

Scientific and Technical Literature
Information Technology
Unit V
Lecture 1

Introduction about IT

Information technology has brought in a sort of revolution to the modern world. If information technology fails, I think the entire world will come to a standstill. So, that is the importance of information technology. You might have seen an office, a very small institution using computers and using information technology and using several softwares. So, information technology is very much important. Now, let us try to understand what is information Technology?

Technology is a sort of application of some science for the wellbeing of the human beings. So, here information science is available and how information science could be made use of for developing technology that is called Information Technology. Now, when you think about information science, you must know what is information and what is science as well. Science is the systematic study of anything in this world. So, any systematic study of information is called Information science. Then you may ask the question, "Do we need information at all?", but according to me, without information, no human being can live. No human being can prosper, no human being can do any activity in this world. To do any activity, you require information. In the sanskrit sastra-s it has been very clearly stated - 'Jaanaati Ichchati Yatate', every human being has to do some activity or the other, when he is awake he cannot stop his activities. The activities may be mental or physical. Even if somebody is sitting quiet, his mind will be thinking about something, so the mental activity will be going on and the physical activity will be going on as well. If you want to do any activity, you require information. In the sastra-s, it is said, 'Jaanaati Ichchati Yatate'. One knows and later he tries to do something, he desires to do something, that is Ichchati. The third one is, Yatate, he tries to do whatever he has desired. So, when we are doing some activity or the other, first there is a knowledge of that particular activity and there is a desire to perform that activity and ultimately, we do that activity. So, these are three stages in any activity.

Now, when you think about information, what is information? According to me, in the olden days, it was called knowledge, it may be called in several other ways like; Cognition, Ideas, Knowledge or Experience etc, all these are modifications of consciousness only, according to vedanta. Any information is an idea or the cognition you get. So this information has to be processed. To process the information, the information science has to be developed. Then, how do we get that information, that is also mentioned in the sastra-s. They say; "Aatmaa manasa saiujjate. Mana indriyena Indriya martyena. Tatah pratyakshma." When you want to know whether there is a car present here or not, what do you have to do? You must have the desire to see the car. So, your consciousness will get connected with the manas or mind, which has got the willpower to do something. Then what happens? Mana indriyena, the manas or the mind will get connected with the sense organ and the sense organ will get in contact with the car. Then you will say that you perceive the car, "Yes, there is a car here!" So, generally when a perception knowledge takes place or a perceptual information comes to us, it comes through this particular channel. This has to be understood very clearly.

Next happens is, how do you get the information? Whether we get the information, the right information or the wrong information, that is the problem. Wrong information is called the Bramaa whereas the right information is called Pramaa. Pramaa means real knowledge. I will give you one or two examples to establish both these things. You see a rope and you understand that it is a rope, then you say that "I am seeing a rope here." Then it is real knowledge and it is called Pramaa or it is knowledge according to my own experience. On the other hand, if you mistake the rope for a serpent and then you say, "I am seeing a snake or serpent here". This knowledge is called Bramaa or erroneous knowledge or unreal knowledge. That means, there is no correspondence between your knowledge and the object which exists in front of you. So, we come to the conclusion that it is erroneous knowledge. So, any information we get, should be correct information or it should not be erroneous. To get that particular information, what are the methods that are mentioned in the sastra-s. These are one of the important points to be understood by us.

So, Sastra-s say; "Pratyaksha Anumaana Shabdakhyaani treeni pramaanaani.". They used the word Pramaana, pramaana means valid knowledge. When you want

to get valid knowledge, you require means also. How many means are there to get a valid knowledge and how many varieties of valid knowledge are there, these are also discussed in the Sastra-s. First, they also mentioned that there are two important things in this world; Pramaana and Prameya. If you want to understand all the things that exist in this world, you can think of only two things, one is called the Pramaana and the other is Prameya. Pramaana means, means of valid knowledge or the instruments of valid knowledge. Prameya means the objects of valid knowledge. So, the entire things that exist in the world, can be brought under these two categories namely; Pramaana and Prameya. This is a very important thing to be noted. in the meanwhile, what happens is, interaction between pramaana and prameya, one more thing comes in i.e; the valid knowledge or the resultant knowledge. You should also add one more thing, when it comes to information science, probably the western science and western systems of philosophy have ignored this point. When you say that there is something to be known, there is also a Knower. Without the knower, they cannot be any knowledge and thereby anything to know. That's why, Vaachaspati Mishra, in one of his works, very beautifully he states, "Samvid eva hi bhagavati vastupagame nah saranam", if your consciousness is black route, probably you are not aware of anything in this world. When you consciousness is functioning, then you know everything and you can know anything also, it is possible. So, the knower is a very important person in the information science and western science has very much ignored the knower i.e the subjective element of the knowledge. There is a subject and also an object, if there is an interaction between subject and the object, there will be knowledge or the resultant knowledge will come into existence. So, it is called Gnaana Triputi - the knower, the known and the knowledge; Gnaataa, Gneyam and Gnaanam, this is a very important thing particularly with regard to information science as mentioned in some sastra-s.

Types of Pramaanas

When you think about the means of valid knowledge according to the Sastra-s; Pratyaksha, Anumaana, Shabda. There are three main valid knowledge namely; Pratyaksha i.e perception, number 2 : Inference i.e Anumaana and then Shabda, it is called Verbal testimony or the statements in the form of language. I will come to the part of language later. Now, when you think of these three things, we must first understand what is Pratyaksha. Pratyaksha means that which is generated by means

of the sense organs, it is called sense perception that means that the perception can only happen when there is a contact with the sense organ with the object. Then how many varieties of sense we have according to sastra-s, it is chakshuhu, shotra, granhaa, rasana and tvak. Chakshuhu means the eyes, most of the time when we say sense perception, we refer to the perception of eyes i.e ocular sense perception we only refer to. That means, when there is contact between eyes and a particular object, then there is sense perception. According to western science, the story of perception is piecemeal, it is not complete because there have got different stories and there are different people who read stories of perception. According to a physicist, what happens? When you see a particular object, the image of the object falls on your retina, it is an inverted image but according to some mechanism, you can see that the object has not inverted. This is the sense perception according to the physicist. Suppose, somebody is opening their eyes but he is unconscious, then also the image of the object falls on the retina but he is not able to see, then physics cannot answer this question. Then comes the neuroscientist, he says that when the image of the object falls on the retina, there are certain sensations created through the nervous impulses created, it reaches the brain and then you will see that particular object. Over here, he stops the story of perception, then comes in the psychologies comes in saying, what happens to the brain etc and how you perceive it. Ultimately what happens? All these people have completely ignored their consciousness. According to Plato, what happens is you cannot see the original object at all because when you see a particular object, you are having contact with the image of the object only not with the object at all. So, it is a sort of indirect perception according to him and he says even the objects which you see or which you perceive have to be inferred. This doesn't seem to be a very interesting theory or it is not a convincing theory also. On the other hand, what we do in this world is, we have a direct cognition of the objects. So it appears to be shakshat or direct. So, from that point of view our shastrakaras, explain it in a different way. This consciousness is just like what is stored in our reservoir, it is in our soul and when the gate of the reservoir is opened, the water flows out, then it actually goes through different channels i.e the mind, then the sense organs and ultimately it reaches the object. So, when the water goes out through the gates, then flows through the channel and then, spreads into different fields, it attains that particular shape. So, from that point of view what happens is, your consciousness is cast in the form of that particular object. If it is cast in the form of the particular object,

then you are sure that you are seeing the object or you are having a direct experience or direct cognition of the object. So, from the point of view of Indian systems of philosophy. The perception starts from the subject and goes to the object, and comes back to the subject. Whereas, from the point of view of western science and western theories of perception, the object is very important, the perception begins from the object i.e the image of the object falls on the retina. Then the impulses are carried to the brain and then later, something happens in the brain, some neurons are fired and then you feel that you have understood something. So, this is how it is, the system of a human being is almost like the system of computers. There are several ways of feeding information to the human system. There are mainly five ways of feeding information to this human system; in the sastra-s they call it perception, and they say that they are five types of perception because there are five types of sense organs. Earlier, I mentioned that there are five sense organs namely; Chakshuh, Shrotra, Granna, Rasana and Tvak. Chakshuh means eyes, shrotra is ears, Graana is the nose, Rasana is the tongue and Tvak is sense of touch or the skin. But these are all not the sense organs, they are the crude forms of the sense organs. According to sastra-s the sense organs are infinite symbol or very subtle and they are located in these places. So, many a times we get the perception by means of our eyes, it is called Chakshusha- Pratyaksha or ocular sense perception. Any object we see in this world, is an object of our ocular perception and when our eyes get in contact with a particular object, they get this perception and the emerge in knowledge is the presence of some object in front of you. Then, Shrotra or the Ears, so, in the ear there are eardrums and through the ear drums, you will able to listen to certain sounds and this is called Shaabdha-Pratyaksha and this Shaabdha pratyaksha takes place because of the sense organ that is located in our ear drums, which is very subtle. Next, is Graana. So, this is called olfactory sense organs. They are the mucus membranes in your nose. Through the mucus membrane, what you do is, you try to smell and there is a subtle sense organ that is located in the mucus membranes and directly gives you the sense of smell which is further taken directly to the brain. This is the third variety of perception. The fourth variety is Rasana or the sense of taste or the taste buds that are located on your tongue. When you want to taste something, you just lick it and you will get the taste. This is called Rasana pratyaksha or the perceptual knowledge of the taste which is acquired by means of the sense organs that are located in the tongue and it gets in contact with the

particular object, you can taste. The fifth one is Tvak or the skin, it is called textual sense organ, it is spread all over your body and when anything gets in contact with your skin, immediately you will feel the sense of touch. In this way, you can feed the information into your own system in five ways and that is how you have got different types of perceptions. Here, very important thing to be noted is perception also means resultant knowledge is also called perception, in sanskrita, it is called Prayaksha Pramaana and Pratyaksha Gnaana, both of them are termed Pratyaksha but you must be able to distinguish between the means and also the results. So, pratyaksha gnaana is the result and pratyaksha pramaana is the means. So, pratyaksha pramaana ultimately means aksha is a sense organ, Pratyaksha means the contact between the sense organ and the object. That knowledge which rises with the help of contact between the sense organ is called Pratyaksha. This is about Pratyaksha. Then, our shastrakaras also mention about another pramaana or the means of valid knowledge which is called 'Inference' or 'Anumaanaa'. Many a times, in the local languages, Anumaanaa means doubt, so you must not mistake it for doubt. Inference means that it is a sort of speculation based on certain reasons. So, this Anumaanaa pramaana is a very very important pramaana, it is based on Pratyaksha Pramaana, that means you see something, based on that you infer something/ speculate something. Let us say, you are passing through some street like Anna street in Chennai, you see a huge building in front of you and suddenly you see a smoke, a column of smoke emerging from that building, what would be your immediate reaction? You say, "Oh! Something wrong must have happened, probably the building is on fire!", immediately you get alarmed and give a ring to the fire brigade etc, how did you come to the conclusion that the place is on fire ? You didn't see the fire. On the other hand, you just saw the column of smoke that was rising, if that is the case, how can you accept the presence of fire. For this, the Shaastrakara says, this is called the inference or the inferential knowledge you have acquired by means of inference. For that very important things have been mentioned in the Sastra-s, many a times you have seen smoke and fire together, it is called 'Vyaapti', "yatra yatra doomah tatra tatra agnih", wherever there is smoke, there is fire; this is called Vyaapti or invariable concomitance. Whenever you see smoke, your immediate reaction is, that there must be fire here. You have seen this several times and when you see some smoke or some column of smoke emerging from a huge building, in Anna road, Chennai, immediately your conclusion is; "Yes, something must have happened.", so, the building has caught fire. So, this is

a sort of speculation but this speculation depends upon 2 or three important aspects. First and foremost is you see the smoke, this is perceptual knowledge, because there is contact between your sense organ and the object that emits the smoke. After you see the smoke, then you infer the presence of fire, what goes on in your mind, probably this is called as knowledge engineering, I will not get into its details, probably some other lecturer will be able to speak to you about knowledge engineering, particularly with regard to inference. So, when he sees the smoke, immediately he remembers the invariable concomitance or the coexistence of smoke and fire which he has seen in several places, that is his experience, then he comes to the conclusion that here also he sees smoke and because of the presence of the smoke there should be fire also. So, ultimately he comes to the conclusion that there is fire here. This is called the inferential knowledge. Two important things are to be noted, there is contact between the sense organ and the smoke which is the object, which is perceptual knowledge. Based on this perceptual knowledge, you come to the conclusion that there is fire because there is no contact between the sense organ and the fire. So, it is speculated or it is imagined or it is inferred. So, the knowledge of the fire in the building after seeing the smoke, is called inferential knowledge, it is called Anumaana Pramaana in Sanskrit.

Then there is one more Pramaana that is called Shabda Pramaana, Shabda Pramaana is the use of phonetic sounds to convey some information to other people, it is called shabda pramaana, ultimately it refers to the language only. Only human beings are endowed with this capacity, they can speak to other and they can convey so much of information. When a person goes to America, your friend, he speaks from there and he says that he is at Niagra falls and that he is witnessing a beautiful scene and that the falls are beautiful. Do you get the information or not? Not only do you get that information, do you believe that information or not, that is the most important thing. suppose there is a person who always speaks lies and many people say, I am in America or in order foreign destinations, etc. There will not go out of their village also most times and such a person says, I am seeing Niagara falls you would only reply, "No, no, I cannot believe that.", as your trustworthy friend who has gone to America and he says that he is seeing Niagara falls right here, immediately your response would be "Wonderful! I Should have been with you.", So, the statement of a trustworthy friend is called Shabda

pramaana or the means of valid knowledge. It is called verbal testimony in shaastra-s or it is translated as verbal testimony in the philosophical context. So, it is called shabda pramaana. Generally, in the shaastra-s this is the example given, there is a person who is in Madras, let us say and his wife has gone to her mother's place and she has given birth to a child and then the father-in-law of this person rings up from there and says " Putraste jaatah", you have been endowed with a son, a son is born to you. Then this son will be very happy because his father-in-law is a very trustworthy person, his statement should be accepted and immediately he gets the cognition of getting a son or immediately he gets the knowledge of having a son. This knowledge is also very important and it is called Shaabda Gnaana or the knowledge obtained by means of phonetic sounds used in the language and the means of the Shabda Gnaana, it is obtained from the sounds, means for this is shabda or the sounds that have been used in the language. So, there are three pramaanas that are accepted in the Shaastras, it is called; Pratyaksha, Anumaana, Shabda.