Hello viewers, welcome back to this NPTEL course on Psychology of Learning. So, in the last class we were discussing about Ausubel's theory of meaningful learning and etcetera. Now, similarly today we will discuss about learning theory that means, instructional theorist's work that is Robert Gagne. Robert Gagne's theory of learning and instruction. And Robert Gagne actually primarily is a behavioristic in motion, behavioristic theorist. And he, but even though he is the one of the behaviorist theories, but he this instructional model he has perfectly blended both behaviorism concept and the cognitive concepts to create the new viewpoint of the instruction and its design.

So, here as he is a he is a behaviorist he formally believes in the learning results in behavioral changes that are observable and how it can be and how it can be captured through instruction in terms of behavioral outcomes. So, here outcomes are actually the descriptions of the learning educational goals because every education course or the curriculum or the system instruction system they have the some certain educational goals. And the so, these behavioral outcomes the behavioral outcomes actually primarily relates to those educational goals or the instruction objectives ok. So, Gagne actually maintains that the cognitive approach is equally important in learning as because learning as it is recognized as an individual's cognitive effort.

Because why the cognitive perspective is equally important even though we measures observable behavior, but the cognitive effort how much effort the learner is putting in the process of understanding and learning the new components that is equally important that is a cognitive perspective is also important very important. And it and learning and learning is recognized as a result of individual's cognitive effort to construct his or her personal knowledge ok. So, now how to plan the curriculum? So, he primarily focuses on the memory that means, we have to plan the curriculum in such a way that in different modules in different groups and chunks in such a way that it should not create a burden on the memory. So, it should not overload the memory. So, that is why his instructional model is it more reflects more emphasis on the emphasis on the thinking and remembering processes ok.

So, he divided actually his theory into three different elements first is that what is the taxonomy of learning outcomes, how the learning outcomes taxonomy will be defined. Then the conditions necessary to achieve those learning outcomes and the third is that nine events of instructions designed to guide the teacher through the process of designing the learning. As you can see these the Gagne's hierarchy of learning these are the nine events these are the nine events that the learner will go through learner will go through from in the in the hierarchy in the process of learning that is the hierarchy of learning. So, as you can see so, five what are these five categories of learning five categories of learning it each require the different types of instruction in order to in order for learning to occur. So, different categories of learning requires different types of instruction, different types of verbal information,

different types of intellectual skills, different types of cognitive strategy.

So, that is why it is named as a taxonomy of human learning capabilities taxonomy of human learning capabilities. So, actually and his theory he combines both direct instruction his theories direct to the instruction that can combine both the behavioral as well as the information processing learning theories. Because he equally gives emphasis on the memory remembering things memory cognitive effort etcetera. So, both the behavioral and the cognitive aspects and he believes that the result of learning are the measurable that is the learning outcomes would be measurable and it can be done through some different kind of practice, training, drilling, immediate feedback all these kind of mechanisms can also be practiced can be used. So, result of the learning can be visible can be measurable through observable or external behavior and learning outcome must have the prerequisite knowledge of the skills that must be identified.

Like for every new learning there must be existing prerequisite knowledge the basic knowledge foundation knowledge. And the conditions of the learning for the particular learning outcome actually the instructor has to identify, determine and use it that is necessary for that type of learning then the different 5 categories of learning for each category of learning the learning conditions instructional objective learning strategies will be identified by the instructor to apply it. So, different internal external conditions are also necessary for each type of learning ok. There are different types of internal and external condition factors environment ecosystem are equally important and the teacher must accomplish at least 3 tasks. So, what are the these 3 you can say mandatory components of this learning process? First is to assure the prerequisite skills.

So, in order to learn at a certain level of certain level certain level or the stages the new any new any category of learning the learner must have some prerequisite and the teacher has to ensure it ensure it assure that it is the learner the present learner has got that prerequisite skills and the past knowledge and he is ready enough quickly he is ready enough to learn the new thing. And supply of instructional condition there should be he should has to ensure the proper supply of the instructional condition both internal and the external and determine the type of learning what type of learning actually and the learner is going to learn. So, that has to be all these 3 things are the mandatory components for the teachers before proceeding making progress or proceeding towards the instruction what is ensuring the prerequisite skill supplying of the instructional conditions both the internal condition and the external conditions and the determining the type of learning in which type of learning actually the learner is going to be engaged. So, these are the framework you can go through I have captured it from so on different sources. Now this is the Gagne's theory of instruction as you can see.

So, here the one thing is from the basic thing is that these there are both the things cognitive aspect as well as the behavioral aspect. So, in the cognitive strategies the intellectual skills verbal information these are the things the cognitive domain is related to all these activities skills and competencies which are also prerequisites. So, taxonomy of learning outcomes it is related to cognitive domain it is related to affective domain and it is also related to psychomotor domain psychomotor domain related to motor skills affective domain it is related to some positive some attitudes positive attitudes that is intention to learn. So, this is one thing and another is that the conditions of learning conditions of learning external both external conditions of learning that is a classroom environment educational environment internal condition is that that is the learners preparedness all these things. Now here the 9 events of learning what are the 9 events what type of 9 events in each event different types of

learning   takes   place   on.

So, he has explained this 9 events of learning like for example, starting from like gaining attention first thing is the gaining attention these are learning sequential events first is gaining attention second is that information informing the learners of the objective that is of the goals educational goals learning instruction objective. Then stimulating the recall of the prior learning that is recapitulating the past learning experiences as a presenting the stimulus then presenting then providing the learning guidance related to particular type of learning content. Then eliciting the performance eliciting the performance producing trying to elicit the performance of from the learners providing the feedback feedback then assessing the performance evaluating that performance giving the feedback then enriching the retention and the transfer of learning. So, these are that means, the whole learning sequence learning event. So, whole learning sequence total learning learning event he has divided into sub events that is the sequence of these 9 events that is we can see this is the progress of the lesson delivery progress the structural framework of the lesson delivery etcetera.

So, here he has so, ultimately the learner's performance will be measured through behavioral outcomes, but at the same time he has also given the when he decides the taxonomy of learning objectives it is also related to both the cognitive affective and the psychomotor domains. So, he has equally blended this cognitive domain as well as the as the behavioral domain and it is up. So, that is a his theory of instruction has been divided into 3 3 things one is cognitive domain another is the learning events events to be type of events the whole sequence are sequence of the events the learning process and the conditions of the learning ok. So, these are all these steps are actually the 9 event events of instruction that is it is going to happen the instruction should follow these guidelines should be carried on through these sequential process of 9 events. So, the so, this is the this is all about the Gagne's theory now we will go to the another theory that is called the instruction theory of Jerome Bruner.

So, Bruner's theory is primarily known as the guided discovery learning theory and Bruner he sees that learner is an active agent and he emphasizes on giving the emphasizes on importance of existing schema in the guided learning. That means, discover guided discovery we have discovered the learner has to discover the thing with the guided support guided support. So, for that matter existing schema is important. So, the learner must have some existing schema in this framework the students should discern for themselves the structure of the subject content discovering the links and the relationship between the different facts concept and the theories etcetera. The student will be given the topic will be exposed to the topic, but the student has to identify and discover himself the link is the type of relationship between different   events   different   facts   different   theories   he   has   to   establish.

So, Bruner actually says that he hypothesized that the usual course on the intellectual development moves through 3 stages again like the he has also developed his own theory of cognitive development similarly. So, Bruner says that this intellectual development actually takes takes place through 3 stages through 3 processes 3 stages one is that is the enactive stage iconic stage and the symbolic stage. So, this is the order in which this intellectual development takes place. So, therefore, the aim of education should be to create that autonomous to create the autonomous learner that is create the independent learner autonomous learner who can independently learn. That means, to helping out to helping out the learner to educating the learner how to learn independently the learning to learn how to learn independently learning to learn that is to prepare the autonomous learner.

So, and the cognitive growth it involves the interaction between basic the human capabilities and culturally invented technologies cultural factors. So, technology and culturally invented technology they act actually acts like a serve like an amplifier to enhance and enhance that those capabilities. So, the culturally invented technologies include not just the computers and the televisions or the you know smart phones etcetera, but the abstract notions such certain abstract notions such as the way of way a culture categorize the phenomena and the language itself. So, here in Bruner's theory so, culture and language it has a significant impact on the abstract notion or conceptualizations. So, it is culturally invented technology means not just technology of computer and television and the smart phones, but how the culturally created culturally curated some abstract notions are there which are being depicted through in the different language in the linguistic format.

So, that is a so, that is a you can say the culturally invented technology along with the interactions, but the culturally invented technology like the culturally curated idea or abstract ideas and notions and the language. So, that is as you can see the discovery learning is an approach to of instruction through which the students interacts with their environment definitely. And by exploring and manipulating the different objects wrestling with the questions and controversies etcetera and performing the experiments. So, when he will be given a novel situation and he will be allowed to discover the type of relationships the controversy the challenges he is facing with this the questions that comes to his mind with exploring with answering all these playing all these things then automatically he discovers his own learning. So, now the things are the language serves to mediate between environmental stimuli and the individuals response.

So, here language plays an significant role because through language only the child the learner can explain can narrate can understand. So, it mediates between this environmental stimuli and the individuals response to the stimulus to the environment to the. So, modes of presentation is that are how the information's or the knowledge is stored and encoded in the memory. So, mode of presentation is that how these information are coded in our encoded in our memory. So, knowledge is created is presented and organized through different modes of thinking like in different schemas, representations, images etcetera.

So, he proposed this three modes of presentation where. So, as per the developmental stages the knowledge is being represented is being created through three modes of representation. One is the enactive presentation that is action based presentation another is iconic presentation in terms of image in terms of image based representation another is the symbolic representation which is the language based representation. So, in the process of learning when we are exposed learner is exposed to different environment different stimuli different things and modes of as and how learning takes place through different modes of thinking. So, how learning takes place? Either we remember it in the symbolic form or we remember it in the image form or we remember it is in terms of some actions.

So, that is the modes of presentation the modes of presentation that is it ends up in representation of the learning that takes place through three things. One is enactive representation which is may be there some experiments some actual you skill training some on the job training some skill based or some experiential learning. So, that is primarily based on actions. So, actions is action based representation will be kept in our memory or iconic that is image based that is image based that is representation is kept or symbolic based means that a language symbolically the language based. So, he suggest that it is effective when the when faced with the new material to follow a progression from the enactive to iconic

to   the   symbolic   presentation.

   For example, suppose when the child is exposed to the new situation and instruction will be effective will be effective when the learning material will be exposed in three modes all the three modes like in the progressive way from enactive from hands on activity oriented to image to the language. So, it will follow the progression from the inactive mode to iconic and the symbolic representation. So, then only their instruction will be effective. So, according to his theory learner even of a very young age is capable of learning by material so long as to instructed is instruction is organized properly. So, that is like you know you can say this the definitely self learning instructional design self learning instruction materials are designed.

   Even if the young boy is the learner is at the very young stage he can learn the things if it is organized structurally organized systematically. So, for example, you can say representation suppose it is a say representation is the enactive. Enactive representation means that at the earliest ages children they learn about the world through actions or the physical objects they are manipulating, they are exploring, they are handling and the outcome of these objects when they are playing with the different toys, different things, different stimulate, different you know gadgets, different things etcetera. So, when they explore all these things so when they are playing with exploring the things etcetera that is the Enaction during that action they try to understand the external world. Iconic representation is that learning can be obtained through using different models of the picture, the imagination, the pictorial formats, those the stories based   on   the   pictures.

   So, in this imagination pictorial imagination and the images and the pictures they will the learning takes place. Another is the symbolic is that when we use the different symbols, represent symbolic either verbally or using the body language or using the gesture etcetera. So, symbolic presentation is that learner develop this ability to think in the abstract terms. For example, we are showing the different body gesture like this to remain silent this way or just to encourage the child by through some gestures or through some language thing you know all kinds of things or in can praising the child with some kind of you know smile or some kind of symbol. So, that also helps the learner to symbolically understand the   meaning   of   that   context   and   the   learning.

   So, as and then the developmental stage enactive mode is from 1 to 0 to 1 year that is the child is in enactive mode stage primarily focusing more on the motor responses. And so, first year of life primarily thinking is based on entirely on the physical activities infant is learning he learns by doing. So, when the children are in the play schools or in the even at home even at home during 1 year by exploring by exploring the different tools, different toys, different things etcetera they learn something. So, encoding this physical action based information and storing it in their own memory. Then iconic mode representation stage takes place 1 to 6 year where the information are stored in terms of sensory images, pictures, icons, visual pictures in mind like for example, all the quadruple animals will be doggies or something like that.

   So, in terms of pictures and the maybe the aeroplanes or maybe the flowers, the fruits in terms of pictures they can they try to remember it. So, here so, that is a is very often between all the diagrams, illustrations along with the verbal interpretations are these are being used for you know for teaching them for exposing them to the new concepts. Then the thinking is based primarily used on the mental images as you can see in the iconic says both going through the pictures etcetera images, books, pictures. And the 7 years onwards slowly and steadily they learn they learn symbolic mode, symbolic or knowledge is stored primarily as the language

like mathematical symbols, the rhymes, then the tables all these things the symbolic way, symbolic forms.

So, language is extensively being used. So, this is a developmental stage. So, symbols are flexible and they the symbolic phase the symbols are very flexible and they can be manipulated, they can be classified into different categories depending on the its purpose, its goal, its actions and images. So, according to Bruner's taxonomy the symbols are arbitrary, symbols are arbitrary and language is important for the increased ability to deal with that abstract concepts. So, symbols are arbitrary it can be we can give it different ways it is not any fixed set of symbols, but it can be arbitrary anything related to as per the preference. And language is very important for abstract concepts when we want to express it the abstract concept language is necessary and language can code the stimuli and it also provides more complex yet flexible cognition through linguistic coding, language using language for representing the different ideas and learning through language we can even code the complex learning content also.

So, the use of words can aid to the development of this presentation iconic and while using the word you can enhance the functions of these iconic and inactive functions because for example, the suppose the child is going through this enactive and the iconic stages, but at the same time when the linguistic development takes place very fast faster linguistic development. So, it supplements it boost its and then this his understanding level of understanding. So, education should aim to create that kind of autonomous learner that is learning how to learn. And so, discovery learning we do not have discovery learning primarily argues that the students should not be presented with the subject matter in its final form rather they should be allowed they should be given opportunity they are required to organize themselves to discover themselves to find out the relationship interrelationships and among the different existing concept items etcetera. And in this process only they can learn and they will be they should be allowed to be an independent learner autonomous learner using all this all these tools and all these representation modes to learn independently.

So, that is it that is the basic things so that means, along with the theoretical content or the content or topic should not be given in the final format. So, it would should be in a rough stage, rudimentary stage, half done stage which will be and the learner will be allowed to explore it further and to find out the relationship and interrelationship. So, that they will be independent learner they can know how to learn so, they can the independent learner. So, that is therefore, the implications are the teacher should facilitate this learning process, the teacher should design the learning process to help the student to discover the relationship between the bits of information and that intermittent questions in the feedback intermittent questions queries should be there questions should be there. So, teachers should be actively involved in the lessons that is called the cognitive scaffolding.

Cognitive scaffolding means which guided learning that means, which will facilitate the learning on the part of the students. So, slowly and steadily giving them the cues while delivering the lesson giving them the cues so, that they can uncover they can find out that they can uncover the type of relationship that is called the cognitive scaffolding. It is a type of support teacher's support towards the learning of the lesson by giving them the support by giving them so, that means, initially guiding and then we drawing the support then giving them the clue the cue word to facilitate the learning process so, that the learner becomes independent. So, scaffolding refers to steps taken to reduce the degree of freedom in carrying out some task so, that the child can concentrate on the difficult skill she is in the process of

overcoming. So, slowly and steadily taking him forward towards the task which is more difficult, but by drawing on the support so, that in this process he can also find out concentrate more on the difficult task become more focused.

So, Bruner he is primarily says that the level of intellectual development determines the extent to which the child has been has been given the appropriate instruction. So, the intensity difficulty level the quality of instruction it should match with the children's or the learners developmental stage. So, keeping in mind whether he is in which stage like whether he is in an enactive stage or the iconic stage or the symbolic stage depending on he is a total completely grown up person then accordingly the instruction material should be learning material should be developed. And the symbolic representation is very crucial for cognitive development because you know language primarily you know not just symbolizes, but language also it explains it narrates and determines the cognitive development it gives that has immense implications and importance in the process of learning.

So, now the Piaget theory, Piaget actually Piaget theory primarily is relevant in case of the intellectual development cognitive development because by observing his own children Piaget has developed the how the intelligence or cognition develops it starting from the birth to adolescent stage.

So, he has developmental stages. Now, he Piaget's learning cycle is includes all these kind of things like in this process of development how the child learns because this assimilation accommodation processes are going on how these how these through these developmental stages the child learns he just gives that depicts that learning cycle. So, he says that the learning cycle of the children they it includes the exploration then concept introduction and concept application phase. So, based on his intellectual development theory he says that learning cycle includes exploration concept introduction and concept application. So, human learning humans they learn by constructing their own learning own knowledge. So, as you can see so, teachers would be should be to motivate the children to create their own knowledge through their personal experience.

So, facilitators who support the learners the teachers are merely the facilitators the mentors the guides who support, but the learners who take control in making the decisions in line with their own needs and cognitive states. And he advocated the non interventions saying that everything one teacher needs and teaches a child they prevents him from inventing or discovering again he primarily also thinks that the children should be allowed to explore their own environment. Because in the process they explore then they explore the environment they form they form different kind of schemas, schemas that means, ideas and concept and the more they expose the environment they more they more discover new things then slowly they changes their schemas existing schemas and modifies it to new schema that is in the process of a simulation and accommodation. And whenever the child explores the environment he whenever he faces any kind of difficulty any kind of hurdle any kind of challenge. So, automatically it creates a kind of disequilibrium.

Equilibrium is just a state of balance state of mind ok. When he is confused he is puzzled then disequilibrium states is being created. So, in order to resolve that in order to resolve that tension and the conflict etcetera again he tries to explore further so, that to restructure his own schema. Initially he will try to assimilate it oh so, that is why you know the best example you know initially at the very young stage they said every bird every birds are flying.

So, all the flying objects are birds. So, initially the first time whenever he sees that it is a aeroplane he cannot understand that aeroplane is something different, but he said it is a big bird or maybe that he can identify the same doggy all all the to with all the quadruped animals. But slowly as he grows up as he grows he discriminate, discriminate he find out something different like the dogs barking and the cows mow it is something different the the their sounds are different their you know their foods are taking different. In this way he try to differentiate then slowly that it this kind of differences creates a kind of disequilibrium and in order to resolve that tension and conflict he again more difference. So, this assimilation and accommodation process is ongoing process with this equilibrium and disequilibrium as you can see the equilibrium is balance state of time the moment the moment he is engaged in a simulation equilibrium is there, but the moment he faces something different something new disequilibrium creates. So, that disequilibrium actually then moves towards takes in takes him forward towards accommodating or developing changing the modifying the schema and the creating   the   new   schema.

So, that is why he advocated for the non intervening type of things that means, they should be given enough freedom and enough freedom. So, let them develop the knowledge through their active participation in the environment and build their own knowledge through experience and this this these mental mechanisms internal mechanisms is an ongoing it is a inbuilt inherited that been implicit in inherent that implicit mechanism that is that exist in every in case of every human being and with the help of this mental then experience will have them in building the mental models. So, that will that that will be further be developed through the simulation and accommodation when they keep on working on the cyclic way of learning. So, with the more accommodation with the new schemas will be developed in this process they will then no more knowledge model and knowledge model or mental models will be created. So, here you can say as you can say the process of equilibrium is a state of balanced state of mind the moment it is disturbed then it is and in this process of equilibrium it is a cyclic way a simulation and the moment it is disturbed disequilibrium equilibrium creates created then then again that you know pushes the child to learn something new that is accommodation   takes   place   and   new   concepts   came   as   a   result.

So, his theory is primarily developmental theory and he is he also believes in the in the exploring the environment discovery kind of learning. So, instructor should not give any kind of pressure on that, but it is primarily relevant for the pre learning school pre learning stages of education up to the child up to the school level learning primary school level of learning children, but for the high level of instruction that is this theory may not be that much of relevant, but again, but yes how to how to you know how to enhance or encourage the encourage the independent learner by exploring themselves and this assimilation accommodation process also it also happens in case of adults also even in our case also as the adults case also whenever we visit new place new country new thing we try to find out relate it compare it with our existing practices existing knowledge. The moment we recognize that it is not like that then we change it similarly the same mechanism also takes place in humans because it is the inherent mechanism inherent cognitive mechanism. So, and in case of children it primarily takes place because they have the limited schema the by the time they have 1 year or 2 year they have limited experience limited schema the more they explore the environment the more schema they develop. So, and this is this is the stages given widely thing like for example, the concept you know the instruction should follow this concept introduction phase, then concept application phase, exploration phase, the students interaction in the with the   learning   material.

So, this is the phase through which the learning materials will be instruction should be done and this in between how this evaluation and discussion will be carried on. So, before the when the very young children they are able to process the information at the concrete number he has given the different stages you know sensory motor stage pre operational stage concrete operational stage in the formal operational stage when the child reaches the formal operational stage actually they are in the adolescent stage. So, from there they onwards they can think of abstract thinking, abstract concept, reasoning, abstract reasoning all kinds of thing. So, at the stage of formal operational stage the children they can just learners they can built up the built up the hypothesis for problem solutions problem solutions, then hypothesizing abstract conceptualization of the ideas all these things. So, all these difficulty higher level of cognitive abilities   developed   over   time.

So, this is the Piaget's learning model as you can see the schemas, schemas with the new situations this disequilibrium takes place this disequilibrium takes place that instigates accommodation, but with the accommodation, but with the existing schema equilibrium is there that is being promoted by the simulation. And when again a simulation when he face the new situation again and new situation again this disequilibrium takes place and that from the accommodation to again he try to strive to achieve the equilibrium. So, and again this equilibrium again accommodation. So, this is an ongoing process from the equilibrium is that whenever he is happy with the existing schema that is a simulation he could solve the he could identify the schema with the within the assimilation process then equilibrium equilibrium. The more he is exposed to new schema, new concept, new stimuli, new environment then this disequilibrium starts the tension some conflict with the disequilibrium then automatically that strives to understand and understand and try to familiarize a simulated with the existing the moment he could not do it then he said no it is something different then new schema develops with   the   new   schema,   new   situation,   new   concept   develops.

So, then again with the new concept again it has been it will be added in his repository it is mental model repository a new schema, new concept. In this way conceptual development takes place the more and more concepts are being developed by the child with the more exposure more experience with the developmental stage. So, but this, but this equilibrium and in disequilibrium processes are the processes are the mechanism through which the again assimilation and accommodations are you know at the process mechanism to satisfy to get the solution. And in this process of assimilation, accommodation and equilibrium and disequilibrium, equilibrium it is a cycle learning cycle in this process new concepts are being formed and learned and saved in the repository. So, this is all about the same thing the whatever construction model that has been narrated here in the you know as per the type of instruction.

So, it has been given here, you can go through. But in the next class, we will be discussing about the different instructional pedagogy. And this is all about this course. These are some of the references I have given you. You can go through it for understanding the instructional approaches. Thank you very much.