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Introduction

The free online encyclopedia, Wikipedia, defines learning as: "the process of acquiring new understanding, knowledge, behaviors, skills, values, attitudes, and preferences."

Humans, along with animals, some machines and possibly even some plants, possess the ability to learn. Learning can result from an instantaneous isolated occurrence, for example, hitting one's

finger when trying to use a hammer, but most learning is accomplished from the repetition of experiences.

New skills and knowledge learned, lasts for life, unless some event or physical or cognitive condition renders skills or knowledge irretrievable and unusable. Learning is a continuous process that occurs throughout a person's life. The outcome of learning is a modification in behavior that is brought about by experience.

The psychology of learning

The website, indeed, states the following: "The psychology of learning helps researchers, educators and employers understand learning processes and how they work." The psychology of learning covers many subject matters relevant to how people learn and their interactions with the environments they are in. Perceptions from one, or many of the five senses are transferred to the brain, creating learning. Psychologists have also discovered that rapid learning occurs when information is relayed through multiple senses.

It is agreed by psychologists that there are diverse learning methods and that people have varying learning styles. Some individuals prefer learning methods that they consider to be easy, in comparison to others. Having an understanding of the different learning approaches is important in recognizing the influence the environment exerts on the way in which people learn.

The field of science that incorporates various theories concerned with how psychology pertains to the ways in which people learn, is called the psychology of learning. Many learning theories have been proposed on multiple disciplines such as: social constructivism and cognition, behaviorism and neuroscience.

The focus of recent research, into the mechanics of how students learn, has concentrated on developing new methods to teaching, assessing and testing, homework and to enhance student's motivation, participation and engagement.

Behaviorism monopolized the valued opinion in psychology during the early decades of the 20th century, and it attempted to describe the process of learning. Only behaviors that can be observed are measured in behaviorism. Classical conditioning, operant conditioning and observational learning are the three major types identified in behavioral learning.

A brief history of the psychology of learning

John B. Watson

John Broadus Watson, a psychologist born in America, made behaviorism a well-known scientific theory. Behaviorism is the study of how learning influences behavior and Watson concluded that all behaviors result from learning processes; it is a scientific study of behavior that is observed and measured. Behaviorism was established as one of the psychological schools (theories of psychology that are now considered to be great and classical). The website Wikipedia states: "Watson advanced this change in the psychological discipline through his 1913 address at Columbia University, titled *Psychology as the Behaviorist Views It.*" He carried out research on raising children, behavior of animals and advertising by applying his behaviorist method.

Other influential psychological schools include: cognitivism, functionalism, humanistic/gestalt, psychoanalytic and systems psychology.

In a survey, Review of General Psychology, which was published in 2002, Watson was ranked as the 17th most cited psychologist who lived during the early 20th century. Later in the century, humanistic psychology, biological psychology and cognitive psychology emerged, however, behavior based methods are still important today.

Edward Thorndike

American psychologist, Edward Lee Thorndike worked on comparative psychology and the process of learning, which led to connectionism as a theory, from which the scientific foundation for educational psychology was established. He was also involved in finding solutions to industrial problems, for example, employee testing and exams.

Thorndike also had a considerable influence on behavior analysis and reinforcement theory. He provided a structure for the observational laws applied in behavior psychology by means of his law of effect; behavior is repeated if there is a positive association to the outcome, and behavior is less likely to be repeated if there is a negative association to an action. For example, a punctual employee, will in all likelihood, continue to be punctual if commended by a supervisor for this example-setting behavior. If on the other hand, an employee is late for a meeting, the behavior is less likely to be repeated because being late and missing a meeting is seen as having a negative outcome. His experiments with cats using puzzle boxes led to him developing his law of effect.

Thorndike used puzzle boxes to study learning behavior in animals. He would put a cat in an enclosed container or puzzle box and place a meat treat for the cat outside the box. If the cat learned to press a lever, the cat would be able to escape the confines of the box and eat the piece of meat. He noticed that even if the cats initially pressed the lever by chance, the cats became conditioned to press the lever to get to the reward. The behavior was likely to be repeated because an immediate reward awaited them after the action was performed.

The law of effect is very influential in the classroom because Thorndike's input into the field of behavioral psychology resulted in considerable impacts on education. Due to his influence, he is considered to be the founder of educational psychology in the modern age.

Ivan Pavlov

Nobel Prize winner in the category: Physiology or Medicine, 1904, Ivan Petrovich Pavlov, was an experimental neurologist, physiologist and psychologist. He was born in the former Russian Empire and became well known for his dog. He studied his dog intently and attempted to understand reflexes in a medical context.

In the field of psychology, he is best known for discovering classical conditioning, an achieved behavior after repeated association with something. His studies showed that animals salivate when given food, but they can also be conditioned to salivate when recognizing their food-giver and, even salivating when recognizing a certain sound. He influenced other people including John B. Watson and he contributed substantially to the philosophy of behaviorism.

B.F. Skinner

American born, Burrhus Frederic Skinner, was an author, inventor, behaviorist, psychologist and social philosopher and was possibly the most authoritative psychologist of the 20th century.

The website Very Well Mind states the following about his "radical behaviorism" philosophy:
"He suggested that the concept of free will was simply an illusion and, instead, believed that all human action was the direct result of conditioning."

In the field of psychology, Skinner's most noteworthy contributions or discoveries include:

- The process known as operant conditioning which is Skinner's theory of learning
- The concept of schedules of reinforcement
- The establishing of response rates as a conditional variable when carrying out research
- The introduction of tracking responses by recording the cumulative data

Skinner also suggested that emotions predispose a person to act in definitive ways. For example, if someone is angry with another person, they are more likely to exhibit a behavioral outburst, such as being verbally abusive or yelling at the other person, or they may even become physically violent with them.

Skinner has made valuable contributions to psychology and several other fields, including philosophy and education, which are still significant today. In our day, professionals specializing in mental health, will frequently apply operant techniques Skinner developed, when they work with their clients. Teachers often utilize principles of reinforcement to mold behavior that is

desired in the classroom. Animal trainers have also been known to rely on the techniques Skinner practiced to train dogs and animals.

It is evident from the many psychologists, and other researchers, and their numerous theories, that people learn in a variety of different ways; these include behaviorism, operant conditioning, classical conditioning, cognitive learning, and observation to mention a few examples.

Behaviorism

The website Simply Psychology defines behaviorism as: "a theory of learning which states all behaviors are learned through interaction with the environment through a process called conditioning." In a simple statement, one could say that behavior is purely a response to stimuli from the environment a person is in. Behaviorism is solely focused on observing behaviors that respond to stimuli, because they can be studied systematically in an observable process.

Behaviors are learned and thus acquired through the process of conditioning, and in turn, conditioning takes place when there is interaction within the environment.

John Watson's article 'Psychology as the behaviorist views it', defined a number of presuppositions concerned with the methods used and the analysis of behavior.

Basic presuppositions/ assumptions

- Everybody's mind is a clean slate and without any records at birth.
- All behavior is learned and acquired from stimuli in the environment.
- Behavior is influenced by environmental factors and innate or inherited factors are excluded, thus the focus is on learning.
- New behavior is learned through operant or classical conditioning, together known as 'learning theory'.
- Behaviorists only study behavior that is observable and events that originate internally, including thinking or cognition, emotions, mood, motives and meanings, and unconscious yearnings and desires, are excluded because they cannot be studied objectively or measured scientifically.
- Humans and animals have no qualitative characteristics or distinction between their behavior and for this reason, research can be conducted on both, which is known as comparative psychology. Humans and animals learn in similar ways. Behaviorists used rats and pigeons as a primary source for collecting data because it is easy to control their environments.
- All behavior, no matter how simple or how complex, is the result of, or a reaction to a stimulus, known as stimulus-response association.

On the website Simply Psychology, Watson stated the purpose of psychology as: "To predict, given the stimulus, what reaction will take place; or, given the reaction, state what the situation or stimulus is that has caused the reaction."

Behaviorism types

The formation of behavior is described by two main types of behaviorism.

Methodological behaviorism

Methodological behaviorism is behavior that is observable and requires scientific study. Internal events, cognitive process, mental states, and any form of introspection, do not add anything to understanding behavior. Watson's approach, ideologies and principles that all behaviorists adhere to are outlined in his article *'Psychology as the behaviorist views it'*, which is frequently referred to as the 'behaviorist manifesto'. In the behaviorist's entire scheme of investigation, all behavior is considered and is not limited to humans, even though human behavior is refined and very complex.

Radical behaviorism

B.F Skinner was the founder of radical behaviorism. He also conceded with the methodological behaviorism assumption that the field of psychology should aim to predict and regulate behavior. However, while he agreed that internal events could not be applied in the explanation of behavior, he suggested that they should, in the analysis of behavior, be explained.

Watson's methodological behaviorism states that, at birth, everyone's mind is a blank slate. Skinner on the other hand in his radical behaviorism, questions to what extent do environmental factors impact and influence behavior. Radical behaviorism acknowledges that behaviors are innate and organisms are born with them. In this regard, the role that genes and other biological systems have, is recognized as important.

Behavioral psychology

The website Rivier University, defines behavioral psychology as: "the study and analysis of observable behavior." It is the study of how our minds and behavior connect. Researchers and scientists attempt to understand our behavior and they are interested in identifying behavioral patterns. The purpose of behavioral psychology is to help people predict human behavior and in doing so, there is the opportunity for individuals to form better habits, companies can produce better products, and communities can develop and establish better residential areas.

During the middle of the 20th century, this field of psychology had a significant influence and persuasion on thought. In addition to the contributions of Ivan Pavlov, John B. Watson and Edward Thorndike in behavioral psychology, Clark Hull was to advocate and promote his drive theory. When people experience deprivation of something, needs are created internally, driving people to satisfy their needs, and their consequent behavior is impacted directly.

Behavioral psychology has been integrated into practice in many ways such as: psychologists researching a specific topic to examine and understand behavior; applying their findings in the treatment of mental health disorders. Psychologists, psychiatrists, mental health counselors, social workers, family therapists, market researchers, and substance abuse counselors, are some of the professionals using therapeutic techniques based on behavioral psychology to aid people in overcoming specific issues.

Behavioral psychology techniques utilized in therapy

Systematic desensitization

This technique is applied for clients who present with a specific phobia and have a heightened fear or anxiety about an object or a situation, such as an animal or creature, or germs. In therapy, the person learns to relax and have coping techniques as they are exposed to the object or the situation in gradual steps.

Exposure and response prevention

In this strategy, clients are exposed to situations that cause fear and they do not engage in any coping strategies that are not helpful. This therapeutic technique is applied in anxiety disorders, such as obsessive-compulsive disorder.

Token economy

Tokens or symbols are given to children and adults to reinforce targeted behavior. The tokens can then be exchanged for a reward. This technique can be used in educational settings and for people who present with varying mental health issues.

Modeling

With modeling, clients learn behavior by imitation only. Its application is in developmental psychology and it can also be integrated into clinical use.

Applied behavior analysis

Applied behavior analysis was developed in the 1960s as a method to modify behavior. In general, its application is for children with autism spectrum disorder, and it is also used in other fields such as education, industrial safety and criminal behavior.

Contingency management

Individuals receive vouchers for merchandise or services or the chance to win prizes. It is often used when treating patients who abuse substances or other related disorders. Typically, reinforcers are monetary-based and are given, for example, for drug-negative tests.

Operant conditioning

Operant conditioning, or instrumental conditioning, is a learning method that uses rewards for positive or desirable behavior, and punishments for negative or undesirable behavior. The website [verywellhealth](#) further explains: "It's a type of behavior change that occurs because of a purposeful cause-and-effect reinforcement." An association or connection is made between a behavior and the resulting consequence, whether it was a positive or negative consequence.

By way of illustration, lab rats learned to press a lever when they saw a green light and would receive a pellet of food as their reward. If they press the lever when a red light is on, they get

shocked mildly with electricity. They learned, or were conditioned to avoid pressing the lever when the red light was on and to only press the lever when the green light was on.

Operant conditioning is not limited to studies in experimental settings but is rather a powerful tool in ordinary everyday learning. In natural settings, reinforcement and punishment are constantly exercised, as well as in more structured and formal settings such as in the classroom or in therapy sessions.

It was behaviorist B.F. Skinner who described operant conditioning first, and it is periodically referred to as Skinnerian conditioning. Skinner suggested that the focus of human behavior should be on the external causes of human behavior. These causes are observable therefore one should not focus on internal motivators and thoughts.

Skinner identified two definitive behavior types, namely: respondent behaviors and operant behaviors.

Respondent behaviors

These are behaviors that are automatic and reflexive, they are not learned and occur automatically and involuntarily, such as pulling your hand off a hot surface or jerking your leg when the knee is tapped in a specific spot, known as the patellar reflex.

Operant behaviors

These behaviors are controlled under our conscious deliberation. Some of these behaviors may present spontaneously, while others, may present purposely. However, the consequences of these behaviors influence and determine whether or not they are repeated in future scenarios that are similar. In the learning process, our actions and behaviors on the environment and the resulting consequences, are the important factors.

Operant conditioning consists of several notable concepts:

Reinforcement

There are positive and negative reinforcements, which are presented after any behavior to strengthen, increase or encourage that behavior.

Positive reinforcers, can be described as a favorable event or outcome that is given after the behavior. An example would be a manager rewarding an employee with a bonus for good work.

The bonus then is the positive reinforcer in this instance.

Negative reinforcers on the other hand, are the actions of removing of an unfavorable event or outcome after the behavior, the response is strengthened by removing something that is undesirable or unpleasant. To illustrate this idea, one could give the example of my child screaming in a restaurant but stops when I give him a treat, such as an ice cream, candy or cookie. In this way, my behavior is negatively reinforced and not my child's.

Reinforcement schedules

There are many factors that influence reinforcement in the process of how quickly and how well all new behaviors are learned. The website [verywellmind](#) states: "Skinner found that when and how often behaviors were reinforced played a role in the speed and strength of acquisition."

Simply stated, learning new behaviors and modifying old behaviors, is greatly influenced by the timing and frequency of reinforcement.

Skinner noted that operant conditioning is impacted by several marked schedules of reinforcement:

1. Continuous reinforcement – a reinforcement is delivered with every response, prompting relatively quick learning however, the rate of response is low. If the reinforcement ceases, the behavior quickly becomes extinct.
2. Fixed-ratio schedules – responses are partially reinforced after achievement of a predefined number of responses have taken place, and the response rate is fairly steady.
3. Fixed-interval schedules – responses are partially reinforced after specific intervals of time elapses. Response rates to the reinforcement remain fairly steady and tend to increase as the reinforcement time approaches, and slow down after delivery of the reinforcement.
4. Variable-ratio schedules – reinforcement of behavior is delivered after a certain number of responses. Skinner found that the response rates are high and the extinction rates are slow.
5. Variable-interval schedules – reinforcement is delivered after a variable elapse of time, leading to a response rate that is rapid and an extinction rate that is slow.

Punishment

Positive and negative punishment are an adverse or detrimental event or outcome that results in a specific behavior decreasing.

With positive punishment, an unfavorable event or outcome is presented to lessen or weaken the behavior or response it follows. It is also known as punishment by application and an example is spanking for misbehavior.

Negative punishment, sometimes also referred to as punishment by removal, takes place when a favorable event or outcome is removed following a behavior, for example, taking away child's mobile phone after misbehavior.

Operant conditioning is used in education and in clinical applications to reduce unwanted behaviors such as: eating disorders, substance use disorders, mood and sleep disorders, anxiety and stress, schizophrenia and trauma recovery.

Classical conditioning

With classical conditioning, sometimes also referred to as respondent or Pavlovian conditioning, learning takes place unconsciously. The website Healthline elaborates further: "When you learn through classical conditioning, an automatic conditioned response is paired with a specific stimulus. This creates a behavior." A new response in behavior is learned when two stimuli are associated or linked together.

Ivan Pavlov has provided us with the best-known example of this type of conditioning and he is widely considered the father of classical conditioning theory. While performing an experiment on the digestion of canines, he observed that over a period of time, the dogs modified their behavior. At the beginning of the experiment, the dogs were presented with the ringing of a bell. The dogs did not salivate because there was no association and thus, this was a neutral stimulus. The dogs learned to associate a bell tone with the imminent presentation of food and would then salivate. Eventually, they started salivating when their carers arrived to feed them. The food was the unconditioned stimulus and according to Pavlov, salivation was the unconditioned or innate response. After conditioning, the bell became the conditioned stimulus and the reaction of salivation was the conditioned response.

Learning from the environment is a key emphasis in classical conditioning and nurture over nature is strongly supported. However, behavior cannot solely be described or defined in terms of one or the other: nature or nurture, as that would be limiting and underestimating in the understanding of human behavior. It is rather suggested that behavior is the result of interactions between nature, the biological component, and nurture, the environmental aspect.

Key principles of classical conditioning

Behaviorists have defined several different elements associated with this type of conditioning such as, the initial establishment and formation of the response or the disengagement and

withdrawal of a response. There are five key principles to consider in classical conditioning namely:

1. Acquisition – this is the commencement stage of the learning and is characterized by the establishment and gradual strengthening of a response. A neutral stimulus (NS), that does not evoke a response, is paired with an unconditional stimulus, time and again. The unconditioned stimulus is an element that automatically triggers a response, without any learning taking place. As soon as there is an association, a behavior in response to the previously neutral stimulus, will be displayed. At this point, the neutral stimulus becomes the conditioned stimulus and the acquisition of the response has been established. With the establishment of the response, the response can gradually be reinforced to ensure thorough learning of the behavior. In Pavlov's experiment with his dog, the bell was the neutral stimulus, and a response only presented when it was paired with food.
2. Extinction – is the decrease in frequency or disappearance of occurrences of a conditioned response and is the result of a conditioned stimulus no longer being paired with an unconditioned stimulus. The website Wikipedia elaborates: "For example, after Pavlov's dog was conditioned to salivate at the sound of a metronome, it eventually stopped salivating to the metronome after the metronome had been sounded repeatedly but no food came."
3. Spontaneous recovery – is when a response reemerges after a rest period of extinction. This occurs when reinforcing the behavior is resumed, for example, a dog salivating when hearing a bell, is stopped and the response becomes extinct. After a period of not

presenting the conditioned stimulus, you ring the bell, the dog will spontaneously recover the response that was previously learned. Extinction will reappear quickly if there is no longer an association between the conditioned stimulus and the unconditioned stimulus.

4. Generalization – after a response has been conditioned, a conditioned stimulus can present with similar responses. By way of illustration, through conditioning, a dog salivates when hearing a bell but may also respond in the same way to a sound that is similar to the bell.
5. Discrimination – this is the ability to make a distinction between a conditioned stimulus and other stimuli that have yet to be paired with an unconditioned stimulus. A case in point: the bell sound is the conditioned stimulus, having the ability to differentiate between the bell sound and other similar sounds, is discrimination and the subject will only respond to the conditioned stimulus, i.e. the bell sound.

Classical conditioning has many applications. It is applied in mental health to treat fears, phobias, post-traumatic stress disorder (PTSD), anxiety disorders, substance addictions and even bed-wetting. Other applications include the fields of education and marketing and advertising. Parents are also known to use classical conditioning to elicit certain behaviors they want to cultivate in their children. Animal trainers also use classical conditioning and recently these principles have reached wildlife conservation, according to the website Scientific American which states that: "taste aversion, which is a form of classical conditioning, is being used to keep lions from preying on cattle. This should, in turn, prevent farmers from killing the lions."

Cognitive learning

According to the website Valamis, cognitive learning is: "an active style of learning that focuses on helping you learn how to maximize your brain's potential." In this process, memory and the capacity of the brain to retain knowledge is deepened by connecting new information with ideas that already exist.

Cognition is the ability of the mental processes of the brain, to absorb and retain information through many inputs such as experience, thought and the stimuli received by the five senses. The brain is constantly processing cognitive abstracts and these include thinking, learning, paying attention, perceiving, solving problems, etc.

Fundamental aspects of cognitive learning

Mainstream learning has traditionally focused on the ability to memorize instead of aiming to master a particular subject. Cognitive learning involves the following fundamental components:

1. Comprehension – without understanding the reason for learning a specific subject, comprehension of learning is detached from cognition. When the reason for learning is grasped, cognitive learning is efficient and beneficial.
2. Memory – cramming information in memorization exercises is ineffective and unproductive in education. An essential requirement is to have a deep understanding of a subject in order to improve ability to associate new gaining of new knowledge with past experiences and previous information received and retained.
3. Application – the strategies employed in cognitive learning aid in applying new information and/or skills in real life situations through constantly developing one's problem-solving abilities and skills.

Cognitive learning theories

Cognitive learning theory

The influence of internal and external factors on the mental processes of an individual are explained in cognitive learning theory. When cognitive processes, such as adequate attention span, observation, long-term memory retrieval, and categorization are not functioning correctly and regularly, the results are evidenced in delays and difficulties in learning.

Significant contributions to the cognitive learning theory have been made by several researchers. The website First Discoverers states the following about American psychologist, Jerome Bruner: "His learning theory focuses on modes of representation and he introduced the concepts of discovery learning and a spiral curriculum." And Swiss psychologist, Jean Piaget, determined that the environment has a major role in learning and he was also interested in, and focused on, the changes that occur internally in the cognitive structure.

In modern psychology, cognitive learning theory is prevalent and it is divided into two types; namely: social cognitive theory and cognitive behavioral theory.

1. Social cognitive theory – this theory is concerned with understanding how people are influenced, and in turn, understanding the influence they have on the environment. A significant component of this theory is observational learning in which other peoples' desirable and undesirable behaviors are observed.

Behavior is modeled for others by, for example, teachers, peers, supervisors, or fictional characters that influence or have sway on the observer's own behavior. Both positive and negative behaviors are learned through observational learning.

2. Cognitive behavioral theory – this theory is mainly interested in mental processes. It refers to how our thoughts, feelings, behavior and perceptions of experiences in life

interact and connect with each other. Thoughts evoke distinct emotions which then cause specific responses in behavior. If we change our thoughts and thinking, our emotions can change and ultimately, our behaviors will change and vice versa; a change in our behavior changes how we feel and think.

Benefits of cognitive learning

Comprehension is enhanced in cognitive learning because students experience an immersive hands-on approach and learn by doing. A deeper understanding of subject or study material is developed and therefore it is easily applied in daily life or in work life situations.

Core problem-solving skills are enhanced through the cognitive learning approach, together with the ability to apply this critical skill in all aspects of life, whether at home or at work.

As a result of new-found problem-solving skills, and the ability learn new things in a relatively short period of time, many people experience improved confidence which promotes better coping abilities such as being able to handle new challenges.

The approach to continuous learning is fostered with a long-term, if not life-long love of learning, and seeking ways to improve oneself. People find ways to combine the knowledge they

already have with new information and materials and to apply them effectively. Learning is exciting, and very satisfying.

Human psychology behavior

A definition of behavior is found on the website IMotions which states the following: "In scientific research, human behavior is a complex interplay of three components: actions, cognition, and emotions."

Factors impacting behavior

Human behavior is complex and is affected, impacted and influenced by many factors. Physical factors that affect behavior include genetics, the individual's age, health status, and presence of illnesses, disease and pain and any influence of a substance or prescribed medication.

Factors of a personal and emotional nature, such as one's personality, ideologies, philosophy, beliefs and religious faith, emotions and mental health and expectations, also play a role in the expression of behavior. Life experiences, including family, the significance of culture, friends, events that transpire throughout an individual's lifetime, and the person's wants and needs, are also impacting factors.

The context in which people experience life events must too be taken into consideration. In this regard, behavior is affected by the environment and what is transpiring at the time, as well as how other people respond, which is also affected by all these factors.

The psychology of learning in modern times

In addition to the extraordinary contributions of the forefathers of the psychology of learning, dating back to Plato and Aristotle, and more recently of note: John B. Watson, B.F. Skinner, Ivan Pavlov, Lev Vygotsky, Jerome Bruner and Jean Piaget, to name a few, researchers continue to discover and expand on learning theories in modern times.

Alfred Binet and his IQ test

In the early twentieth century, numerous tests were developed in America and in countries in Europe, aimed at measuring intelligence and the cognitive ability of individuals. The website Insider states: "The first of these tests was developed by French psychologist Alfred Binet, who was commissioned by the French government to identify students who would face the most difficulty in school."

The 1905 Binet-Simon Scale was the result and has become the foundation of the modern intelligence quotient or IQ tests. Binet however, was concerned that the test could not accurately measure creativity or an individual's emotional intelligence.

It was the German psychologist and philosopher William Stern, who coined the abbreviation "IQ" from his mother tongue German: intelligenzquotient.

The IQ test is designed to identify and sort people based on their intelligence in a comparably quick and relatively simple way. IQ tests have a wide range of application and are used to screen potential candidates and applicants for employment and secondary and tertiary studies, for example. Institutions such as the police force, military, colleges, universities, and employers all make use of IQ testing.

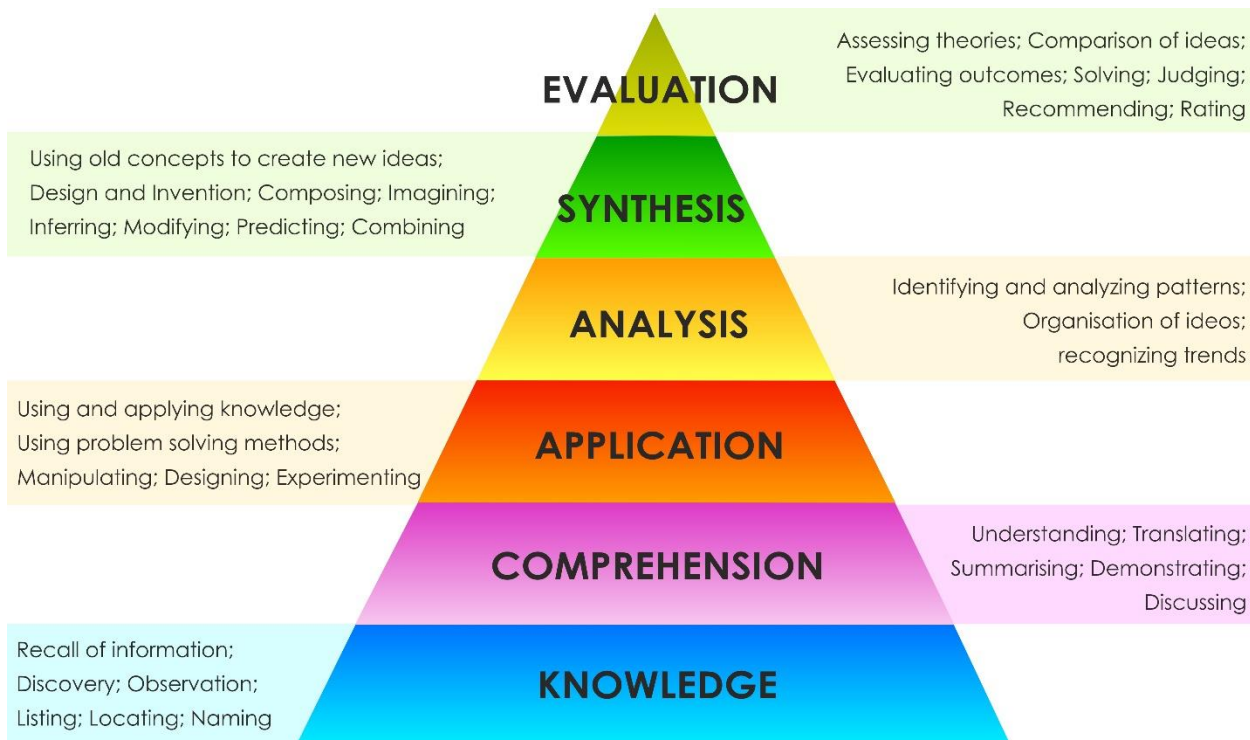
There has been concern that IQ tests have a history of deepening the divide of marginalized ethnic minorities and impoverished communities in some countries.

Bloom's taxonomy of learning

American born Benjamin Samuel Bloom was an educational psychologist and in 1956, his Bloom's Taxonomy was published for the first time, with the publication being modified and updated for 16 consecutive years thereafter.

Bloom's Taxonomy is a model in which learning objectives are categorized and arranged in rank or defined as a hierarchical model. The ranks represent different levels of complexity that range from basic knowledge and comprehension at the bottom to advanced abilities of evaluation and creation at the top.

Diagram illustrating Bloom's Taxonomy (Bloom's Taxonomy of Learning, SimplyPsychology):



The cognitive, affective and psychomotor areas make up the three learning domains of Bloom's Taxonomy. The website SimplyPsychology states: "Within each domain, learning can take place at a number of levels ranging from simple to complex."

The original cognitive domain was predominantly used in the setting of a classroom but has since been updated by other psychologists, who have added taxonomies that explain emotional (affective) and physical (psychomotor) learning. As recent as 2001, Bloom's taxonomy was revised again and now reflects learning as an active process instead of a passive one.

Bloom is particularly well-known for setting the precedent for other psychologists to develop the extensive structure to describe and assess the outcomes of education in the mid-1950s. Today, his taxonomy is still used in many educational settings.

Ausubel's theory of meaningful learning

American psychologist, David Paul Ausubel contributed significantly to the fields of educational psychology, science education and cognitive science. He believed that through deductive reasoning; ideas, concepts and principles are understood. He was also of the opinion that rote memorization held little value and that learning should rather be meaningful. What the learner already knows is the single most important factor that influences learning. Ausubel thus developed a theory encapsulating meaningful learning and advance organizers.

The website International Clinician Educators states: "While rote memorization is characterized by simple regurgitation of facts, meaningful learning implies new information is understood and internalized, as it is incorporated into prior knowledge and concepts." This process is known as subsumption of information. Newly learned information is related to knowledge already internalized and is assimilated in a hierarchical format and then organized into a cognitive format that can be used. The newly acquired information has the effect of expanding on prior concepts and likewise, these prior concepts provide the new information with meaning, purpose and explanation. Information learned in this way can be applied to any new situations whereas, memorization does not allow for this feature.

Ausubel suggested that meaningful learning occurs through four processes namely: derivative subsumption, correlative subsumption, superordinate learning and combinatorial learning.

- Derivative subsumption – in this situation, the new information learned is an example of a concept that has already been learned. By adding or linking new information in the hierarchy, new interpretations or meaning are created. For example, I know what a tree is and now I learn about a peach tree. My new knowledge of a peach tree is linked to my already existing idea of what a tree is. My concept of a tree is not changed by learning about a peach tree, which I did through the process of derivative subsumption.

- Correlative subsumption – the learning is enriched, more valuable and is on a higher level in comparison to that of derivative subsumption. Any new material that is introduced, is an extension and amplifies what is already known. Example; I have existing knowledge of a tree with green leaves when I come across a tree with yellow leaves. I accommodate this new information by changing and extending my idea of trees to include trees with yellow leaves. The process of correlative subsumption has been put into action in this learning I experienced.
- Superordinate learning – a person has knowledge of a concept and is able to provide many examples but does not know what the actual concept is until it is taught. For example: I know Christmas trees, pines and cedars but I do not know that they are coniferous trees until it is taught to me. I already had knowledge of these types of trees but I did not know their specific classification until I learned about it and this is superordinate learning.
- Combinatorial learning – the process by which a new idea originates from another idea that is at the same level in the hierarchy. In the first three learning processes, new information "latches onto" a hierarchal level that is either above or below knowledge that is already acquired, but in this process, it is different. It could be described as learning by analogy; I relate one idea with another. Example, I learn about fertilization of frog eggs and I relate it to my knowledge of how bees pollinate plants. The knowledge is different but the concepts relate to reproduction, which I already know about.

Ausubel's theory is useful in school settings as it is concerned with providing methods for individuals to learn considerable amounts of meaningful information that is disseminated in verbal and textual form, whereas other theories are largely based on experimental settings.

Behavior analysis

The science of behavior analysis is directed at understanding human behavior as well as the behavior of other organisms. The website Auburn University, amplifies this definition by stating: "The focus of this science is to understand, explain, describe, and predict behavior." There are two subdivisions of this scientific field of study, namely: Experimental Analysis of Behavior (EAB) and Applied Behavior Analysis (ABA).

Experimental Analysis of Behavior

This is the basic science and is largely associated with laboratory science that studies behavior in an assortment of animals including rats, monkeys and humans. Its major concern is to understand how environmental events affect behavior. Since its inception about 70 years ago, this field of science has amassed substantial literature that is methodologically sophisticated in revealing core processes that illustrate how environmental experiences condition behavior. The underlying laws governing learning have been established, and are applied in scientific and practical circumstances in numerous disciplines.

Applied Behavior Analysis

Behavior analysis involves scientific observations and activities which include ways of incorporating basic research findings into circumstances of everyday life. This is Applied Behavior Analysis (ABA). Literature on this branch of science has progressed to include the use of technology in applying its methods to modify behavior under many different conditions. Many scholars have trained to be practitioners and will make use of technology as a means to approach behavioral needs. This science is used in fields such as: education, autism, developmental disabilities, behavioral safety, organizational performance management, training and instructional design, brain injury rehabilitation, human operant research, verbal behavior, behavior toxicology, computer modeling of behavior and artificial intelligence and animal and pet training, etc.

Applied Behavior Analysis Teaching Strategies

Regarding the field of education, the website Applied Behavior Analysis Program Guide states the following: "... applied behavior analysis, or ABA, is also well-known for the benefits it confers upon teachers and students."

Among the many proven teaching strategies designed for the classroom, the top five ABA-specific strategies considered to be most effective are: discrete trial teaching (DTT), naturalistic teaching, pivotal response therapy, token economy and contingent observation.

1. Discrete trial teaching

Discrete trial teaching is also referenced as discrete trial training or learning has its roots in behavioral learning theory. Large complex educational concepts are broken down into smaller more manageable tasks that are easier to teach and easier for students to grasp and absorb.

The structure of DTT to complete tasks or behaviors to achieve a skill, is a cue followed by a response. A student given a prompt, known as a discriminative stimulus, will be given a consequence after providing a response to the prompt. The consequence can be a reward, correction of any errors, a break from study or any other appropriate reaction.

The DTT model promotes engagement with peers and teachers that is incentivized, and teachers are afforded opportunities to interact with students thereby strengthening social skills, especially with students who are lacking in this area. It is also a useful tool in highlighting deficiencies that require reinforcement.

2. Naturalistic teaching

This is the second most favored ABA teaching strategy that is used and its main focus is on allowing the student to set the pace of their learning in the framework of their routines that they perform regularly every day.

Learners exercise more control over their individual learning process and as a direct result, problematic or undesirable behaviors are reduced, minimizing learning disruptions or any interferences with learning. Teachers continue to fulfill their role of mediator by providing feedback and coaching on target or desired outcomes behaviors as they are encountered.

3. Pivotal Response Therapy (PRT)

PRT is built on naturalistic teaching, with a focus on imparting essential behaviors specifically oriented to help learners who have autism spectrum disorders. PRT is more structured than naturalistic teaching and is directed specifically at improving critical development areas such as motivation, the ability to respond to several cues, self-regulation and social structures induction, to name a few. With improvement in these skills, learners with autism spectrum disorder can flourish in other areas and domains.

4. Token economy

Token economies or conditioned reinforcers are used as a means of motivation to selectively encourage or discourage specific behaviors. Tokens are given as rewards or taken away for behaviors that have already been defined.

Tokens can be given in the form of points, stickers, marbles or any other simple counter. Token systems do not necessarily adhere to rewards being given when correct responses are provided to a given stimuli, as in the allocation of rewards in discrete trial teaching. Students can also accumulate their tokens and trade them in at a time they choose.

5. Contingent observation

In this method, disruptive behavior is subdued and controlled, and it is often used with groups of young children. Inappropriate and undesirable behavior is discouraged and offenders are given instruction and guidance on more appropriate ways to act. They are then asked to separate from the social group for a while and observe the other students who are behaving in an appropriate manner.

Contingent observation affords students opportunities to learn from the examples of their peers and is not a punitive measure as in the case of making a student stand in a corner.

Studies have shown that contingent observation is more effective in governing inappropriate behaviors such as disrupting classroom procedures or being aggressive.

Conclusion

Through diligent and thorough research, many scientists have made valuable contributions in helping us understand how learning takes place. No one theory is absolutely correct or absolutely incorrect, but rather, all theories have added to decoding the complexities of human behavior associated with learning processes. From research, models and methods, we are equipped to better help learners, no matter their age or disposition in their learning journey.

Psychology of learning is a discipline that will continue to be researched and with the incredible advent of technology being employed more and more in studies, undoubtedly new understandings and discoveries will be revealed.

Understanding learning processes has helped previously marginalized individuals, such as those with Down's Syndrome or autism spectrum disorder, receive more needs-focused education that is not mainstream.

How I will apply this knowledge in my life

I have learned a great deal through researching for this assignment and I understand more about how to apply models and methods in the classroom. Although I do give rewards in class, (I am a teacher), I did not understand the science behind it and the great impact it has on behavior modification, but now I do grasp it. I will be more directed and deliberate in ensuring good classroom management by effectively employing strategies to modify behavior to the desired standard.

I am also very interested in helping my students learn more through self-discovery and will prepare materials and worksheets so that they can work on their own. At the moment, they learn everything using rote memorization which I do not like and have never agreed with. I know they learn more from tasks I have given them that require independent or group work.

I also have a better understanding of how I learn and agree that discovering information through in-depth research, is the best way I learn. I am a cognitive learner and like to think deeply.

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