Management Information System
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Lecture - 7
Impact of IS on Management – 1

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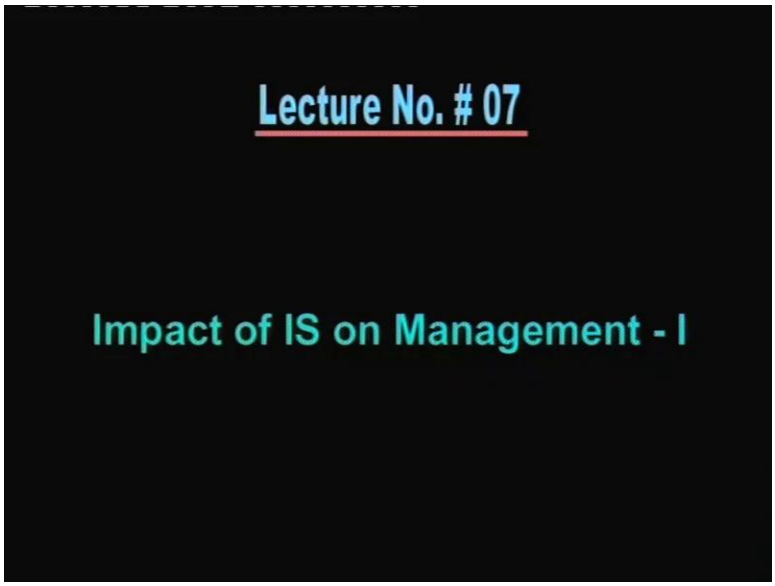

Management information system, as we all have seen is an interconnection of three basic concepts that of management information and system.

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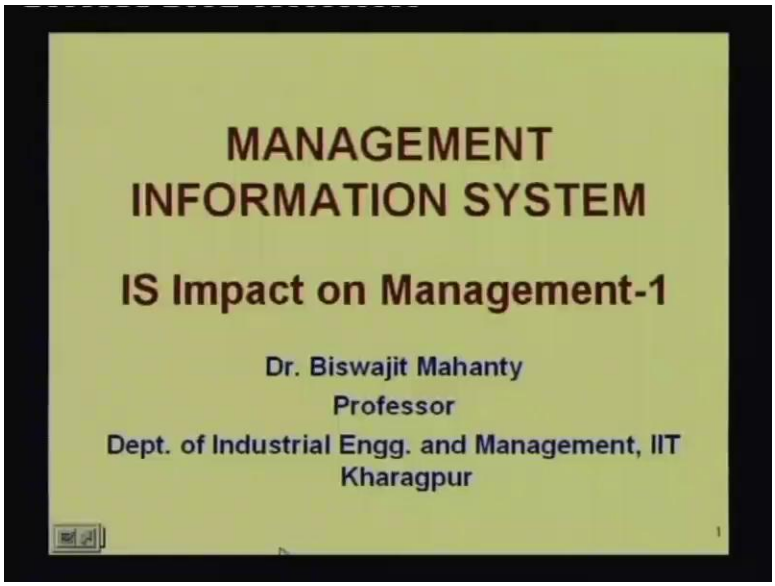

Obviously just understanding these three concepts are not enough. We have to also understand how these really combine together to make an information system. However we have already seen the impact of information. I mean what is information and its impact on management not from the concept of information point of view. Now today let us try to see that if we have an information system in a particular organization, what is its impact on the management process?

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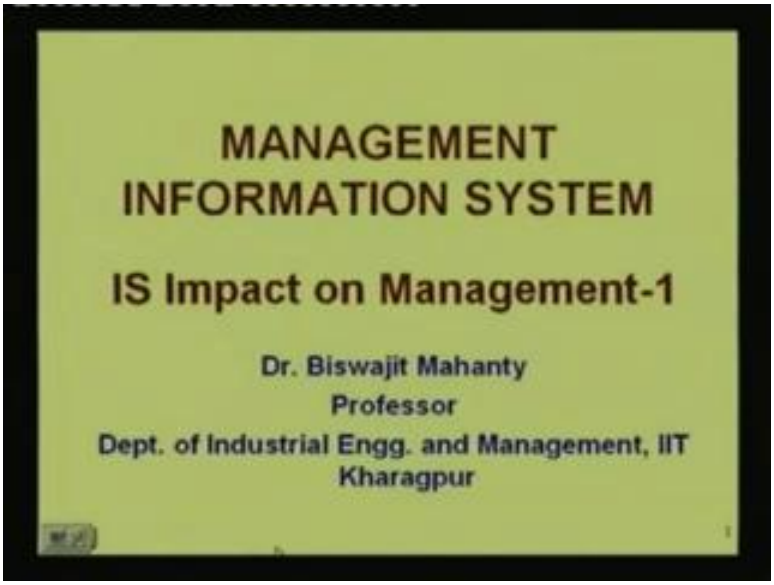

So let us begin today a new concept called information system or in short IS impact on management.

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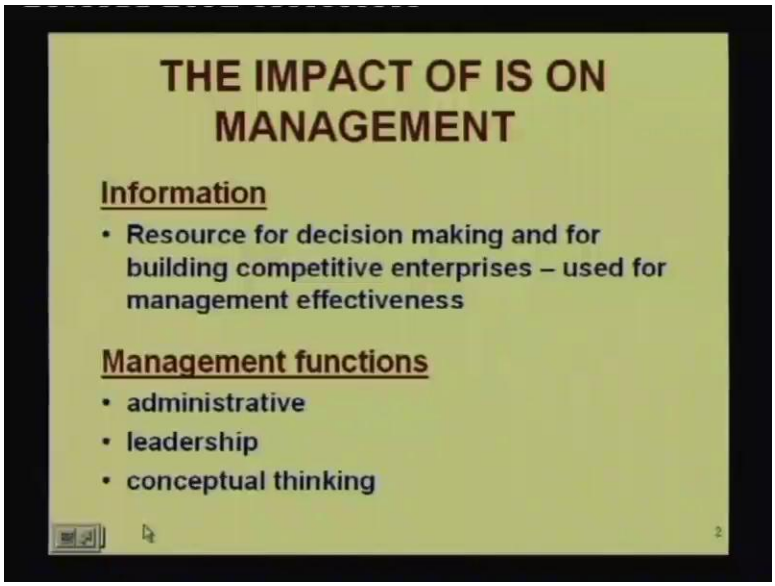

Now we can see that the impact first let us see the basic idea of what is information once again. So, information is resource for decision making and for building competitive enterprises used for management effectiveness. Once again stressing on the fact that information should help in decision making information should help us in building a competitive enterprise and for management effectiveness. So that the management can actually carry out its activity in the most effective manner, now management has got different functions like administrative leadership conceptual thinking and so on.

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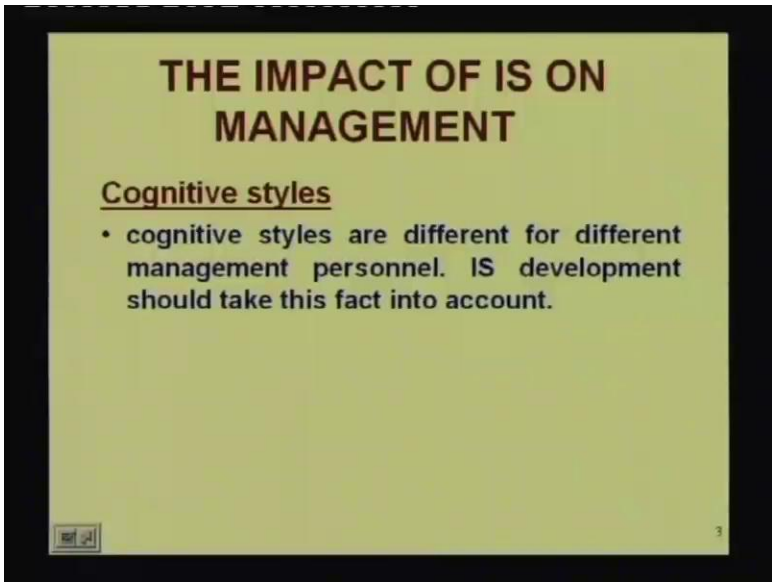

So let us see various things the first one is the cognitive style the cognitive styles are different for different management personnel. Information system development should take this fact into account; we shall later on see how the difference in cognitive style makes different impact of information system on different management personnel. We shall see that later.

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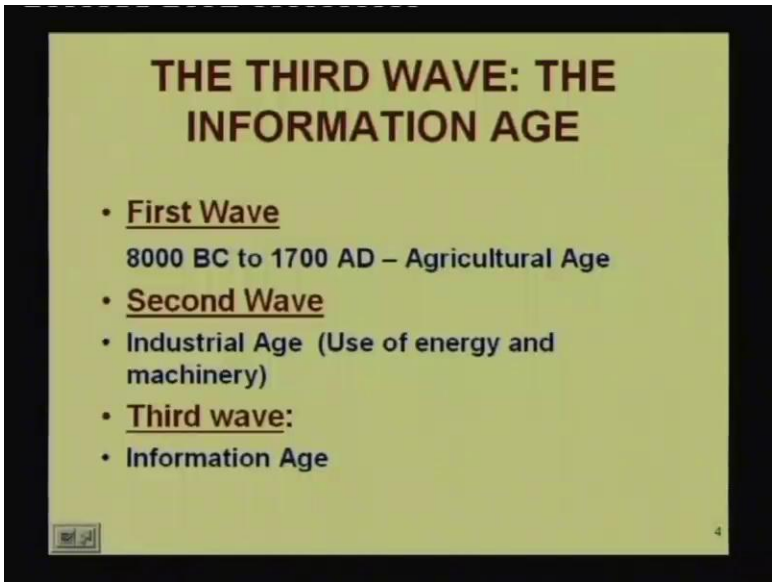

But at this point let us see the various waves of information age and how management has reacted to the different information ages different ages. Now we can broadly divide the information age into 3 waves as per Elfin Toffler. As Toffler have said in the first wave that is from 8000 BC to about 1700 AD can be broadly classified as agricultural age. Now in the agricultural age information did not play a major role and essentially we have seen that during the first wave really the information systems were not at all in place. In the second wave that is in the industrial age we have the use of energy use of machinery. So whenever you have to have the use of energy and machinery naturally information has a played an important role but not so much as in the third wave which we can actually define as an information age.

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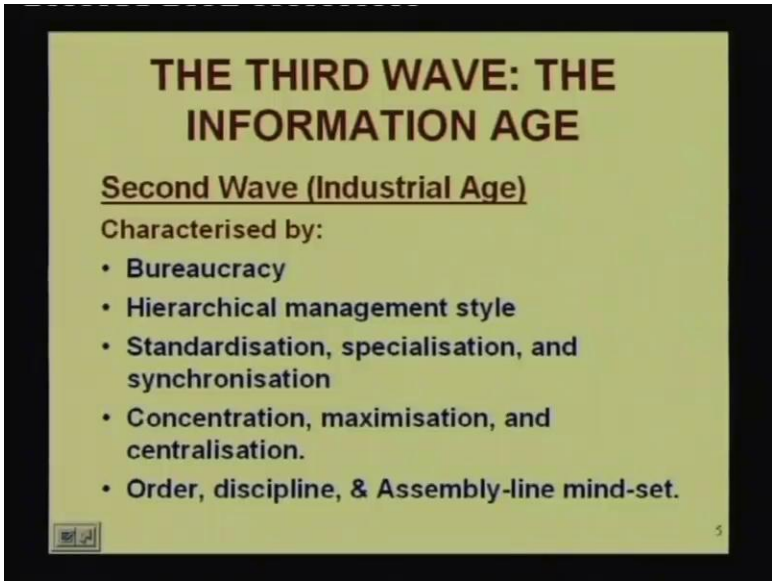

Let us see a little bit in some more detail some characteristics of the second wave that is the industrial age. In an industrial age broadly we have seen it was more of a bureaucratic kind of management system a hierarchical management style. That means a vertical organization where the line plays a major role. That is you have like a military organization you have a very defined line of command. Standardization, specialization and synchronization plays a big role then concentration maximization and centralization. So the power because if you have an hierarchical structure that means ultimately everything moves towards a single top as if in a line right. So

naturally the power will be concentrated they optimization will be that of maximization and definitely centralization.

The decentralization does not play a big role then order discipline and an assembly line mind set right that is what used to play a big role. So usually in the industrial age we have seen massive organizations very large organizations and these very large organizations. They are you know playing a very big role with a very smooth line of command and standardized products. So it is a massive unit and you know you have what you call as economies of scale right. When you produce in large scale mass production then the product becomes more viable and it does that much better in the market. So that is what happened in the second wave and in the, with these you know specific thing that is we have seen in the second wave. Let us see how things have changed in the third wave where we are.

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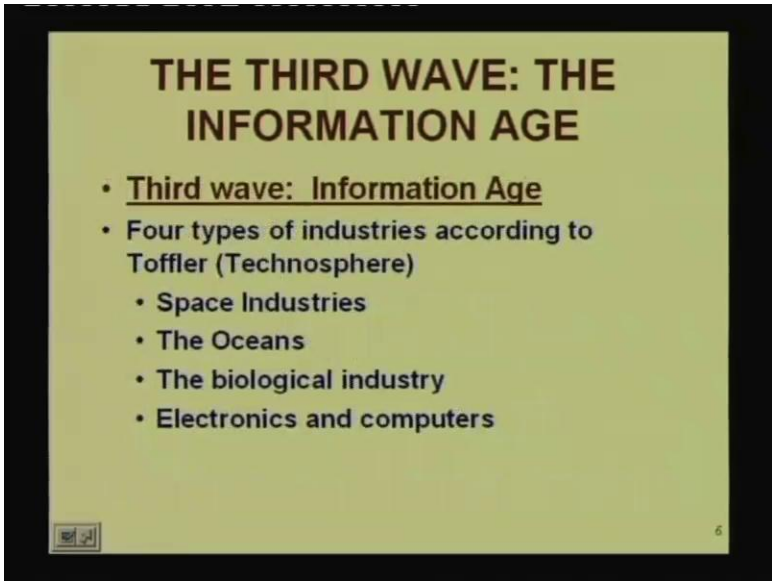

Basically Toffler has identified 4 types of industries in the technosphere. The space industries, the oceans, the biological industry and electronics and computer. According to him these are the 4 different what do you call industries which are the industries of the future.

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But that is not so important. What is more important is in the infosphere as described by Toffler what are the things that are going to happen? Some of the things information would be demassified local or regional newspapers cable or television would be a reality because ultimately people want although the global concept is very important but every organization or every person ultimately has to act locally. So think globally and act locally and if you have to act locally you have to understand or you have to obtain the local scenario. So therefore people would be more concerned about their immediate environment. So there will be local original newspapers, cable television, then there will be personalized information system CBIS for business and then working hours. Accordingly because it is like you know you are carrying your office in your head.

So if that happens there is no need for you to be tied down in your office until unless you are a manual worker if you are a person who are not working manually basically a white collar job essentially you are working through information processing passing information processing information in various ways. So if that is what you are essentially doing, it is not necessary to be tied down to a physical position, so you can actually work from anywhere. So you can actually work from home as well so there could be flexibility in working hours there could be diversity in the compensation the pay packets can be different for different people. Personalization is

possible the management style would be more of participative matrix kind of organization and there will be major shifts in the third wave thinking that of decentralization the standardization may not be so important anymore. The variety of the product could actually increase tremendously so all these things could be a reality.

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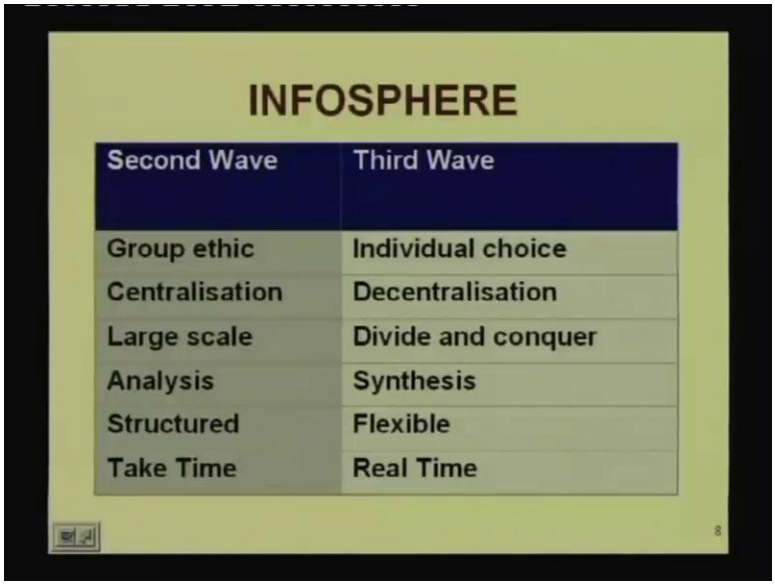

So broad differences here it is identified between second wave and the third wave you can see that in the second wave we have the group ethic a more of group thinking. Whereas third wave the individual choice, second wave centralization. Third wave decentralization large scale versus divide and conquer then analysis verses synthesis, structured verses flexible, take time verses real time. So essentially if you have information quickly then you can personalize using information you can increase variety you can think of product you can think of more personalization. You can use information for a competitive advantage because ultimately if you let us say if you have a product which is let us say, shoes take a beautiful example of shoes. Because you know although we buy readymade shoes but essentially we all feel that if the shoe would have been slightly different.

If you would have fitted me better I would have felt more comfortable why not the shape becomes little bit this way that way. However this personalization may not be possible because

of mass production of shoes and again you see that if mass production is not there the companies would not be able to make profits. So how you can bring in mass production as well as personalization? See this is where the challenge is and this is possible through quick collection of information collection of individual data grouping them together and then decentralizing the production. Again you know naturally if a person is not very uncommon. There will be many like them and you can actually do certain amount of personalization. If that is done through quick information processing information collection and resulting physical system to work in the most efficient manner and effective manner.

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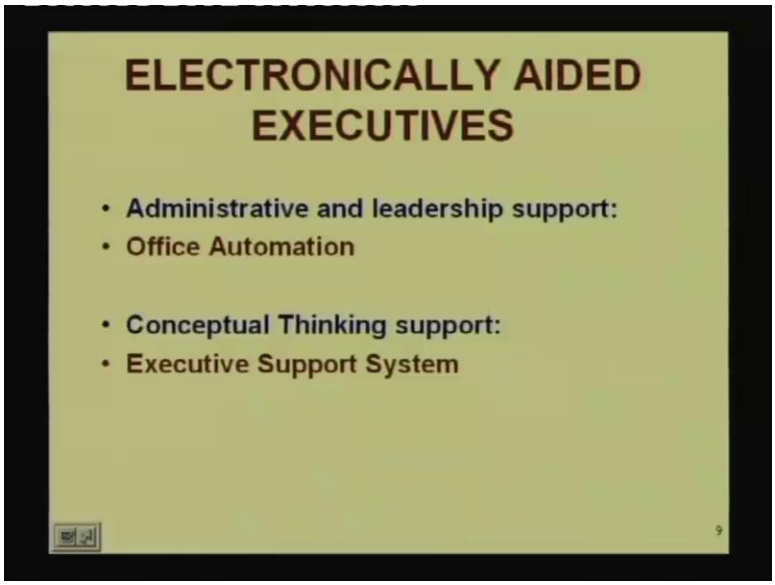

Then we see that executive should therefore be electronically aided. Now essentially two information systems as we have already identified are very important here for administrative and leadership support. There should be office automation and for conceptual thinking support there should be executive support system. So office automation as well as executive support system should play a very big role to electronically aid the executives. So what should be the requirements?

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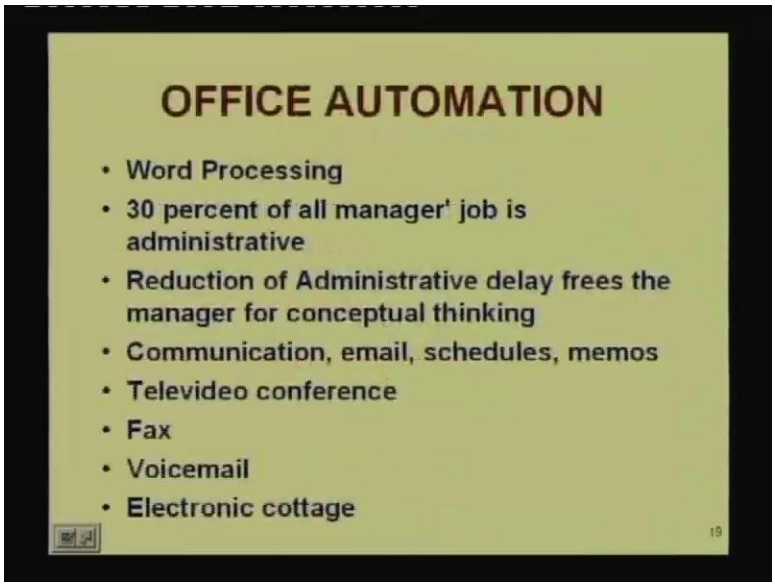

Let us see for office automation there should be word processing and we know that 30 percent of all manager jobs are essentially administrative. So basically there should be reduction of administrative delays that should free the manager for conceptual thinking. There should be communication the email schedules memos. Then there should be tele-video conference the facility for fax voicemail electronic cottage. So all these various facilities you can actually give through the office automation. In other words all the administrative delays can how can information system cut all these administrative delays through various methods by which this is possible. So this is essentially in the domain of office automation all right. So it is all administrative support and how these kinds of different information system help in cutting down administrative delays.

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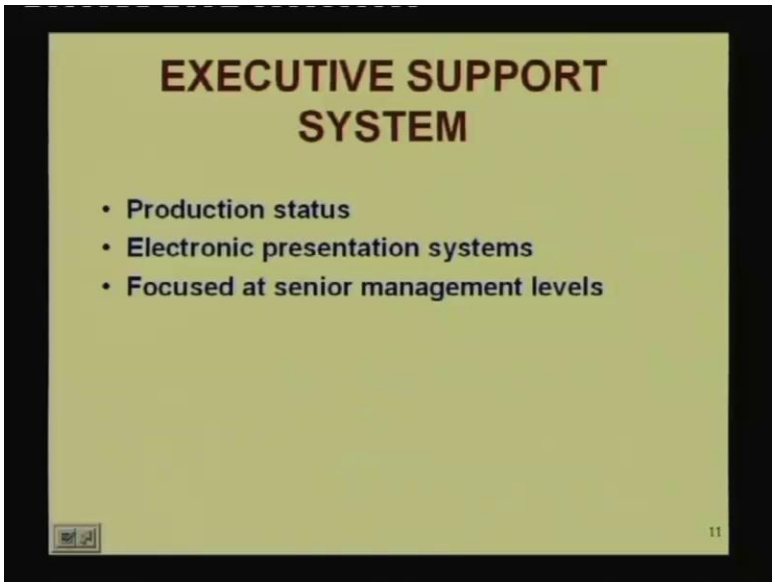

The executive support system on the other hand can help in obtaining, let us say production status quickly, electronic presentation systems, focused at the senior management levels right. So executive support system as I had given an example in our earlier discussions that it should be having the complete information technology support of the company at the board room level right. So if the top executives are sitting at the board room, then how can the complete information system including all data base that is available. The entire information support can be made available through telecommunication networks or through advance processing at the board room.

Now for that you may have to build advanced very high what do you call net speeds of network speeds and so that the servers are accessible from the board room to the individual company sites. Say for example the people want to know why the sales are so low in a particular district so complete information sales man wise to be present at the board room then and there. So it requires the online connection to these concerned servers immediately bringing down the information drill down to that level and quickly shows the summarized report not the detail data. But summary because the board room people they do not have so much time.

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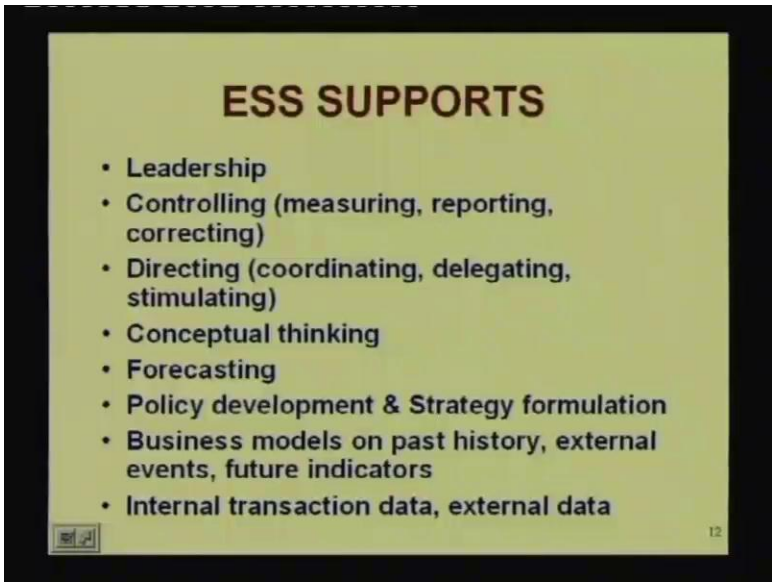

Then certain executive ESS support could be in for leadership for controlling, measuring reporting correcting for directing that is coordinating, delegating and stimulating, conceptual thinking in forecasting in policy development and strategy formulation in business models on past history, external events, future indicators, then internal transaction data and external data. So, all these different kinds of supports are really possible for executive support systems.

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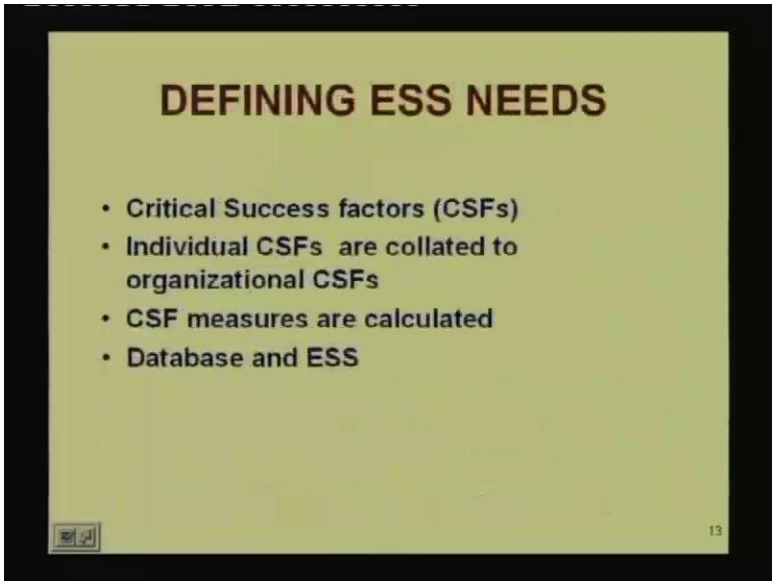

Then if we are interested in defining the needs of an executive support system, we need to obtain the so called critical success factors CSFs. The individual CSFs are collated for to obtain organizational CSFs. The CSF measures are then to be calculated and using them we have to go for the data base and the ESS. So if say from every organizational unit they have to identify what are their critical success factors. So if this critical success factors can be obtained and we could collate them all we get what is known as organizational critical success factors and these critical success factors. If we actually put everything together we know that what are the needs? What kind of information support we actually require in the form of executive support systems and data bases that would be vital or very important for the organization to succeed. So how to discover critical success factors?

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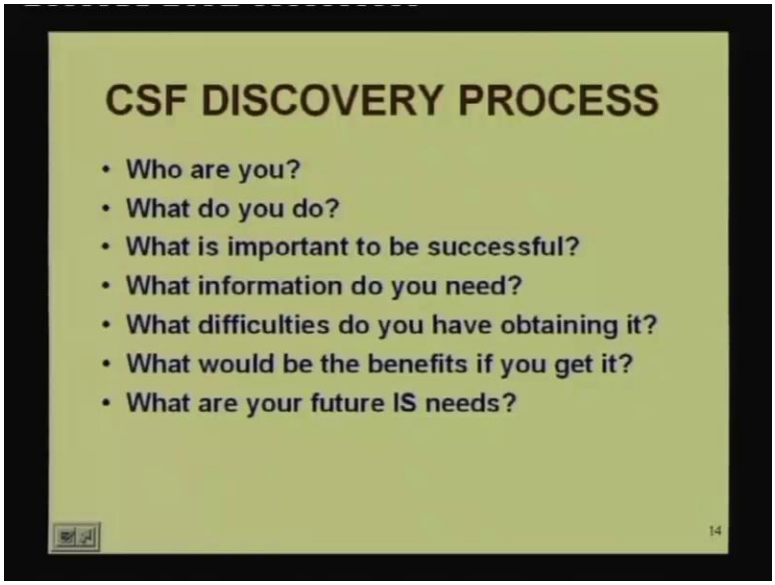

Some of the very important questions are here. Who are you? What do you do? What is important to be successful? What information do you need? What difficulties do you have obtaining it? What would be benefits if you get it? and What are your future information system needs? Right. So these are all series of question who? What? What information? What difficulties? What benefits? and what IS needs right? So if these questions are answered by executives across the organization and the organizational units they can discover the critical success factors for the information system which we would like to develop.

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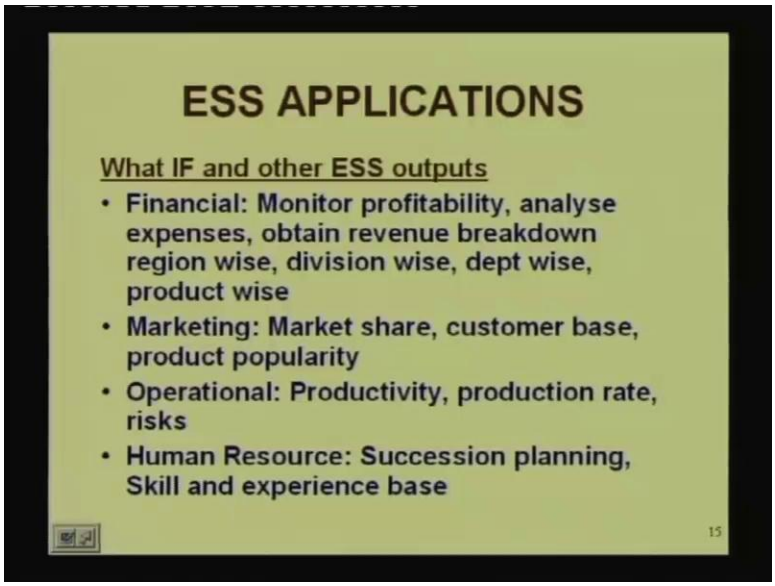

Some of the ESS application examples basically sometimes the ESS applications are what if that means what if these happens then this may take place. So some examples from financial like monitor profitability analyses expenses obtain revenue breakdown region wise division wise department wise product wise. So how revenue can be broken down region wise division wise department wise or product wise then examples from marketing that is market share costumer base product popularity so all these things can also be obtained.

Then operational that is productivity production rate risks then human resource succession planning skill and experience base all these things can actually be obtained. So these are in the domain of executive support system. But basic idea you must know that it should help in strategic decision making as we all seen that strategic decision making is very different from operational decision making, the basic idea is not to have a smooth flow of operations not really day to day activity. For example when we are doing say monitoring profitability we are our purpose is not to see how do the company does a better profit in the immediate quarter or the immediate year which is running.

That is the job of the operational managers for the strategic managers or the top level managers they have to identify profitability. They have to identify how profitability is varying over the

years find out the causes not only within the organization. But also outside the organization the market, the competitors, compare the all the gathered information and obtain policy guidelines for the future the strategic future. It is not really for immediate six months or one year or short term no not really it should be for long term considerations. So that is the focus area of executive support systems.

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Then some of the other examples that is say competitive like competitors financial performance product mix then external factors like interest rates government regulations economy industry trends. So all these things can also be obtained then benefits and beneficiary; the benefits could be efficiency, effectiveness, transformation and beneficiary could be individual, functional units, organizations right. So all these various factors benefits beneficiary should be kept in mind and accordingly the application should be built.

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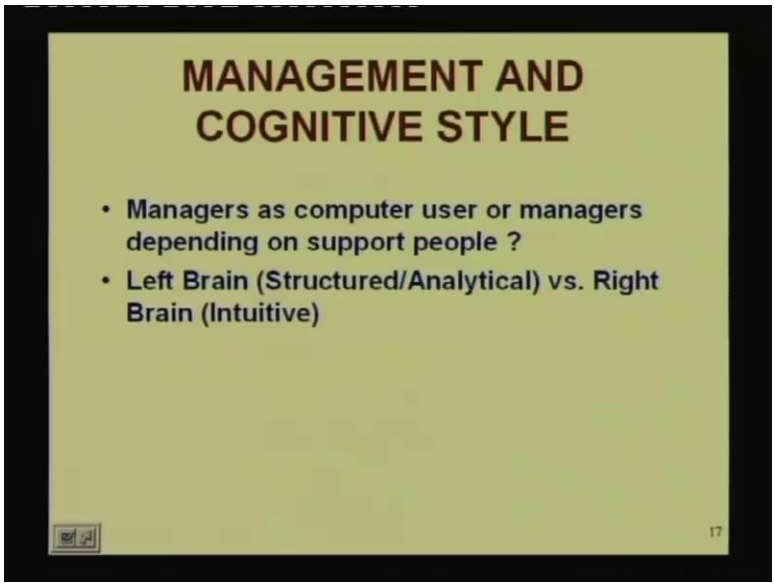

Then let us see some of the effects the management and cognitive style. The managers are computer users or managers depending on support people. So see it is a very important question with regard to information system. Whenever we have let us say thinking of a particular manager will he process information himself directly or will he depend on the support people to provide information to him and he accepts as he is given. Now this is a very important question because depending on that the higher level because if you think of building transaction processing systems. There independent of the managers' choice. Because manager does not even come there they are all operational support systems. But management information system a decision support system or executive support system or even office automation system. Here the manager plays a very big role we have to understand what the manager wants right. So it depends on what is the cognitive style of the manager is he a left brain person or is he a right brain person we shall discuss this in detailed slightly later.

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Now let us see some of the simple models one model of manager is what is the so called Mintzberg model. The Mintzberg model essentially says the managers are relentless they need brevity variety and discontinuity. Brevity means you know conciseness dislike reflective activities do not like to reflect on are superficial and overloaded encourage interruptions make decisions in small increments and do things in an abrupt manner. So this is how what Mintzberg found in his famous studies that they required a variety of information but they work in short bursts. They if you give them the entire information at one go that may not be the right thing they would encourage interruptions and they make decisions in small increments and do things in an abrupt manner so that is one kind of model.

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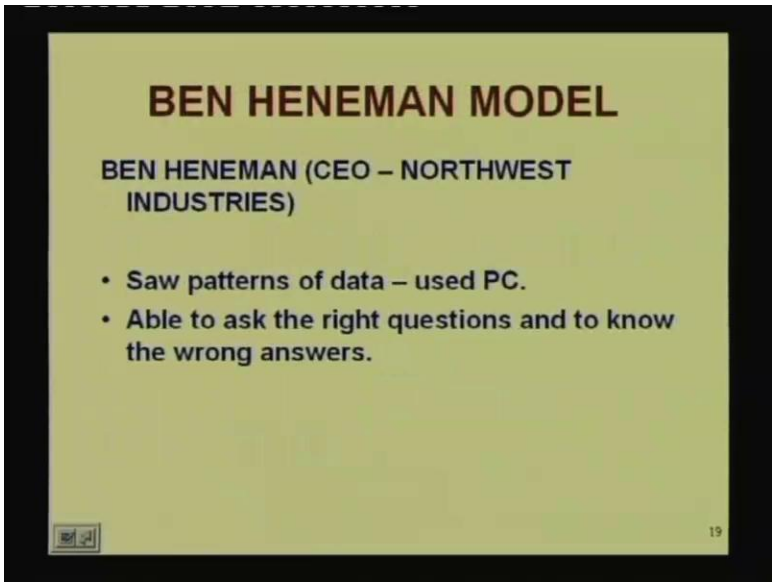

Then the Ben Heneman model who was a CEO of northwest industry. He was very different because he used the personal computer himself and instead of models he used to study the actual data. So by looking at the actual data he used to find out the patterns in the data right. So used to find the patterns in the data and these patterns of the data he used to use really to obtain the specific conclusions so and from which he used to make his decisions. So because of that he was able to ask the right questions and to know the wrong answers right. So that is the thing that instead to the essentially what are the options what are the other options other option is that there are information support people who makes models on the raw data and presents output which is a obtained by processing this input data. So essentially the most managers or most chief executive officers, they see output from an information system which is definitely not raw data which is processed information. But these processing may sometime be done with the help of models which might hide a number of assumptions number of assumptions.

So suppose all these projections that the company would do very well it will grow at a tremendous space at 10 to 15 percent per year. All these projections have got a number of hidden assumptions. And the input data the raw data has been processed in a particular manner all right so one has to understand these to really depend on the information system outputs particularly MIS and DSS outputs carefully. I mean we have to be very careful about. I did not you know

interpreting the outputs that we get out of the systems basically understand that what is the model used and what is the assumption. So the right brain people sometimes they would like to see the patterns of data instead of the model and make their own conclusions. That means they use their own mental models rather than use the models which are specifically used by analysts.

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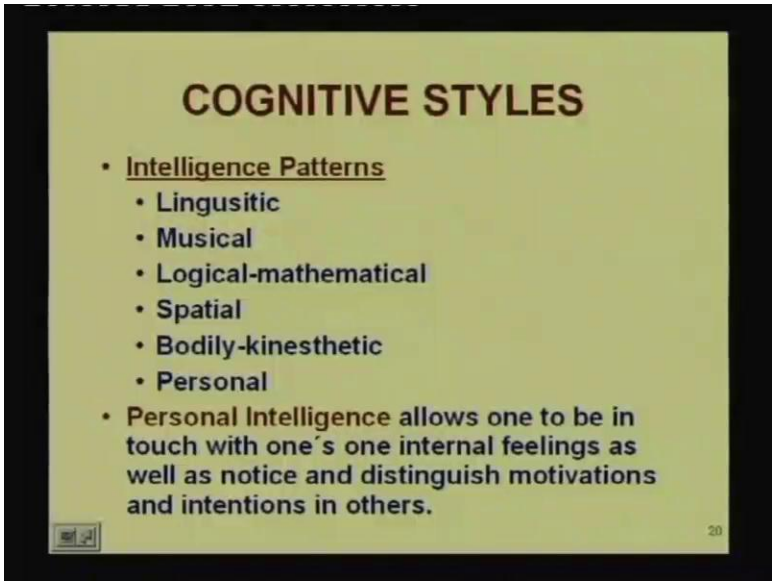

So these are some of the cognitive styles there are various kinds of intelligence patterns like we have the linguistic intelligence pattern the musical logical mathematical spatial bodily kinesthetic and personal right. So there are various intelligence patterns according to the cognitive style and usually when we think of a person the person may fall in one or more of these intelligence patterns. Linguistic means the person of the manager concerned is you know they are quick at barbell abilities the multilingual abilities. The musical the people there more into the rhythmic you know, they like rhythm in their work logical mathematical they would like more of analysis more of left brain type. The spatial they can see things they can high imagination they could see things in space that means if something is a pattern can be visualized very easily. Then bodily kinesthetic will discuss the personal. That means the specific to the given person the personal intelligence allows one to be in touch with one's own internal feelings as well as notice and distinguish motivations and intentions in others.

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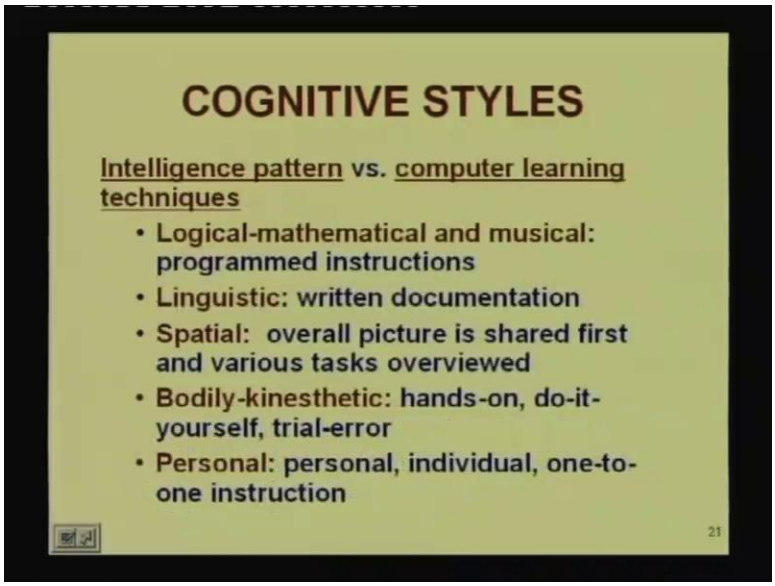

Then we see that some of the things some specific difference between. I mean what happens in cognitive style depending on the intelligence pattern verses computer learning techniques. So logical mathematical and musical people they are more interested in programmed instructions. So they are basically more analytic in mind and they want the output of computer models rather than raw data itself. The linguistic people they are more interested or they will be better off if they get written documentation. The spatial people if they overall picture is shared first and various tasks are overviewed right. That is the property or that is how the spatial people go about then bodily kinesthetic hands on do it yourself trail error right. So these are the people who are not so much bothered about the language models and you know more of what do you call the mental things they are more into the trial error. Let us do it right they are more of hands on do it yourself. So actually you know less word and more work that is the kind of philosophy for the people with an intelligence pattern of bodily kinesthetic and then personal which are more of personal they have to obtain their information more personalized individual one on one instruction so that sort of mind set.

Now why we are discussing, this, the basic idea is that whenever we are talking about management information system and if you recall we have already said that ultimately the management information system depends on the kind of structure the information architecture

that is present in the organization. And this information architecture may actually be totally changed if the power structure of the company changes right. So it is not advisable to ask a question why should a particular manager is getting a particular information. It is not really it should begin. There it should begin what a manager is performing what is his interest area what is he over seeing now what a manager whether you call him a financial manager or any manager personal manager. What is his work area it can be redefined? If there is a change in the power structure of the company if tomorrow somebody else becomes finance manager he may see something more or something less than the previous finance manager. And he may be a different kind of a person if the previous finance manager was a person of logical mathematical intelligence pattern.

And the new financial manager is more a bodily kinesthetic you can see that you being in the information support department or in the MIS department your role should also change your role should also change. He will be not so much interested in analytical models he would like to say okay. Fine. These are your, this thing you simulate and show me what will happen or allow me to play with it right. So you have given me something let me enter something and see what happens or let us implement this and in a small scale and see what is the result. So you see that the way he would look at it he is scope of work everything will vary depending on the cognitive style of the manager and also definitely apart from cognitive style other considerations what is his concerned what is the set of activities that he would like to concentrate on. So all these things are going to be important depending on the cognitive style.

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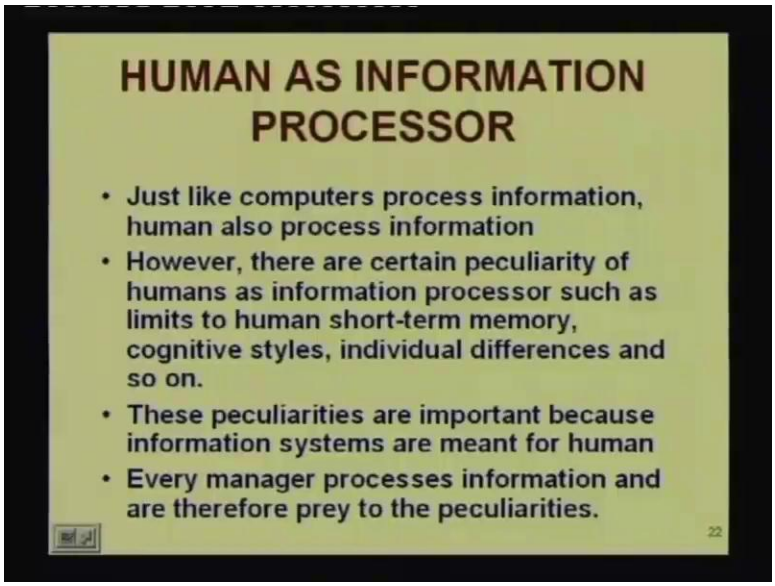

Now let us see so since the cognitive style we are discussing a very, very related and important area is human as information processor. So apart from manager I mean definitely manager is an human. So here what we would like to really concentrate on is that if people process information then obviously they are bound by a number of things like there is a lot of things which will lead to a kind of bounded rationality. What are those factors and if those are the factors what are the impacts of those factors on the development of information system. So here we are just like computers process information human also process information. That is the first thing then however there are certain peculiarities of human as information processor such as limits to human short term memory cognitive styles individual differences and so on. So there are number of limits that are actually applicable to human as information processor. Then these peculiarities are important because information systems are meant for human right. So every manager processes information and are therefore prey to this peculiarities. Now let us see what are these peculiarities that we are talking of?

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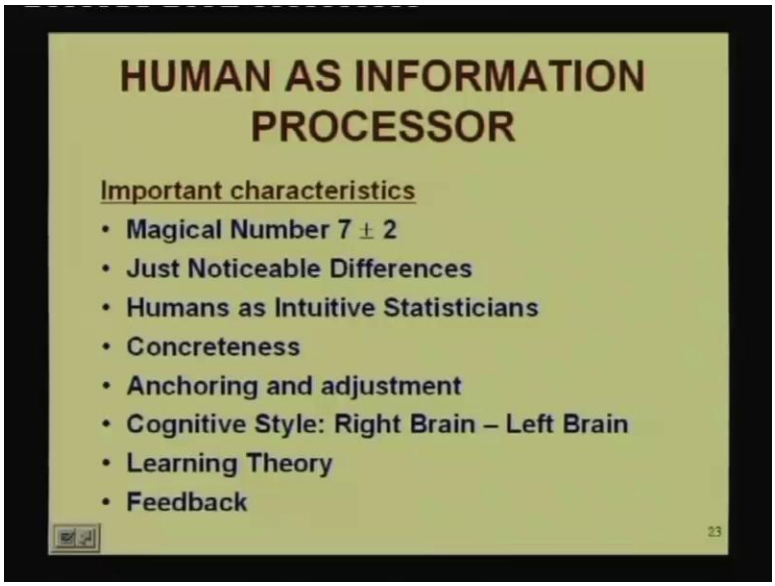

Some of these important characteristics we have noted here the magical number 7 plus minus 2. This is a limit to the human short term memory just noticeable differences that means what is the difference between various outputs or inputs or reports or queries which is just noticeable. Then human as intuitive statisticians what are the limits of human as statistician concreteness if concrete information is given to person does he take better decision anchoring and adjustment? We know that this is a descriptive kind of method that are usually followed by people. Cognitive style right brain verses left brain, learning theory that is we shall discuss the feedback what kind of feedback is required when people are processing information system if there is no feedback what happens.

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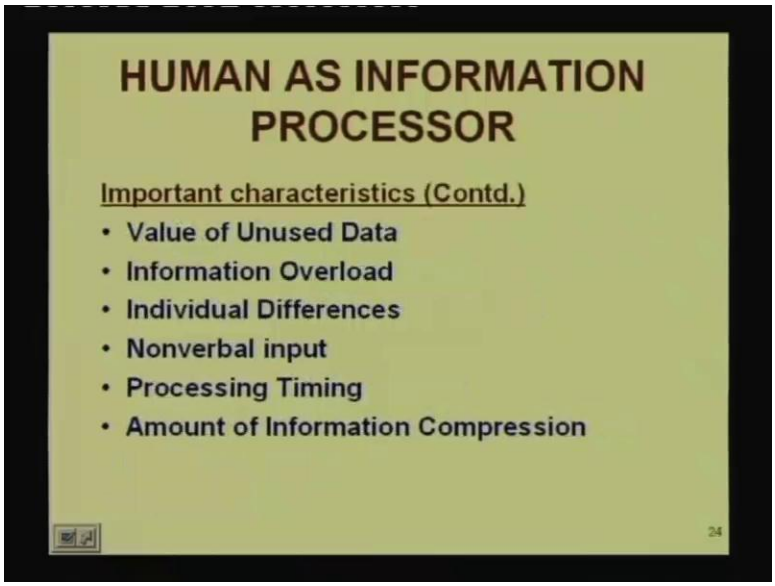

Then value of unused data, sometimes to make people more confident we require more unused data. Information overload what happens if there is too much information. Individual differences between people nonverbal input because information system can only give written answer to the queries. And requests for reports but there is lot of nonverbal input. For example body language those are missing what is there effect then processing time. If the processing time is more, what happens, amount of information compression how much filtering we should really carry out. So these are some of the very important factors which are the characteristics of human as information processor let us discuss them in some detail.

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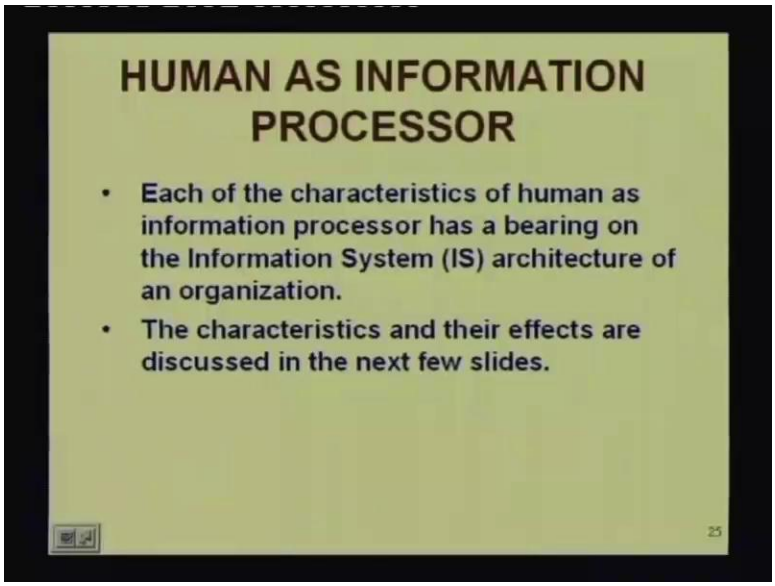

Each of the characteristics of human as information processor has a bearing on the information system architecture of an organization the characteristics and their effects are discussed in the next few slides right. So they have important bearing what are those. Let us see.

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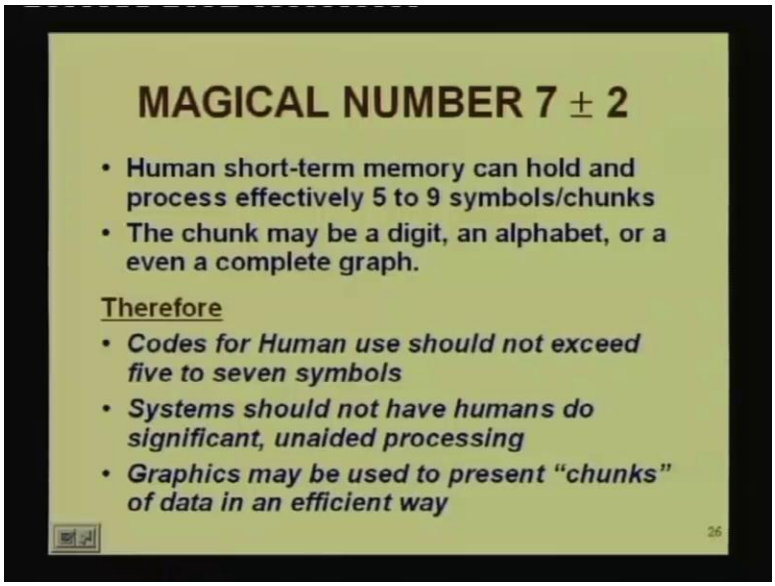

So to begin with let us start with the first one that is the magical number 7 plus minus 2. The human short term memory can hold and process effectively 5 to 9 symbols or chunks right. So that means see it is unlike the usually when we talk about human memory we should understand that there are 3 components of human memory as per the Newell Simon model there is the long term memory there is a short term memory and there is also the unconsciousness. Basically the unconsciousness is that where essentially you know, it is more of undefined more of undefined and that is essentially we know little about. So that is because of the unconsciousness only we have so much of information which we apparently think we have forgotten but it is still there. But long term memory is that memory which we actually put in our mind and through a recalling process we can obtain the thing which you have already memorized.

There is also a forth type that is known as external memory. That is a basically suppose if, for example in this particular example whatever we are seeing in the computer is an external memory to me. So something like so when I see that magical number 7 plus minus 2 this particular word on computer screen I can recall kind of things which are already known by me. So it is also an aid it is also a kind of memory so written words in board chalk board computer screen you known written document can be called as a kind of external memory. So we have the long term memory we have the external memory we have the consensus unconsciousness and we also have the short term memory. Short term memory can be said you know something like the computers RAM, Random Access Memory.

So the hard disc is more like a long term memory but in this case of people the short term memory is really very short it is just 5 to 9 symbols. So that means if you just tell a somebody a telephone number and if this telephone number is quite large the person may not be able to remember these afterwards. So suppose you tell somebody this is a telephone number some 8 digit telephone number you go to the next room and tell somebody. Most likely you will be able to tell but if I ask him the next day what was the telephone number I told you yesterday most likely he will not be able to answer. So these can be defined as a short term memory. So this is limited but limited here this is very interesting that symbol or chunk is a very interesting thing the chunk may be a digit and alphabet or even a complete graph. So it depends on how you make this as a chunk. Suppose I tell you a number that is 2, 2, 4, 5, 1, 2, 3, 4, 5. All right 2, 2, 4, 5, 1, 2,

3, 4, 5. Now these 8 digit number can be called a 8 different digits. So it could appear as 8 chunks right. But it may so happen the 2, 2, 4, 5, is your vehicle number and 1, 2, 3, 4, 5 is one part of your telephone number.

So if that happens then for you it is basically two chunks and not really one chunk if you know those numbers segments well and you can associate with them to something else probably they can appears as two chunks. And to somebody else again the entire number can appear as a only one chunk. So therefore you can see that there is although the human short term memory is highly limited between 9 to 5 symbols. But again what is that symbol if it is already associated then the size could be really very large. But however keeping this in mind we can say that while we design information system, we should see that codes for human use should not exceed 5 to 7 symbols. System should not have humans do significant unaided processing and graphics may be used to present chunks of data in an efficient way. So if we can use a graph instead of let us say some numbers probably the people would be able to memorize in a better manner.

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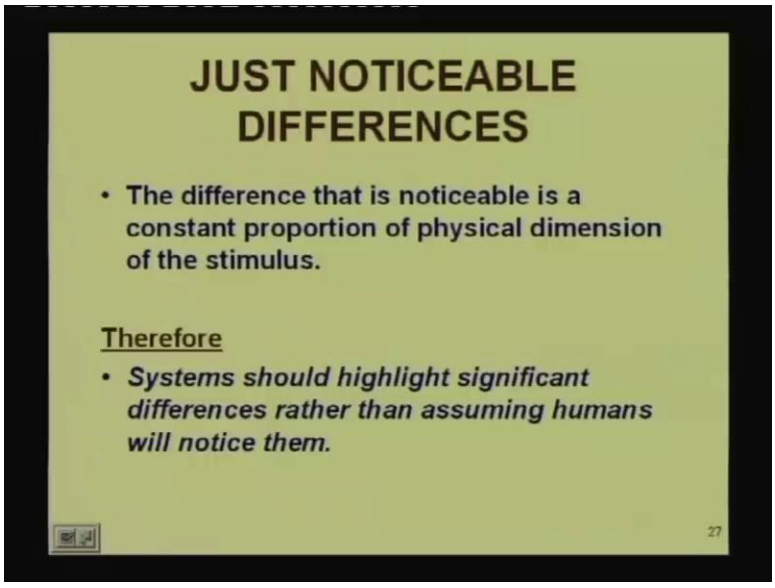

Then the concept of just noticeable difference the just noticeable difference. Basically the idea is that difference that is noticeable is a constant proportion of physical dimension of the stimulus. Exactly what it means. Let us try to see through an example (()) ((00:43:30)) any how will see that the just noticeable difference. The basic idea let us say, if we take if we take, let us say the two sizes, the, suppose we want to differentiate between two font sizes right. Let us say one font size is 24 and another font size is 26. Now are they significantly different in the sense can a person if he sees a particular write-up and this is basically in 26 font suddenly one font is 24 will he be able to recognize. Now this is something very interesting and it has been found out that whenever we are having a particular kind of situation we see that essentially it is said that delta c by c is a constant where c is a criteria. Suppose the criteria is the font size. So what is the just noticeable difference, suppose just noticeable difference is let us say the a ratio which is a let us say point say 0.5 or 0.2, 0.2, let us say point two suppose is a is a particular thing which is can be defined as delta c by c. So if c is a 24 font or 26 font then 26 into 0.2 which is 5.2that is our delta c.

So delta c by c is 0.2. Suppose we say that it is a constant according to the just noticeable difference and if c is a 26, then naturally delta c comes out to be 5.2. So these basically says that if we have to differentiate between two different fonts, then there should be a difference of about 5.2, about 5.2 between the 2 right. So that means 26 say if we round it off to 6, then we should have either 20 or 32 as the next font if the ratio is 0.2. But these six differences should not be taken again. Let us say if the size is instead of 26, 52 or 50 because if it is 50. It should not be between 44 and 56 because again going by the criteria if c is 50 and if delta c taking the ratio as 0.2, it will be 10 say, a 50 into 0.2 that is 10. That means the size now should vary between 40 and 60 and not from really 44 and 56. So therefore the system should highlight significant differences rather than assuming human will notice them. So these will tell that when we are presenting information what should be the differences between one font. And the other on one the thickness of a graph to another thickness anything any other that is important in this case what should be the difference that should basically highlight this particular thing.

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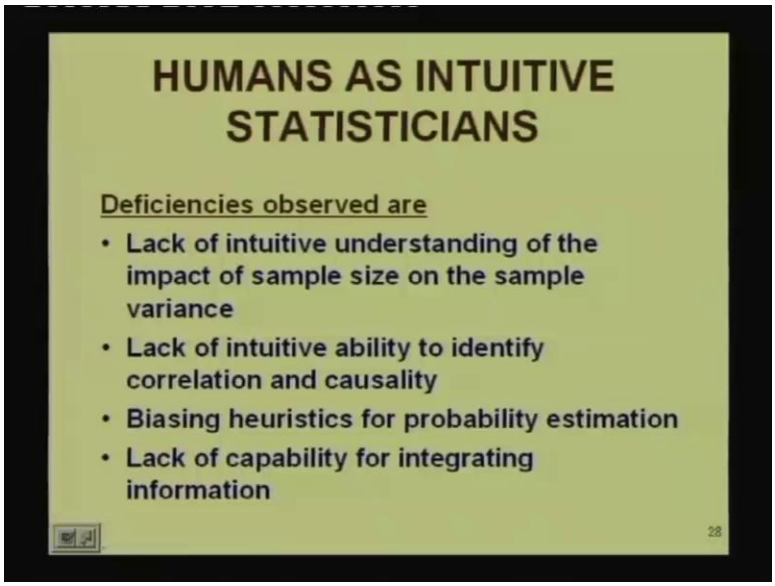

So now another thing is human as an intuitive statistician. Deficiencies observed are lack of intuitive understanding of the impact of sample size on the sample variance lack of intuitive ability to identify correlation and causality. Biasing heuristics for probability estimation lack of capability for integrating information. So we can see that the first one lack of intuitive understanding of the impact of sample size on sample variance. So as I have given an example earlier that suppose you toss a coin and two times it has come as heads. To therefore to conclude that if I toss this coin it will always come as head is really not true. It is not true because although two times you have got head but the our sample size is only two what about variance of the result that it is head both the times the variance will be quite high right. So these human being cannot identify this that although you have got two times head.

But the conclusion drawn from these because the probability is somewhere around 0.5 will be difficult for a person to understand lack of intuitive ability to identify correlation and causality right. It is like there is a lot of rain in Siberia or there is lot of snow in Siberia and because of these we are not going to have too much cold this time you know. This kind of correlation may not be a very proper one right to identify that as a causal connection probably is not going to be true right. Then biasing heuristics for probability estimation sometimes what happens that we estimate probability on the basis of too few a trial too few a trial and we go for approximations

right. So like we toss a coin four times and we say 75 percent it comes out to be a head. Lack of capability for integrating information this is also human deficiency definitely that is, we are seeing certain facts and but to put it together integrate them synthesize them; this is the capability we are lack.

Unfortunately what happens most of us through our education we have become too analytical. If there is a problem we are able to solve it. But if there is no problem if our purpose is to construct the problem, see if you go to an organization nobody will tell you that this organization needs to prosper the organization has a problem it has to be solved. If it is known that yes this organization is going to be sick. Let us do something about it probably you know okay. Let us analyze but you go to an organization you will not understand that this organization is going to be sick that there is a problem nobody will agree. So to construct that problem that is I think a bigger challenge than solving the problem right. So construction of a problem is also a very, very important thing and unfortunately people do not have that capability inherent some people definitely have they have the vision. But it is not a general phenomenon.

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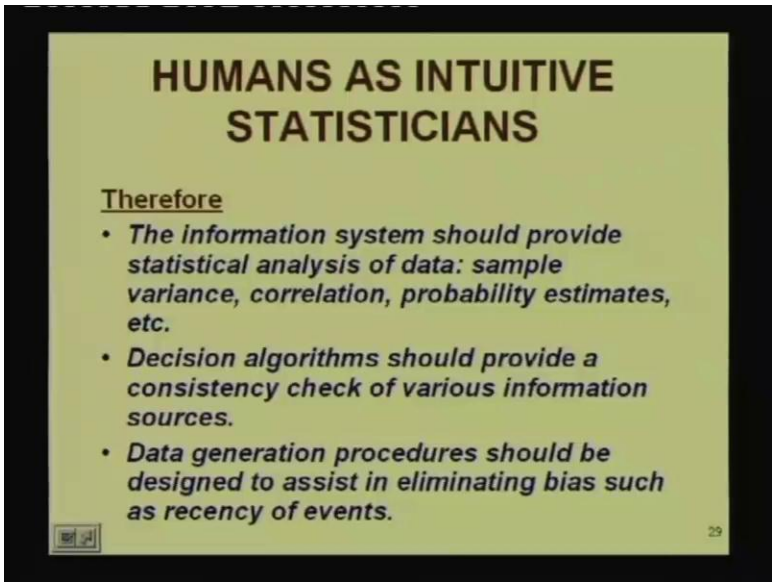

So what should be done about it? What we should do is that information system should provide statistical analysis of data. There should be sample variance correlation probability estimates

etcetera should be available. Then decision algorithm should provide a consistency check of various information sources data generation procedure should be designed to assist in eliminating bias such as regency of events right. So therefore the information system should provide statistical analysis of data sample variance correlation probability estimates etcetera once again. The decision algorithm should provide consistency check of various information sources and finally the data generation procedure should be designed to assist in eliminating bias such as the regency of events. Then thereafter let us see the concreteness.

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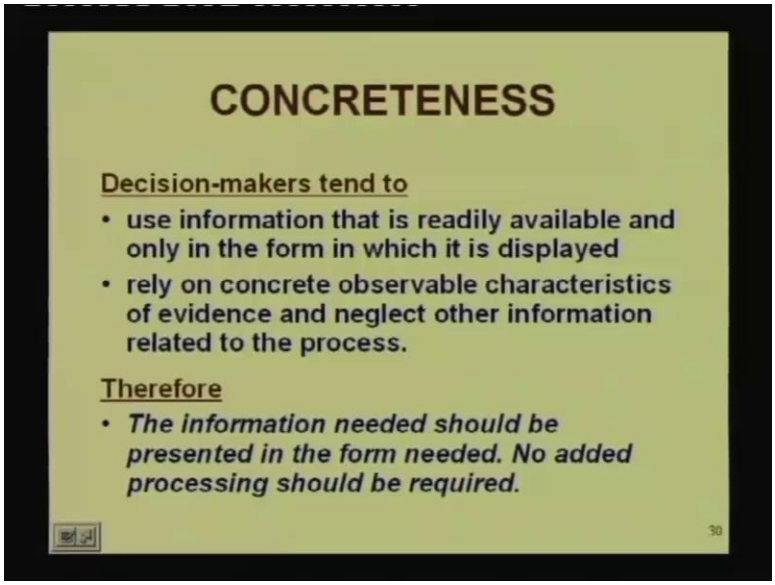

The concreteness is essentially the idea is the decision makers tend to use information that is readily available and only in the form in which it is displayed. So the people usually rely on concrete observable characteristics of evidence and neglect other information related to the process right. So the basic idea of concreteness of information is that people tend to depend on information that is readily available. So let us say we are doing an analysis of let us say why the sales is not that good in a particular area. See the basic idea here is one of mind set that people are not really have changed their traditional mind set and it is a modern product and therefore this particular product has not found acceptance due to whatever reason. But this is not what you will immediately get as information or data.

If you talk to people the readily available data could be that of money that of incomes salaries the preferences price of the product. So it may appear to you that really the people they because they do not have too much money to spend or because the price is probably too high. That is why people are really going not going for this particular product right. So that is the effect of concreteness so what should be done. The information needed should be presented in the form needed no added processing should be required right. So this is sometimes important if information is collected in a particular form give information present it in that form and do not process to really convert them to money or some other variables which are more quantitative rather than qualitative. These may actually cut down lot of information and can actually put it as a bias to the decision makers. So thank you very much will stop here today in our next lecture we continue from this point.