Object Permanence** — knowing an object still exists even when hidden; requires forming a mental representation (schema) of it.
2. **Pre-operational Stage** (Toddler/early childhood, 2–7 yrs) — understands world through language & mental images. Children think symbolically (a word/object can stand for something else). Thinking is **egocentric** — difficulty taking others' viewpoint.
3. **Concrete Operational Stage** (Elementary/early adolescence, 7–11 yrs) — understands world through logical thinking & categories. A major turning point — beginning of logical/ operational thought; child can work things out mentally rather than physically. Children conserve number (age 6), mass (age 7), weight (age 9) — **Conservation** = understanding quantity stays the same despite change in appearance.
4. **Formal Operational Stage** (Adolescence–adulthood, from ~11 yrs) — understands world through hypothetical thinking & scientific reasoning; ability to think about abstract concepts and logically test hypotheses.

Since the theory rests on biological maturation & stages, "**readiness**" matters — children should not be taught concepts before reaching the appropriate stage. Assimilation & accommodation require an **active** learner — problem-solving skills must be discovered, not merely taught.

Classroom Implications (Piaget)

- Focus on the process of learning, not just the end product
- Use active methods requiring rediscovery/reconstruction of "truths"
- Use collaborative as well as individual activities
- Devise situations presenting useful problems, creating disequilibrium
- Evaluate the child's developmental level to set suitable tasks

Weaknesses of Piaget's Theory

- Stage model depicts children's thinking as more consistent than it really is
- Infants/young children are more cognitively competent than Piaget recognised
- Understates the contribution of the social world to cognitive development
- Vague about the cognitive processes/mechanisms producing cognitive growth

Bruner's Theory of Cognitive Development

Bruner (1966) studied how knowledge is represented & organised through different modes of thinking (representation). He identified **three stages of representation**:

- **Enactive** — representation of knowledge through actions. Direct manipulation of objects, no internal representation (e.g. a baby shakes a rattle and hears a sound; later shakes its hand even without the rattle, expecting the same sound).
- **Iconic** — visual summarisation of images; internal representation of external objects as a mental image/icon (1–6 yrs) e.g. drawing/imagining a tree.
- **Symbolic** — use of words & symbols to describe experience (7 yrs+); information stored as code/symbol (language, maths symbols); symbols, unlike images, can be classified & organised.

Bruner believed learning should begin with direct manipulation of objects (e.g. algebra tiles, coins in maths education).

<i>Bruner Agrees with Piaget</i>	<i>Bruner Disagrees with Piaget</i>
Children are pre-adapted to learning	Development is a continuous process — not a series of stages
Children have natural curiosity	Language development is a <i>cause</i> , not a consequence, of cognitive development
Children's cognitive structures develop over time	Cognitive development can be sped up — need not wait for "readiness"
Children are active participants in learning	Involvement of adults / more knowledgeable peers makes a big difference
Cognitive development entails acquisition of symbols	Symbolic thought does not replace earlier modes of representation

Importance of Language: Language helps deal with abstract concepts — it "codes" stimuli, freeing the individual from dealing only with appearances, giving more complex, flexible cognition. Bruner viewed the infant as an intelligent, active problem-solver from birth.

Readiness: Bruner (1960) opposed Piaget's notion — argued schools waste time matching subject complexity to a child's cognitive stage, unnecessarily holding students back.

Spiral Curriculum: Information is structured so complex ideas are taught first at a simplified level, then revisited at increasingly complex levels later — subjects taught at gradually increasing difficulty.

Discovery Learning: Learners construct their own knowledge by organising & categorising information using a coding system, discovered rather than told by the teacher (constructivist approach). The teacher's role is to facilitate — designing lessons that help students discover relationships between pieces of information, using the spiral curriculum.

C. Social Constructivism

A variety of cognitive constructivism emphasising the **collaborative nature** of learning. Developed by Soviet psychologist **Lev Vygotsky**. Unlike Piaget/Perry, Vygotsky rejected the idea that learning can be separated from its social context — all cognitive functions originate in (and are products of) social interactions; learning is the process by which learners are integrated into a knowledge community.

Social Development Theory — social interaction precedes development; consciousness & cognition are end-products of socialisation and social behaviour.

Vygotsky's Theory — Three Major Themes

1. **Social Interaction** — plays a fundamental role in cognitive development. Unlike Piaget (development precedes learning), Vygotsky held that **social learning precedes development**: "Every function in the child's cultural development appears twice: first on the social level, later on the individual level — first between people (interpsychological), then inside the child (intrapsychological)."
2. **The More Knowledgeable Other (MKO)** — anyone with a better understanding/higher ability than the learner regarding a task/process/concept — usually a teacher, coach, or older adult, but could be peers, a younger person, or even a computer.
3. **Zone of Proximal Development (ZPD)** — the distance between what a student can do under adult guidance/peer collaboration and what the student can do independently. Learning, per Vygotsky, occurs in this zone.

Vygotsky focused on connections between people and the socio-cultural context in shared experience. Humans use culturally-developed tools (speech, writing) to mediate their social environments; children first develop these as social/communicative tools; internalising these tools leads to higher thinking skills.

Albert Bandura's Theory (Social Learning Theory)

People learn through **observing others'** behaviour, attitudes & outcomes. Most human behaviour is learned observationally through **modeling**: one forms an idea of how new behaviours are performed by observing others, and this coded information guides later action. Social learning theory explains behaviour as continuous reciprocal interaction between cognitive, behavioural, and environmental influences.

Necessary Conditions for Effective Modeling (Bandura)

- **Attention** — factors like distinctiveness, affective valence, prevalence, complexity, functional value increase/decrease attention paid; also affected by personal characteristics (sensory capacity, arousal, perceptual set, past reinforcement).
- **Retention** — remembering what was attended to; includes symbolic coding, mental images, cognitive organisation, symbolic & motor rehearsal.
- **Reproduction** — reproducing the observed image; includes physical capability & self-observation of reproduction.
- **Motivation** — having good reason to imitate; motives may be past (traditional behaviourism), promised (imagined incentives), or vicarious (seeing/recalling the reinforced model).

Reciprocal Determinism: Bandura believed the world and a person's behaviour cause each other (unlike simple behaviourism where environment alone causes behaviour) — behaviour also causes environment. Personality = interaction of three components: environment, behaviour, and one's psychological processes (ability to entertain images/language in the mind).

Social learning theory is sometimes called a "bridge" between behaviourist & cognitive theories as it covers attention, memory and motivation.

Vygotsky vs Bandura (common ground): Both saw learning as socially interactive. Vygotsky: children construct knowledge from their social environment, using adults as tools to solve knowledge problems. Bandura: good role models produce better behaviour than negative ones. Both viewed language as an actively learned behaviour central to mental development.

Classroom examples: Online activities/projects encouraging cooperation outside class; teachers using videos & interactive worksheets with scaffolding; TV commercials influencing young people's modelled behaviour (buying a product after seeing it advertised).

Difference Summary — Behaviourism vs Cognitivism vs Social Constructivism

Aspect	Behaviourism	Cognitivism	Social Constructivism
Focus	Observable behaviour	Internal mental processes (thinking, memory, attention)	Social interaction & cultural context
How Learning Happens	Conditioning (stimulus→response)	Mental processing & information organisation	Collaboration, language, interaction with others
Role of Learner	Passive responder	Active processor of information	Active participant in social dialogue
Role of Teacher	Authority controlling stimuli	Designer of structured content	Facilitator / co-learner
Key Strategies	Repetition, reinforcement, punishment	Analogies, mnemonics, scaffolding	Group work, discussion, peer learning
Knowledge is...	Transmitted teacher→student	Acquired & stored in memory	Constructed through social experience
View of Errors	Incorrect response to fix	Gaps in processing to correct	Part of learning, through negotiation
Key Theorists	Skinner, Pavlov, Watson	Piaget, Gagné, Bruner	Vygotsky, Bruner, Bandura (partially)

1.3 Intelligence : Concept, Definition & Theories

*Intelligence derives from Latin *intelligere* — to comprehend or perceive. It is the ability to solve problems and to adapt and learn from everyday experience. It has been defined variously — in terms of capacity for logic, abstract thought, understanding, perception, etc.*

D. Wechsler — "A global concept that involves an individual's ability to act purposefully, think rationally, and deal effectively with the environment."

Nature of Intelligence

- *Distribution of intelligence*
- *Individual differences in intelligence*
- *Intelligence and changes with age*
- *Intelligence and racial/cultural differences*
- *Intelligence and sexes*

Factors Influencing Intelligence

(a) The Child's own influence: Genetics, Genotype–Environment Interaction, Gender.

- *Boys & girls tend to be equivalent in most aspects of intelligence — average IQ scores virtually identical; extremes (both very low and very high) are over-represented by boys.*
- *Girls as a group tend to be stronger in verbal fluency, writing, perceptual speed (from toddler years).*
- *Boys as a group tend to be stronger in visual-spatial processing, science, mathematical problem-solving (from age 3).*

(b) The Immediate Environment's influence: Family environment, School environment.

- *Attending school makes children smarter; children from low-SES and high-SES families make comparable achievement gains during the school year.*
- *Over summer break — schools no longer equalise the intellectual environment; low-SES children are less likely to have experiences maintaining academic achievement (the well-known "summer slide").*

(c) Society's influence: Poverty, Race/Ethnicity.

Theories of Intelligence

Different theories of intelligence do not agree with each other — each perspective brings its own assumptions, often contradicting earlier theories.

1. Spearman's Two-Factor Theory (1904)

English psychologist Charles Spearman proposed intellectual abilities comprise two factors: '**G**' factor — general/common ability, universal & inborn (greater G → greater success in life); and '**S**' factor — specific abilities acquired from environment, varying from activity to activity within the same individual.

2. Thorndike's Multifactor Theory

Thorndike believed there is no such thing as a single "General Ability" — every mental activity requires an aggregate of different abilities. He distinguished four attributes of intelligence:

- **Level** — the degree of difficulty of a task that can be solved
- **Range** — number of tasks at any given degree of difficulty
- **Area** — total number of situations, at each level, to which the individual can respond
- **Speed** — rapidity of response to items

3. Triarchic Theory (Robert Sternberg)

Intelligence comes in three forms:

Analytical Intelligence — ability to acquire, store, retain, retrieve, transfer information; to plan, decide, solve problems; translate thought into performance; efficient information processing; monitoring & evaluating solutions; using strategies. Students high in this do well with lectures & objective tests — considered "smart," get good grades, go to competitive colleges.

Creative Intelligence — ability to solve new problems quickly, and to automate solutions to familiar problems so the mind is free for insight & creativity; comparing new info with existing knowledge to form new combinations; thinking originally. Such students may not conform to traditional schooling & may be reprimanded for unique answers.

Practical Intelligence — ability to get out of trouble and get along with others; how to size up a situation & decide what to do (adapt to it / change it / leave it). Such students don't relate well to traditional schools but do well outside classroom walls, with good social skills and common sense.

4. Theory of Emotional Intelligence (Goleman, 1995)

Abilities such as motivating oneself and persisting despite frustration; controlling impulse & delaying gratification; regulating mood so distress doesn't swamp the ability to think; empathising; and hoping. Main areas: knowing one's emotions, managing emotions, motivating oneself, recognising emotions in others, and handling relationships.

5. Multiple Intelligences (Howard Gardner)

Gardner proposed **nine types of intelligence**; each of us possesses all nine to varying degrees. They relate to how an individual prefers to learn/process information.

- **Verbal skills** — thinking in words, using language to express meaning; sensitivity to meaning/sound of words, mastery of syntax (authors, journalists, speakers, poets, teachers)
- **Mathematical skills** — carrying out mathematical operations; understanding objects, symbols and relations between them; ability to abstract, identify problems, seek explanations (scientists, engineers, accountants)
- **Spatial skills** — thinking three-dimensionally; perceiving the visual world accurately, transforming perceptions, sensitivity to tension/balance/composition (architects, artists, sailors, chess masters)
- **Bodily-kinesthetic skills** — manipulating objects, physical adeptness; skilled use of the body for expressive/goal-directed purposes (surgeons, craftspeople, dancers, athletes, actors)
- **Musical skills** — sensitivity to pitch, melody, rhythm, tone; understanding how to combine tones/phrases into structures; awareness of music's emotional aspect (musicians, composers, sensitive listeners)
- **Interpersonal skills** — understanding & effectively interacting with others; noticing moods, temperaments, motivations, intentions of others (teachers, mental-health professionals, parents, leaders)
- **Intrapersonal skills** — understanding oneself; access to one's own feelings, drawing on emotions to guide behaviour, recognising personal strengths/weaknesses (theologians, novelists, psychologists, therapists)
- **Naturalistic skills** — observing patterns in nature, understanding natural & human-made systems; sensitivity to plants, animals, nature (farmers, botanists, ecologists, environmentalists)
- **Existential intelligence** — a knack for tackling life's "big questions" — What is life? Where does it come from? Who am I? What should I do with my life? A philosophical mind comfortable with abstract concepts and theory.

1.4 Creativity : Concept, Definition & Characteristics

Every person possesses some creative ability, though not equally — some are endowed with high creative talent and contribute to advancement in art, literature, science, business, teaching, and other spheres of human activity.

Drevidahl (1956) — "Creativity is the capacity of a person to produce compositions, products or ideas which are essentially new or novel and previously unknown to the producer."

Spearman (1931) — "Creativity is the power of the human mind to create new contents by transforming relations and thereby generating new correlates."

Nature & Characteristics of Creativity

- Creativity is universal
- Creativity is innate as well as acquired
- Creativity produces something new or novel
- Creativity is adventurous, open thinking
- Creativity is a means as well as an end in itself
- Creativity carries ego-involvement
- Creativity has a wide scope
- Creativity and intelligence do not necessarily go hand in hand
- Creativity rests more on divergent than convergent thinking
- Creativity cannot be fully separated from intelligence
- Creativity and school achievement are not correlated
- Sociability and creativity are negatively correlated
- Creativity and anxiety often go together

Factors of Creativity

- Keen observation
- Creative perception
- Curiosity & sensitivity to problems
- Capacity for divergent thinking
- Capacity to evaluate & judge
- Personality traits

The Creative Person — Personality Traits

(Cattell 1968, Torrance 1962, MacKinnon 1962, Foster 1971)

- Originality of ideas & expression
- Adaptability and a sense of adventure
- Good memory and general knowledge
- High degree of awareness, enthusiasm and concentration
- Investigative and curious nature
- Lack of tolerance for boredom, ambiguity and discomfort
- Ability to take independent decisions
- Ambitious nature, interest in vague or even "silly" ideas
- Open mind, preference for complexity, asymmetry and incompleteness
- High sensitivity towards problems
- Fluency of expression

The Creative Process — Four Stages

1. **Preparation** — conscious work on the problem begins and continues as long as possible; the problem is defined/analysed and the stage is set for its solution.
2. **Incubation** — characterised by absence of active work/thinking on the problem; one may rest, sleep, or engage in other activities.
3. **Inspiration / Illumination** — the thinker is suddenly presented with the solution.
4. **Verification / Revision** — the illumination/inspiration is checked to see whether the insight is in fact the correct solution.

The Creative Product

Creativity is investigated, understood and identified through the outcome of the creative process — the creative product. How creative one is can be judged by one's output: ideas, works of art, scientific theories, or even building designs. For a product to qualify as creative it must meet minimum criteria:

- It must be aesthetically pleasing, giving joy & satisfaction to both producer and user
- It should provide new perspectives in some area of human experience, creating new conditions for human existence

The Creative Place

A focus on **place** considers the circumstances in which creativity flourishes — such as degrees of autonomy, access to resources, and the nature of "gatekeepers."

1.5 Implications for Classroom Teaching & Learning

(in Special & Inclusive Classroom Settings)

Learning theories give a crucial framework for understanding how individuals acquire knowledge & skills. In special/inclusive classrooms — with students of widely varying learning styles, abilities & challenges — applying these theories becomes even more vital.

I. Behaviourism

Core idea: Learning is a change in observable behaviour, largely influenced by external stimuli and consequences (rewards & punishments).

- **Structured, predictable environments** — clear routines & consistent consequences benefit students who thrive on predictability (e.g. autism spectrum, ADHD).
- **Positive reinforcement** — praise, tokens, preferred activities, tangible rewards to increase desired behaviours; effective for skill acquisition & behaviour management.
- **Task analysis & chaining** — complex skills broken into small manageable steps, taught/reinforced individually then linked — valuable for developmental delays / learning disabilities.
- **Prompting & fading** — verbal, gestural or physical prompts guiding correct response, gradually withdrawn as independence grows.
- **Data collection** — measurable outcomes tracked to adjust interventions per student.
- **Applied Behaviour Analysis (ABA)** — direct application of behavioural principles, widely used in special education, esp. for autism.

Consideration: Over-reliance on external rewards may not foster intrinsic motivation or deeper understanding.

II. Cognitivism

Core idea: Learning involves internal mental processes — memory, perception, problem-solving, information processing; focuses on how individuals acquire, store & retrieve knowledge.

- **Scaffolding** — temporary support to learn new concepts, gradually withdrawn as mastery grows — essential for accessing complex material.
- **Metacognition** (thinking about thinking) — awareness of one's own learning process and strategies — empowers self-regulated learning, esp. for students with executive-function difficulties.
- **Memory strategies** — mnemonics, chunking, visual aids, repetition, for memory deficits.
- **Schema activation** — connecting new information to prior knowledge (pre-assessments, KWL charts, discussions).
- **Problem-solving skills** — teaching how to analyse problems, brainstorm solutions, evaluate outcomes — not just rote memorisation.
- **Differentiated instruction** — lessons catering to varied learning styles/preferences — core to inclusive education.
- **Clear, organised information** — visual organisers, graphic aids benefit all, especially those with processing challenges.

Consideration: Cognitive approaches demand more teacher planning & deeper understanding of each student's cognitive profile.

III. Constructivism

Core idea: Learners actively construct their own understanding through experiencing & reflecting on experience — learning is a social process.

- **Hands-on / experiential learning** — experiments, projects, real-world application build deeper understanding, highly engaging for diverse learners.
- **Collaborative learning** (group work, peer tutoring) — learning from one another, promoting social interaction & peer support.
- **Inquiry-based learning** — asking questions, exploring, discovering answers — fosters critical thinking.
- **Student-centred approach** — teacher as facilitator, students take ownership of learning.
- **Flexible grouping** — small groups by interest/style/support need allow differentiated instruction within collaboration.
- **Emphasis on understanding, not memorisation** — conceptual understanding & applying knowledge across contexts.
- **Authentic assessment** — projects, presentations, real-world tasks over traditional tests.

Consideration: Requires careful planning so all students — especially those with significant needs — get adequate support during knowledge construction.

IV. Social Learning Theory (Bandura)

Core idea: People learn from one another through observation, imitation & modelling, often in a social context; self-efficacy (belief in one's own ability) is key.

- **Modelling desired behaviours** — teachers & peers as positive role models for academic, social, behavioural skills — vital for students struggling with social cues.
- **Peer observation & imitation** — students learn from peers with strong skills, via peer tutoring / collaborative projects.
- **Self-efficacy building** — opportunities for success, constructive feedback, highlighting progress — builds confidence, motivation & persistence, especially after academic struggles.
- **Vicarious reinforcement** — students imitate behaviours they see being rewarded in others; teachers can publicly praise desired behaviour.
- **Social skills training** — explicitly teaching/modelling turn-taking, conflict resolution, active listening — vital where social competencies vary widely.

Consideration: Must ensure positive role models are consistently available and all students get opportunities for successful imitation.

Conclusion

No single learning theory offers a complete solution in special & inclusive classrooms. Effective educators draw upon elements from all theories, adopting a flexible, eclectic approach:

- Students with disabilities often benefit from structured, explicit instruction (behaviourism & cognitivism) for foundational skills.
- All students, including those with special needs, thrive where they can actively construct knowledge, collaborate with peers, and feel a sense of agency (constructivism & social learning).
- **IEPs** (Individualized Education Programs) and **UDL** (Universal Design for Learning) principles are rooted in these theories — aiming to provide accessible, engaging learning experiences for every student.

By consciously applying these learning theories, teachers create dynamic, supportive, effective learning environments catering to the diverse needs of all students — fostering both academic success and social-emotional growth in special & inclusive settings.