

Psychology of Learning

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Lecture – 9

Major Theories of Learning (Contd.)

Hello viewers, welcome back to this NPTEL course on the Psychology of Learning. In the last class, we were discussing theories of intelligence: Howard Gardner's multiple intelligence theory and Steinberg's triarchic theory. So, today we will discuss another theory of intelligence that is PASS intelligence planning. The PASS theory of intelligence was proposed by three psychologists: one Indian and two international psychologists. So, this is also the latest model of intelligence. All these theories are under the cognitive era and the cognitivism approach.

So, the PASS model of intelligence was propounded by Das, Naglieri, and Kidby. Das is an Indian psychologist, Naglieri and Kidby both are Canadian psychologists. So, the full form of this PASS model of intelligence is: P stands for planning, A for attention, S for simultaneous and another S for successive processing. This is the basic picture of this thing. I will just explain it.

So, this is the first unit. So, we have three functional units, the first functional unit is arousal attention. That is the arousal that means, we receive the information from the external world input that is either in a serial way or in the concurrent way we receive the information that enters into the first functional units that is attention and arousal. Thereafter we process this information, we process this information that is the second unit cognitive processing unit. So, second, how do we process either in the simultaneous way or in the successive way.

Then thereafter this information enters into the third functional unit that is the planning functional unit. So, so that a primary planning decision making takes place that is primarily in the text it takes place in the frontal lobe primarily. So, plan after planning execution of planning, then the output that is the response behavior. So, this is the basic structure. Now we will explain it in this manner. So, the PASS theory of intelligence had been propounded in 1994 by these three authors.

So, actually PASS theory focuses on information processing like how the brain functions, what are the underlying mechanism processes that result in certain activities. So, this theory is unlike the IQ concept. IQ concept was criticized because it focuses only on the output of the product that is the score. But whereas, the others this processing information processing researchers say that these and other product processes are equally important. So, they started focusing on how we process the information. So, all the information processing theories have come up.

So, this is a similar kind of information processing approach, like trying to understand the underlying information processing processes that take place while we are engaged in some activity. So, actually this theory is primarily based on or inspired by the pioneering work of

Alexander Luria who was an actual neuropsychologist. And Luria has already described the human cognitive processes and these three functional units he had already described earlier. So, taking the basics from Luria's theory, they have developed this in the PASS model.

So, the first functional unit that is responsible for cortical arousal and attention etcetera. And also Luria theory as it is a neuropsychological theory. So, Luria has already mentioned which portion of the brain is responsible for what type of activity that has that is also reflected in the PASS model. Second unit actually codes the information, information coding that is either in simultaneous way parallel way. Suppose we receive more than one piece of information how do we code it like coding coding and then either in simultaneous way or in the successive way whether one after another.

And the third functional unit actually provides the planning, planning, self monitoring, reflecting on the thing, analyzing thing and analyzing and synthesizing the whole thing. So, ultimately analyze all these processes and structuring of the cognitive activities then finally, we decide what to do how to do. So, that is the final decision making. So, there are not just three functional units but four processes. Four processes of attention arousal is that when we are coding the information, coding the information and coding at one kind of encoding processing either we code it in simultaneous way or the successive way.

So, these two are the different separate processes. So, simultaneous and successive processes then planning processes. So, planning primarily takes place in the frontal lobe frontal lobe and all the prefrontal cortex and it distinguishes that is why it is distinguishes human beings from other animal other animals etcetera because human beings brain is the most complex and most developed organ. So, that is in this way prefrontal cortex function is very important for planning. And the prefrontal cortex also plays a central role in the decision making, devising a plan, planning all kinds of major cognitive decision making activities.

So, cognitive skills required to implement the plans etcetera also being given direction directed by the prefrontal cortex and it is responsible for evaluating the success and failure of the different plans etcetera. So, planning, that is it is a planning actually the selection of the development of the plans and strategies needed to complete the task or resolve any problem in problem solving situations. So, you can say these are the cyclic processes like attention, attending the stimulus etcetera, then processing and coding, then after the planning and execution etcetera. So, this planning actually includes the generation or generating generation, evaluation, execution, self monitoring, reflex, impulse control or the higher cognitive processes. And it also helps us in solving the getting the solutions to the problems, control the attention, control the attention, simultaneous successive processes, execution, then selective utilization of the knowledge and skills how to do, what to do, what not to do, how to strategize the whole thing.

So, these are the things. And attention is the mental process which is closely related to orienting process unless and until the optimum level of arousal and attention is given to a task it is not going to be further processed. So, that is where the base of the brain allows the organism to direct the focus selective attention towards the stimuli. Retention and loss of attention. So, the first functional unit actually gives the focus attention to a task then only after that only the other processes.

But the whole PASS model that is all the activities like you can say planning, simultaneous successive and attention all these processing actually takes place in the platform of knowledge

domain. So, knowledge under the knowledge domain only platform only functions. So, as far as the attention is concerned, the longer the attention will be that longer attention is required and suppose the task demands a high level of resilience. So, then longer attention is required. Attention is also controlled by intentions and the goals, knowledge and skills.

So, depending on the purpose, intention, moods, emotion, skills and goals etcetera attention is being regulated. Then the knowledge base is closely assigned. Why is it said that all the processes function in the platform of knowledge? Because knowledge is the platform, the foundation, the background under which all these processes act. So, here the knowledge base is closely associated with the PASS model and all the processes are found within this framework. If you take away the knowledge combination that is domain knowledge, then it cannot function.

So, the basic foundation of the platform is that knowledge. So, the knowledge base of the PASS model represents all the information obtained from our culture, from our social background, from our academic environment etc. floats and it gives a light it gives a kind of platform to function and process the information accordingly. So, knowledge is the base. So, simultaneous processing is that organization of the information into groups in a coherent whole. Like for example, from different like at the moment suppose we are receiving auditory stimuli, visual stimuli then we are also engaged in some kind of activities.

So, for a multiple way we are processing the receiving of the information. So, how do we process it? So, how do we suppose it is more of memory related task, remembering, memorizing something then we prefer to go and process it one by one because we are memorizing and remembering certain things. Then we adopt the successive processing like some data that may be some mobile number, some date, some data etcetera. So, there we adopt the successive processing one by one etcetera, but simultaneous processing like when we are engaged in different activities and the nature of the stimulus are different then we prefer to process it simultaneously. So, and parietal occipital temporal bones are actually responsible for simultaneous and successive processing that is the coding of the information works. How we code it.

Then you know planning is a program regulation, verification of all these things successive processing is a use of stimuli in arranged specific order one by one because we want to remember it in a better way. So, also each element can be related to those who proceeds it one by one that every for every stimulus is related to the previous one and whenever we are going to the next stimulus just like the numbers of the data or the dates etcetera. So, but again so, this PASS theory the problem the researchers the founders they have also proposed the different kinds of psychological test research based test standardized test to measure different kinds of verbal intelligence, non verbal processing skills, different types of quantitative test they have also developed to measure like to not just to capture how the brain functions in the in case of different individuals, different children, different adults etcetera, but how it functions, but where the defect lies and how to capture these in terms of different kinds of standardized test both verbal test, non verbal test, memory related test, then logical reasoning test, different kinds of test they have also developed a test battery test battery that is called the cognitive assessment system cognitive assessment system to capture to measure to assess all these types of processing like starting from attention to successive simultaneous processing to planning all kinds of things they have developed to map it to measure it. So, accordingly any kind of remedial activities can be taken over in case of any deficiency or any difficulty in learning. So, this is the framework that we have already discussed.

So, PASS theory proves emphasis on the basic psychological processes and precludes verbal achievement like vocabulary. So, that he has vocabulary definitely when gives you that this is the foundation of the information information or knowledge base. So, the function of the brains brains are considered the building blocks of the ability conceptualized within the cognitive processing framework. So, this is the they have given a framework like starting a PASS at attention to simultaneous successive to planning and this in this platform we can process the thing provided we have the data. The data we have the prerequisite information like the vocabulary, the language, the information etcetera then only we can processing it.

So, it is also it also this theory can also be applied in case of developmental perspective in educational psychology it has immense relevance and it can from they have already developed the test battery for the 8 to 17 years students in terms of arithmetic ability, reading ability, then different kinds of other kinds of reading skills, compliance skills. And the PASS theory they have also developed the scale PASS theory and so, they have developed the scale cognitive assessment system that has not just measures the different cognitive processes, but also provides the remedies for it. So, they have also developed other prep modules for the enhancement reading programs also for the children for the learning disabled children or children, slow learners or the children having the different ability disabilities, children who find difficulties in mathematical ability also. So, now we will move on. So, these are the salient features in the test of intelligence set of cognitive processes and remediation of the cognitive processing difficulties in case it is found that some children are having this and the difficulties in processing or in attention or in planning etcetera that can be rectified.

Then it has the developmental varieties and CAS battery also is available in Indian language also it is available Indian language in translated in Indian language it is also available besides being available in Indian English, but it can be applied by the educationist and educational practitioners. So, now another important thing is also brain based learning that is cognitive. It is also clear how the brain functions. So, we will not go into depth of this neurological neuro psychological perspective, but as you can see this is the brain structure and what is the basic theme of this brain based learning. So, brain based learning says that means, how the different parts of the brains are functioning. So, that is called the brain based learning that is the concept of learning in a neuro physiological context.

This explains the process of learning from the physiological perspective like the biochemical changes like electro chemical changes and learning is a process definitely it establishes the connection between the brain cells and the intercellular connections like for example, neural networks. So, neural the computers signs or the latest signs the neural network similarly in our brain cells in our brain the how the difference in neurons how they function how they establish the network that decides and with the with the different neural networks now we new connection is getting established and each new learning takes place with a new neural neural networks and connectivity. So, the structure and the processes of the brains especially the inter cellular relationship brain hemispheres lobes processes at which each part is good and good at and the structural qualities of the brain all these are it some of the features of the brain based learning how skillfully efficiently that that means, here the structures of the brain components how it functions neural network brain chemical neuro chemicals brain chemicals and the neural functions neural network that is some kind of that signaling process of the neurons. So, this these are the compositions of the brain structure of brain structure that is the base of this learning theory that is composed of a number of the parallel processes that carry out lot of how the brain functions and all these brain activities is the foundation of the

brain based learning. So, it is also theory as you can see the structure and function of the human brain as long as the brain is not prohibited from fulfilling its normal processes learning will occur.

So, then you know due to some there are some lessons there are some you know some if any damage brain damage takes place any kind of so, loss of memory all these are the biological things and how the brain functions the left brain functions activities that you can see it here right brain function activities and how the brain functions that means, collaborating live both the qualities of the left brain and right brain these are the things how they collaborate and functions effectively. So, this is a completely neuropsychological perspective. So, brain based learning it is a new science that has emerged in by Eric Jensen in 2000 it is that primarily based on the structure and function of human being and brain and Kane and Kane 2002 then again expanded it this theory and making that means, how can we make a sense of the brain is more important. So, brain creates the meaning in line with the patterns and connections how can the brain learn based. So, it focuses primarily on how the brain perceives operates interprets establishes the connections stores etcetera etcetera.

So, it is a neuropsychological perspective how the brain functions how the brain functions can be enhanced. So, factors that ensure the learning to be meaningful and permanent that is yes definitely the relaxed three factors are important here one is relaxed alertness. Relaxed alertness whenever the person is in a relaxed state of mind calm and quiet. So, calm learning so, then that learning will be influenced by this environment. So, relaxed poised attentive alert, but relaxed position that is the it enhances boost the meaningful learning.

Similarly orchestrated immersion. What is this orchestrated emotion that is when a certain level of integrity and inter core relativity is ensured like the that the learning stimulus or the very variables or the component that is we are learning. When then integrate all the materials all the components are interrelated. So, when certain level integrities level of integrity inter core relativity is ensured then the learners will use the memory system in order to explore the content and reach the learning goals. So, so, here is again so, in neuropsychology that is orchestrated immersive immersive by establishing the connectivity integrity core relativity. So, then our memory system will function properly and the learner will try to explore many things to reach the goal.

And another is the brain requires active processing, active processing is the learning brain is an active brain. So, actually researchers they say that brain has a immense capacity, but the thing is how much we are being able to utilize it that is it depends on our skills it depends on. So, brain again is a machine also it we need to exercise it we need to work on it. So, ideal brain that is why it is said that ideal brain is the devil's work. So, brain is a machine is a machine we need to activate it.

So, the learning brain is an active brain and learning activity takes place by means of new connections. The more we learn the more you know more connective connections neural connections and networks and connections get established and with the more new connections etcetera again our the horizon of the learning also knowledge also increases. So, it establishes a result of the data transfer between the neurons. Like the computer it is now data transfer from one server to another server neural network all these computer language computer you know ontology etcetera it actually resemble the brain functioning. So, the more we exercise of course, like for example, when we sleep we think that we are taking rest actually, but the brain never takes rest brain.

So, during that period that during our sleep hours this thing sleep hours hours the brain actually stores it preserves it stores it files it categorize it. So, the brain is a active machines the brain is always active, but thing is that how to channelize the effort how to learn skillfully how to you know how to prepare ourselves like for example, suppose a random like that is why we need a discipline to and to learn something like for example, how to maintain the learning behavior like one type of task at one time then thereafter another. That means, in a organized way in a more disciplined way if you learn then one after another we can save it retain it. Similarly that is why we also and as because we have yes of course, in case of humans the brain has limited capacity. So, into in order to enhance because biologically we cannot expand it, but thing is that if we want to extend enhance our brain power then we have to use certain strategies that learning strategies, mnemonic strategies that is the memory related strategies, the linguistic strategies.

So, different kind of strategies we use to that is for coding for better coding for processing and word retention for better retention. So, these are the three factors that relates to meaningful learning, permanent learning relatively permanent learning, relaxed state of alertness, orchestrated immersion the way how we integrate the material learning material components and the active processing of these things. So, then now the principles of brain based learning how to realize the effective learning. So, again yes brain is a parallel processor learning is also affected by this different external factors like psychosocial qualities of the individuals, his personality attributes like biological traits, the chemical structure of the organisms all these things. So, learning the learning engages in the entire physiology.

So, when we are learning means brain brain based learning it involves the whole physiology that is starting from his you know nervous system to his blood composition to his brain chemical to his you know all kinds of the biological parameters. So, search of the meaning is very innate here, the search of the meaning occurs through patterning. So, when so, usually the brain scientist what happens when through MRIs, MRIs or like scanning etcetera they just when they map the brains the brain waves. So, what is the pattern, what are the things? Primarily they will try to understand the functions of the brain through different patterns. So, as of course, emotions are very critical in this pattern formulation and construction.

So, the brain processes the wholes and the parts simultaneously like suppose we are venturing into a new domain, new world or maybe suppose for example, imaginary land some immersive learning experiences. So, we so, the brain while perceiving the stimulus from the different direction different aspects, the brain processes the both ways in a holistic way as well as simultaneously. So, the brain processes the holes as well as the parts simultaneously. So, learning involves both the focused attention, peripheral perception and also gets affected by the environmental factors ok. So, even if whenever we are attending a particular target content the focused attention in this process also blend learns and what is happening in and around periphery that is also we are also perceiving brain is also perceiving and the environmental factors yes environmental factors.

And all the and whatever the factors within the human physiology like starting from emotion to you know even the even the blood sugar level to the you know we are you can say our nerve impulses to all kinds of the physiological activity it affects the brain, brain activity that is learning behavior, brain based learning behavior. As you can say different domains cognition for cognition major part is the cognition frontal lobe is the cognition then how much where the study is relevant study behavior is relevant and aptitude is relevant the logic rational

thinking is here and memories. So, they have profound and they have found which lobes which do which lobes which areas of the brain are responsible for major this major kind of function you know. However, these are all interrelated, but the major functions. So, the concepts like so, that is where the awareness consists automatization, unconscious behavior, feelings sense all these are you know are can be called as the factors of learning processes.

That is why even if we are asleep the brain is still functioning. That is you know filing this, saving the files and categorizing the files and retaining the files, organizing the whole learning thing. So, learning involves both the conscious and unconscious processes. It has two types of memory : short term memory and the long term memory. And like for example, we understand and remember best when the skills are embedded in the natural and special memory. Each brain is unique and there are different factors that affect the brain based learning. These are organic factors, chemical structure of the brain, music, physical vitality, exercise, A to Z lifestyle, stress and motivation. All these factors affects the learning behavior starting from the memory to stress to our social influence. All these factors influence brain based learning. So, brain based learning is a new science that saves in the learning process. Nowadays it is a major factor, with the emergence of cognitive science. Cognitive science is a composition of psychology, the physiology (physiology that is physiological aspects of the brain), psychological aspects as well as cognitive science.

And mathematics also. So, it is a combination of all these things neuroscience, education, psychology and even mathematics and the mathematical sciences also. So, in cognitive science, a new era has emerged that is a composition of a number of things. So, that is why as you can see there should be sufficient support for effective brain-based learning. Brain needs sufficient nutrition, water etcetera. Feelings can weaken or strengthen the brain. Positive feelings can strengthen it, while negative feelings can weaken it, and new learning is built upon the previous learning. The brain stores the data in more than one place and it processes and gathers the data beyond the awareness of the conscious level. Even if we think that we have forgotten, it might somewhere be there in our backup. All of a sudden within insightful learning or maybe after getting cues, all of a sudden we can we can retrieve it.

So, reflection is an important part of learning. It enhances the information processing. After you study something, when you get back and reflect on it again, this strengthens the information processing. So, it goes in memory systems in the long term memory. So, depending on the processing skills depending on the intensity, the timing and the quality of processing, we acquire the information, retain it and retrieve it in future. But it all of it depends on how we have learned it. What is the level of processing? What is the level of learning? How in-depth analysis has been done? Whether we have used all kinds of higher cognitive skills like reflective thinking, analytical thinking, comprehensive understanding and comprehension. All kinds of things. If you are engaged in all kinds of cognitive processes then definitely the learning material is going to be retained with us for a longer period of time. It will be stored in the LTM.

So, now, these are the 20 different strategies. Also, 20 brain compatible strategies are given here. Anybody can use it, and apply it to enhance the power of brain-based learning. So, now, I am just stopping here and in the next class we will discuss another theory. Thank you.