Systems Analysis and Design
Prof. V Rajaraman
Department of Super Computer Education and Research
Indian Institute of Science, Bangalore

Lecture - 10

Last time, we concluded the lecture by very briefly looking at the use of questionnaires. And I would like to expand a little bit on that because, very often people use questionnaires without thinking too much about the efficiency or efficacy of using such questionnaires.

The reason why people seem to user lot of questionnaires, it is something very easy to develop and easy to mail. And expect the respondance to respond reasonably accurately and fast to their questions. And also the method is somewhat less expensive. Because, one does not have to go personally to individuals, you can just mail it and expect that the questionnaires will be returned.

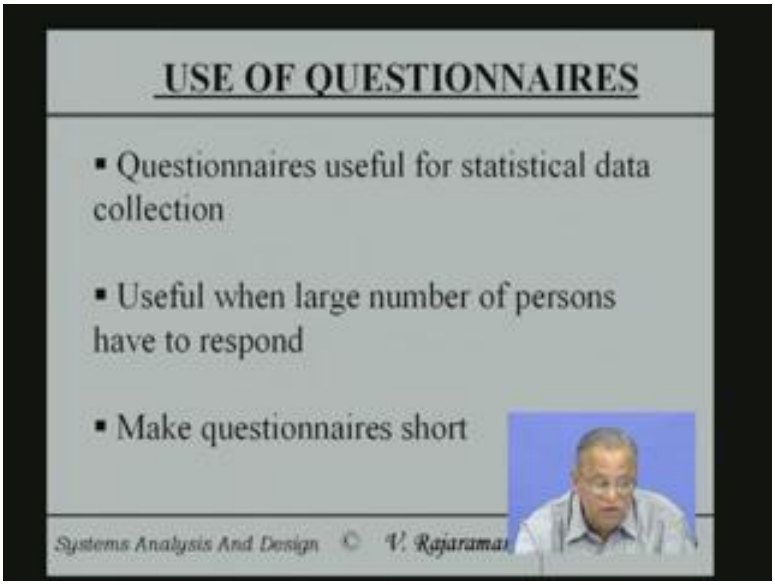
But, in actual practice this is not really true, very often if the questionnaires are very long. The response in terms of, suppose you mail out 100 questionnaires, even getting back something like 10 or 15 becomes the norm. In other words most people consider questionnaires as something impersonal. And that it may not be used effectively. And they do not really spend a lot of time doing it in the effect.

It becomes one of the things to be done and put go under the pile. And finally, some reminder comes, they will come back take it back again and see. Whether, they can fill it up and so on. And also I have observed that for instance when I give my vehicle for servicing, they give a questionnaire about the type of servicing and so on. And the questions are such that, the responses are excellent good fair and poor.

And most people have the tendency, not to mark it excellent or not to mark it very poor. But, just mark it good or fair and this does not really convey, much information about, what that company sort to get, in terms of the efficacy or efficiency of whatever servicing they do. So, to some extend I think this is as I said wasted effort.

But, questionnaires are very useful for gathering statistical data, when there is number of persons is very, very large. But, here also there are lot of difficulties.

(Refer Slide Time: 07:02)



I remember one big survey, which is done for urban reconstruction in a big city in India. What they did the collectors of information, that is they had a questionnaire. And they did not really try to look at the beginning. What questions are to be asked, in order to be able to get the kind of conclusions along to draw from the study.

So, they collected a lot of information, including information on income the type of houses they live, the locality where they live and things with that type. And the one thing they forgot is that, when they say income, they very often. The person who went out to do the survey, looked at the family income, where in the poorer families more than one person, works three or four people works.

And they all live together and so the income is quite inflated. And the conclusion seem to be the people with fairly high income are really living in slums. So, this kind of conclusion; obviously, not correct. Because, the way in which they collected the data. They should have really asked how many people are there in the family. How many people are earning members.

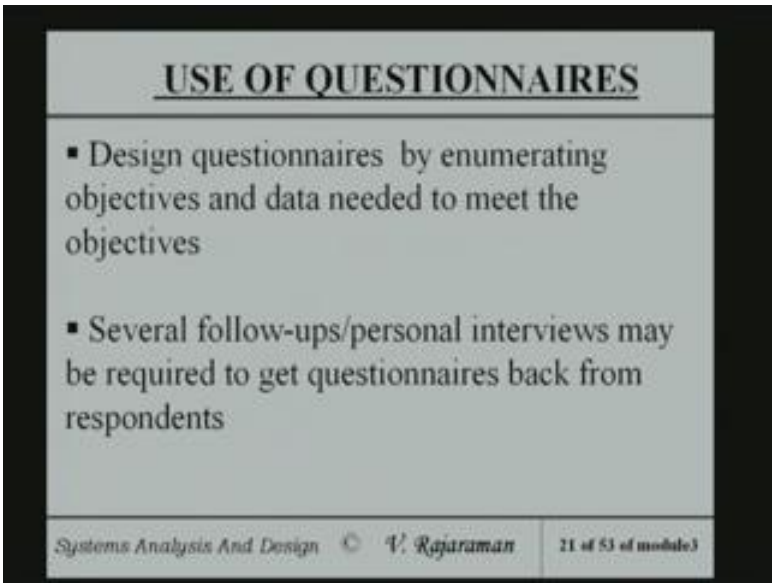
And then, try to conclude based on that in terms of what is the relationship between the, individual income which is what you are looking for. And the type of residence you

would like to or she would like to live-in, on the area and which one would like to live-in. So, this kind of a problem occurs too late. Because, what they have done is to send the questionnaire, with people who are collecting it house to house and fair amount of that is done, it took about an year to do the work.

And then when they finally found out, that not the one of the most important things you wanted to get out of this, was not available. Because, they just did not ask the right question, they get into big difficulty. So, even in questionnaire design, it is extremely important to be carefully look at what are the ultimate objectives of study. And work backwards from the objectives, towards the questions you have to ask.

So, that the objectives the answers can be used to meet your objectives. So, this is one thing which is careless design of questionnaires is very, very common.

(Refer Slide Time: 07:03)



So, as I said we have to enumerate all the objectives. And go backwards to find out the data, which are needed to meet this objective. And if the questionnaire is very long, very few people will actually answer it. So, the questionnaires has got to be simple precise short and to the point. Then, the success of getting your replies are more.

And of course, many companies also give some kind of incentive saying that, if you return the questionnaire, there will be a lucky draw and you may get some prices and so on. And of course, that does not always, you know entice too many people to do the

questionnaires filling. Because, after all lottery and you do not know whether you are getting it or not.

So, you would rather spend that time something else. So, that is essentially what really happens, even in terms of incentives. So, even if you send out a questionnaire by post, it is important to follow that with personal interviews. And if you make a phone call and ask for responses, people are very reluctant, now they feel very disturbed with phone calls, which come from odd people at all hours.

And in fact, now there is a law coming up many countries including India. That unsolicited phone calls to people at all times cannot be done. Because, the fact that unnecessarily it disturbs the privacy of the individual. So, it is better to kind of interview with them personally, after actually setting up some kind of a time with the person. So, that he knows is also prepared for the person, who is going to collect the data.

That he is coming and this course, is possible only the target is small and if it is, it has specific purpose. In the area of systems analysis, it does a certain purpose. Like, we want to do a marketing survey, in terms of trying to find out. They coming up with a new hard ware product may be like a new type of lap top. You would like to know who are the people who mostly like to buy it.

And so, you have to really get to know this. And this is the kind of marketing surveys, they are trying to do by looking at the different types of what they call markets of different people. Who are the potential buyers of the product. And then, try to ask the right question target them, saying that. Suppose, the price is between 20,000 and 30,000 rupees will you buy it or is it below 20,00 will you buy it.

What at level of cost, do you think it is worth while buying and things of that type ((Refer Time: 10:10)). So, lot of both quantitative and qualitative questions are asked, in such marketing interviews. And; obviously, you cannot do really do a very extensive survey., you have to do a... So, called sample survey, come up with a sample of different market segments and go and do this survey in this market segments.

So, in marketing also this system are very often used. Because, ultimately the results of all these surveys and so on are analyzed by computer to come up with a with some conclusions, which can used by the management to appropriate decisions. So, that is the

whole idea of doing it. And there are so many cases, where people do not really understand. That just nearly collecting the data, using questionnaires is not enough.

Because, once you collect these data, you have to analyze it. You have a get some positive conclusions. And so the analysis and programming and coming to proper conclusions all that, requires a fair amount of effort and time on the people on the system analyst. And others consulting people, who are very knowledgeable to make this kind of a survey effective.

And so there is a lot of expense after the collection of data. And very, very many places they just do not understand. That analysis of massive amounts of data cost money. Both in terms of people's money and computer time and things like that. I remember one survey that in fact, it is a lot of work they did.

They are actually breeding ship, somewhere in Rajasthan and trying to find out the kind of breeding methods, kind of ((Refer Time: 12:22)) they should give and the hardiness of animals to kind of various diseases. And they have done extensive kind of work with many types of sheep and cross breeding. And different types of ((Refer Time: 12:38)) to find out the good yield. And how the yield increases and so on.

And so they have collected a huge amount of data over something like 2 years. And they had all that data in a reasonable interesting form. But, then as usual many of them are written up manually register and so on. And then, they came to our computing facility and said that we have all these data.

Now, I want to analyze that and try to get a some conclusions about, what type of order, what type of breeding, what kind of breeding will reduce things. Like you know certain disease coming and which will increase their yields and things like that. And so ask them all right to be first of all we have to convert all these handed data into a codified form for analysis by computer.

And then, you have to write write program. And you have to really analyze, what exactly requires and write a program accordingly. And then, come up with proper reports, graphs and work note. So, that the management or the people who going to do this work will actually use this. So, then he ask how budget have you allocated for this purpose.

Because, this is going to cost you a reasonable amount of money. And he said well sir I did not really know, that it cost lot of money to analyze and so on using computers. And I did you know we had very little money left in the project. And ask him what is the total money you spend on the entire project. Sir you spend about 4 crores of rupees for 3 years and I said what happened to all that money, he said sir the ((Refer Time: 14:34)) take it up.

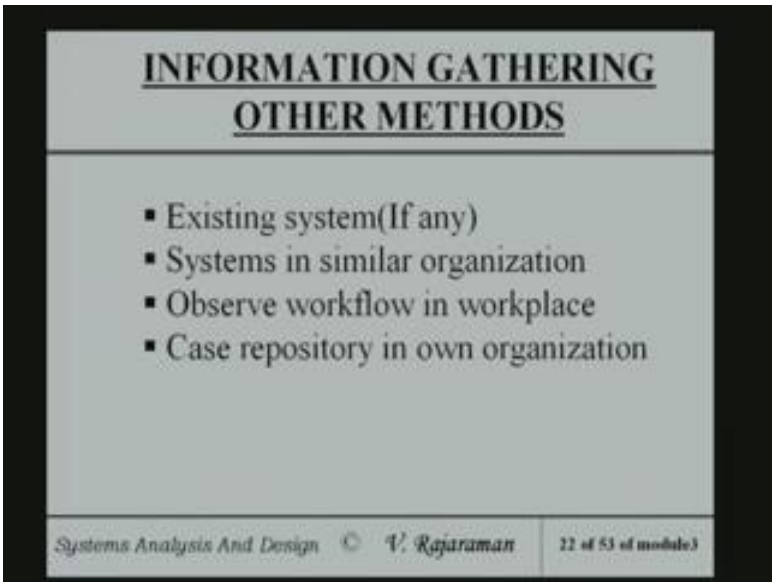
This is kind of response, they said because do not have to be fed. And most of the money went for that. But, ultimately they at the end of the study, they just did not analyze it. So, outing them went waste, what they have to go back. And try to get some funding for the analysis. So, that the entire study will now become really useful.

So, this again shows the fact that many people in general public. Particularly, who are working on these kind of areas, do not understand the time required and cost required, to analyze data and to come up with appropriate conclusions. So, it is very important for the analysts to be involved also at the time of any large experimentations, which people do things like breeding, experiments and so on.

So, that also a right kind of a analysis can be done at the appropriate time. So, there is the money is allocated appropriately for each segment of the work to be done. So, that the budgeting is done properly. So, these are may look trivial. But, these are things which you have to remember in actual practice. In practice people do not really seem to have a lot of common sense, say they kind of thing that computer use is going almost free of cost.

The may be the actual computer and the programming and all that. The computer cost is low. But, the programming cost, people cost and analysis cost is very high. I mean these are issues which has got to be understood by the managers and management of any organization. And that is the responsibility of system analysts to make that known to people who are to be involved.

(Refer Slide Time: 16:39)



Apart from the methods I have been talking about for information gathering. The other very common areas, which you look at our existing systems may really. What I mean by existing systems is, that particular company would like to say put a new system. And they may have an existing system or you kind of look at similar organization, which is doing similar work.

Suppose you are doing an analysis and design for courier agency. And you may look at what some other computing courier agency does. And that may be either available in public knowledge or it may be available in some, even many of them give the case study at the end of a particular job. They may not give all the details. But, at least give an overview of what they did to kind of a computerized, their courier operations, like chain of a tracking of items they go along and so on.

So, you look at existing systems. You look at system the similar organizations. And go also to look at the work flow, whether what really happens in the organization. In a courier organization for instance, how does the data and items flow. Just looking at it, see normally what happens is that. Either the agency collects the item from the customer, if it is large customer or the customer goes to the agency delivers it.

Immediately receipt is given, that this item is being handed over. And time stamp is also set, this time this is given this much weight and also the charges. So, these are all done at the very beginning. And then, once that is done, then there is a certain guarantee time by

which that package is suppose to reach. So, the question is what kind of guarantee to they give, they could have different categories.

It could be a overnight, next day it should go or it could be more relax, like they are willing to wait 48 hours, in this case the cost may be lower. So, that will be a tariff depending upon the urgency. And also the tariff depending upon the cost of the item. If it is item is very expensive, they will take a insurance on the item.

So, ((Refer Time: 19:15)). They have also had to ask the customer, what that packet contains. So, these are all the issues, which are important and then, ones it gets in. Then, the actual process starts of putting it appropriate transport method, either air or track or train or whatever. And then, at the receiving end do the similar thing of being able to receive it, track it and then, look at the address of the recipient, give it to recipient, take the signature and then the entire cycle is complete.

And very often, it may you may also send a acknowledgement back to the person, who has dispatched it to say that it is reached. And now a day's many companies also try to keep, the entire movement of that item on the computer. So, that the person who is sending that item, can actually track it or even the person, who is receiving the item. Given that the number the which is unique identification number, assigned to the item.

They can look at that unique identification number. And say, what is the actual place where it is still. And how long will it normally take for them to get it. And if it is, is it struck somewhere and so on. So, there are many things, which now are amenable to computerization for such companies. In fact, this is called logistics and so on. Logistics is one of the large areas developing areas, which is where particularly internet based, interconnected computers become extremely useful.

So, the last thing is so called case represetory. What I mean by case represetory of in a organization is that, a large organization which does a lot of system design and the analysis. Normally will have a library of previous similar thing they did a good organization. That means, the organization which is reasonably well organized, has got fairly large number of people working on it.

What I mean by this is companies, which are got 7, 8000 employees. Like, large companies in India, like Wipro or Infosys or TCS and so on. They do so many projects

over the years. That, they normally try to give keep a library, properly classified are the various type of systems, they have analyzed. And for which they have developed and delivered systems.

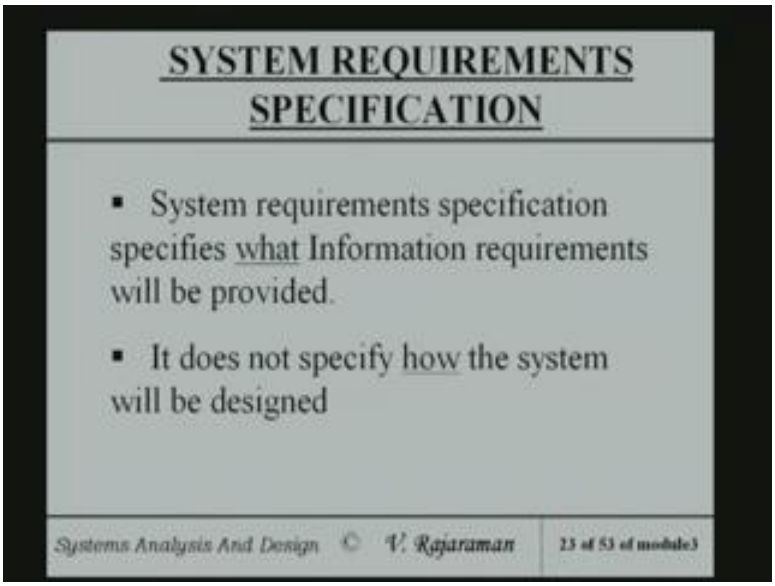
And there is also lot of information about sometimes problems, they encountered. And the general analysis, which they did. So, this case represtory is very useful. So, if you are starting on a new project and you have not done it similar thing before, this companies provide you, on your desktop machine method of searching, the library. And it is normally some kind of a digital library, to find out if there are similar cases or similar situations, which have been actually tackled already by the company.

So, if you are able to identify that. Then, you can get a lot of information from that, in terms of what types of questions to ask. And what type of response is expect and what type of ultimate system would normally be good for the customer or will satisfy the customer. These are issues, which are one has to keep in mind, that it is important for every large organization to create. What I would call knowledge represotry knowledge based on previous experience.

And this knowledge based experience is something, which is extremely useful for new people starting off. Because, then you kind of stand on the shoulders of others already gone through all that earlier problems and so on. And removed all those, you know encounter all kinds of little difficulties. And how they tackle the difficulty and how they can solve it. So, this is always useful.

So, good organization always keep a good represatary of knowledge. And also good classification. So, that classification is very important to be able to retrieve the required information fairly easily. So, that is a large you might say library of cases. And the represetory, you might call represotory in the lower consulting organization.

(Refer Slide Time: 24:48)



Now, having the whole idea of gathering information is to come up with a systems requirements specifications, have been saying again and again. That system requirement specification is very, very important document, which is agreed to between the users. The ultimate people who want to use the system you design and the designers, who are going to design the system.

And it is a by the term specification really says that, it only tells what information is required will be provided. And does not say anything how it is to be done. You have to be very clear about this, because very often what and how are confused. How gets into details of doing it. What you require is only gives a overview of what are the desirable things, you you require in the system.

So, the specification in the case of a human systems. Like, what we have been essentially talking about for things, like logistics or financial systems or whatever. All the systems are which computer based system are actually designed. Or as I said human system, where humans become part and parcel of the entire chain of a passing information and using documents and things like that.

And so the methodology for a specifying information are the specification method, which is the ((Refer Time: 26:58)) what is to be done is not amenable to some kind of a what one would call a formal specification. There is a area called formal specification,

people are being looking at for many, many years. By means of what is meant by formal specification is something, which is more mathematical.

In terms of saying the hypothesis and then the conclusions or the the this kind of a pure mathematical specification. Let me take an example of what I really mean by mathematical specification. You know, if you are going to design suspension for a motor car. The motor car suspension is normally modeled first, as consisting of the weight of the car, plus spring and the shock absorber. And the tire which is also got certain springiness and shock absorbance probability.

And this is actually put the specification now is in terms of this model. And then, equivalently described by the using differential equations. It may be a ordinary second order differential equation or it could be second order differential equation. But, coupled one part dealing with the dash part and spring. And the other part dealing with the tire and the amount of year and tire and stuff like that.

So, there there could be two aspects, two could be a coupled system. But, this is specification and it only says, what does these what kind of formally described system. And then, you solve that to try to find out, how well this things work and things like that. That is how to pick the right dash part, spring and so on. To get your ultimate objective of a smooth ride. When you go through a bump or when you go through part whole roads like in Bangalore.

And so you really the whole idea is to try to come up with a design, which is ultimate object. Similarly, people have been trying to see any formal methods, like differential equations and so on. But, they have not being able to come up with anything. There is something called Vienna definition language, which IBM try to kind of propose. But, it is not acceptable, because many managers and others are awareness to even looking at mathematics, mathematics kind of put them off.

And so you cannot really use anything, which is too mathematical to explore anything to lay managers. That is they are really people who are not all that comfortable, with mathematics unlike a engineers are. But, there are certain systems, those formal specifications are absolutely essential. Like for instance, when they designed the signaling system, automatic signaling system for the fast trains in France.

And also some of the metro rail systems, which are all coming up in India now, where the signal is all automatic. The auto what I mean by automatic signaling is that, it is not like the old manual person changing the point and so on. The whole thing is controlled by a computer. And the computer has access to census, whenever a train moves and where the train is and so on.

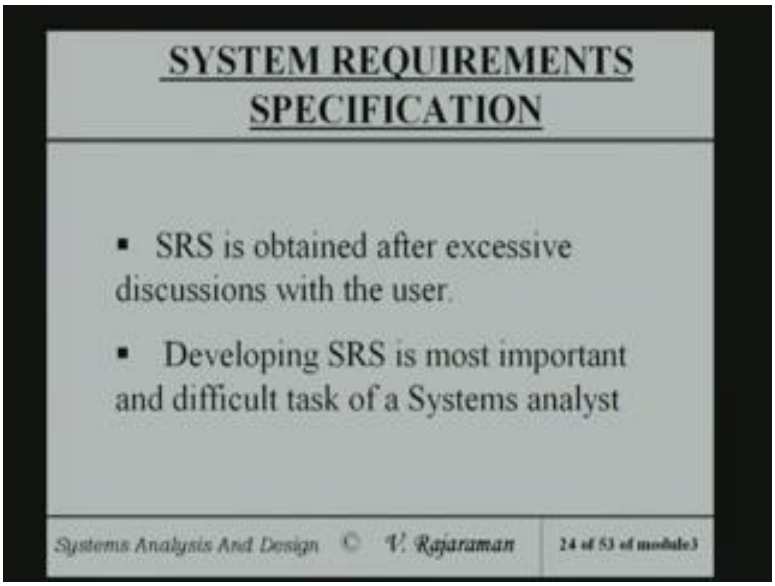
And based on that it does the proper signaling. So, that reasonably fast transport and take place and also be a safe transportation. In this case, unless you formally specify it and clearly understand, the requirements you could lead into very major accidents. So, in such cases, there are formal specification methods have been used very successfully.

And they have been found essential, the kind of specification they use or something like state diagrams. The Boolean algebra methods, logic systems and so on, which they have been they used very effective in such systems. And so the point I am trying to make, there are varieties of systems. And I am not going to really talking about the systems, which are safety critical. Like, rail system or even a ((Refer Time: 32:08)) running system, which is all now controlled by a computer.

So, those things are safety critical, where you require formal specification. And you got to have the clarity in terms of the ultimate requirements. And what is got to be required is very clearly mentioned, that too formally. So, point is that the in the kind of systems you are going to talk about, which are mostly human systems. We will not be really talking about formal specifications.

In some other course, we are going to take and real time system, design and so on. Then, the you will definitely learn, about the formal methods. Because, they become very important for such systems.

(Refer Slide Time: 33:00)



The systems requirement specification, in the case of companies for which you actually are writing systems is based on extensive discussions. As I said interviewing techniques is one of the most important methods of getting this information. So, that the system requirement specification we can be drawn up. And drawing up the SRS is the most important and the most difficult task of a system analysts.

Because, if the SRS is not drawn up properly. Then, system you design will not satisfy the user ultimately. So, there is always is misunderstanding between what the user really wanted. And does not able to say very precisely and what you understood. In fact, there are large jokes about it in the cartoons and so on.

One simple joke I might say is that a user said, that he wanted to have a class four vehicle, where two people can travel comfortably. And it should be least it is energy efficient should not use up too much energy. What you really meant of course, you want to have a bicycle with a good seat at the back, apart from the rider.

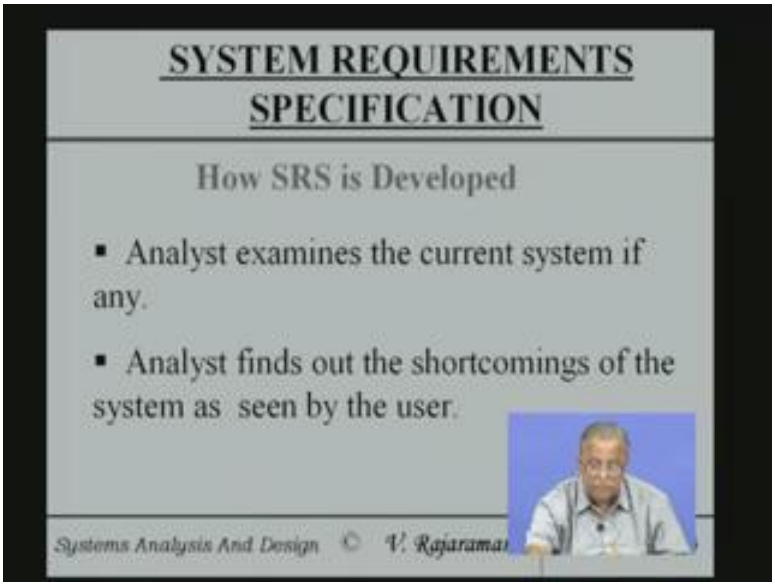
What the analysts understood was that, well it is a transport vehicle, which two people can go comfortably, energy efficient and so on. And he kind of thought in his own mind or something like a cycle rickshaw, where one person rides and the other person sits at back. And then, when he design when he show, when he gave it to the ultimate designer. The designer kind of look at this and he said may be, it will be stable if I put one more wheel. And no need of four wheeler.

So, what originally the ((Refer Time: 35:22)) required is a cycle. And ended up getting a four wheeler, which is extremely difficult to drive and so on. So, the point is that these kinds of cartoons and jokes, abound in literature, in system analysis and design. And the reason being that there is always misunderstanding, in when somebody says something and somebody understand something else.

So, this misunderstanding is because of the non clarity of natural language. The natural language or the language we use for daily communication, cannot by nature do all that precise. There will be always grey areas. Suppose, your language is very precise, there do not need of lawyers at all in this world. Lawyers only kind of split hairs and try to find out, some loop holes and stuff like that.

So, the whole point is that one has to make sure, that the understanding, mutual understanding is there. And that will make clear to the ultimate customer.

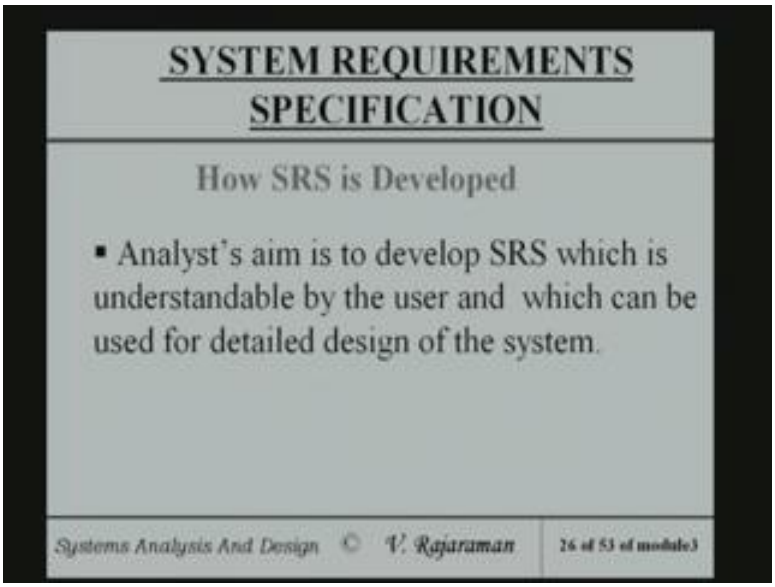
(Refer Slide Time: 36:36)



As I said the development of SRS is analysts examine, the current system if any. And finds out the short coming, anything which is missing in the system. And checks with the user, whether if the what are the things which are missing. And what is that he wants to introduce in a new system. There may be manual system already in place.

And then, they might be may not satisfied with that system. And they may like have to something extra put into it. And that is what, this analysts will try to find out and tell them this can be done.

(Refer Slide Time: 37.22)



Ultimate aim of the analysts is to develop a system requirement specification, which is understandable by the user. And which can be used for detailed design of system. See there are two parts to this. One part is that, the SRS document is something, which is agreed to between the customer or the user and the analysts. And the analysts gets his SRS more or less signed off. That is the customer has to say that these exactly what I require.

So, unless the SRS is signed off by the customer, one should not proceed. Because, very often people do not produce proper system requirement document. And get into deep trouble later on. I mean emphasizing it again and again, but it is very important. It is important to be able to come up with a well defined system requirement specification. In saying, what is required by the organization.

And what is required if it is made very clear, as I said oral communication, written communication is always prone to misinterpretation. Misinterpretation can happen, because of understanding of the same sentence by two different people can be different. As I said that is why there are lawyers in this world. So, it is always good to have

something which is much more precise. Of course, one end of spectrum is the formal specification, which I said is not always possible.

So, you have to have something which is not really formal. But, still something which is precise enough. A getting back to my civil engineering or house construction example. The plan of the house is something, which is understood by the house owner, who is going to give the contract to the contractor. It is also understood by the contractor.

Both side understand it, because the language is that of a plan. And the elevation and so on. And this case much more precise, in terms of the plan will give you, what is the length? What is the breadth? What is the height of the plan, itself will give you length, breadth and the disposition of rooms and so on.

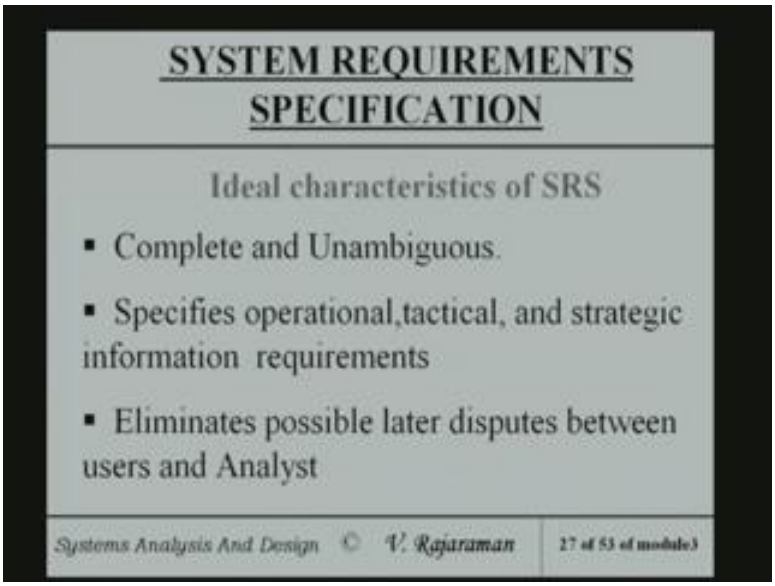
The elevation will give you the height and the looks and stuff like that. And so this specification language, which revolve over the years is actually a plan. Now, the plan on the one hand is understood by the user. On the other hand, the architect process the plan, the plan can be given by the architect to the engineer who is going to build the building.

The engineer also understands it, because of the common language and it becomes the link language between the user and the ultimately, the contractor and the intermediate is the architect. Similarly, system analysts is intermediately, working between a user and designer on the other hand. So, the analysts is like an architect and whatever he kind of gives a specification goes to the designer, who designs the system as per the specifications drawn up.

So, if he misunderstands the specification, he will design a wrong system. And ultimately it will not work. So, there is absolutely there is a good need or there is a essential need of having a tool it is understandable by both people. And very often, you find the graphical tools are lot more precise as suppose to writing out in terms of long sentence.

That is the point I want to make is that, specification written in plain English is not really is not as précised as specification, which is more like a drawing, which is graphical. Because, graphical gives a better image in your own mind and understanding. So, you have to find graphical tools, which are appropriate for specifying.

(Refer Slide Time: 42:20)



The tool must be such that, the specification should be complete and unambiguous. In other words, what I mean by complete is that, all requirements which the user felt should be fulfilled or fulfill. Nothing should be left out. Completeness means, nothing is forgot or left out. As I said very often what hurts, system most is that user thinks that he has understood or stoled.

But, the analysts does not fully understand, the certain which are unset by him assumed to be known to everybody is not so. So, completeness is an important part, one has to be careful. And again re iterate with the customer, that this is complete which are something which I left out. An unambiguous means, there should not be any inconsistencies in the specification. Inconsistency there is some part of it, if you do some part of it cannot be done or they are contradictory.

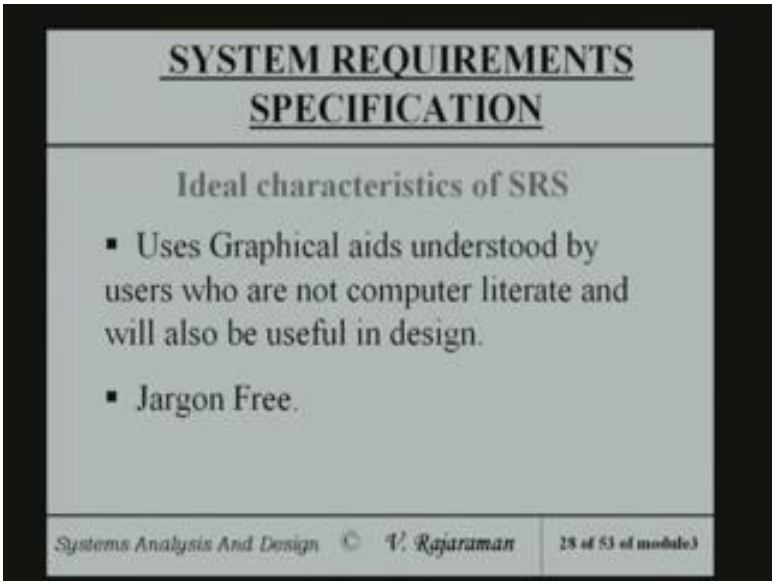
So, that kind of a an un ambigutive contradictions can really ultimately. When, the designer start designing, he will find that he cannot do much with it. Because, it reduce the specification is if he follows one path some other part will not work. So, it is important to have unambiguous specification. And as usual specification must include operational, tactical and strategic requirement. So, all three and very clearly.

And once, you have these all drawn up it should eliminate possible later disputes between the users and analyst. The ultimate idea of a good SRS is that later on in the life cycle of the system, there should not be any unresolved issues, which will lead to

disputes. And disputes can really become very uncomfortable for both the user or and the analysts.

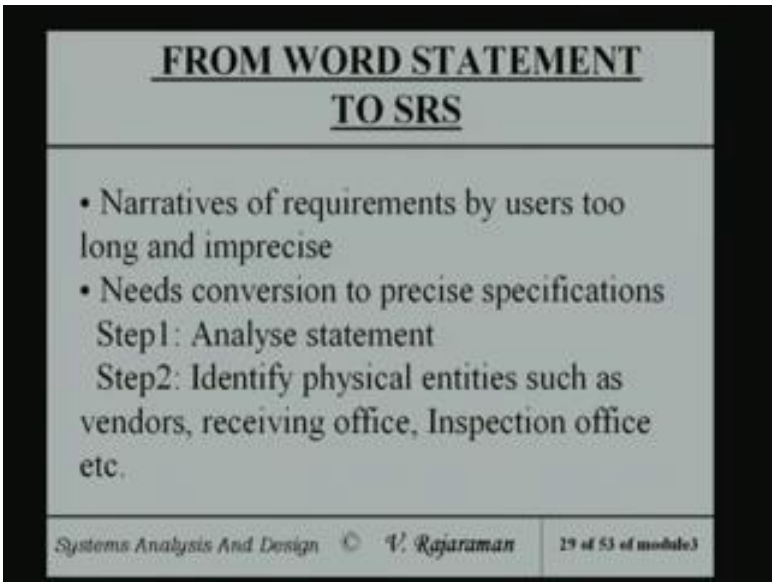
So, dispute resolution is something which one should avoid, very often for dispute to resolve by using arbitration and so on. But, one should not really get into that stage, if you are finding a designing a good system.

(Refer Slide Time: 45:21)



So, as I said ideally one should use graphical aids, which is understood both by the users and by the who need not be computer literate. And also will be useful in design, but you should understanding, it should be jargon free. What I mean by jargon frees? You should not use computer terminology, which is not understood by the general user say. And there is no point in using certain kind of terminology, which is not understood by the user.

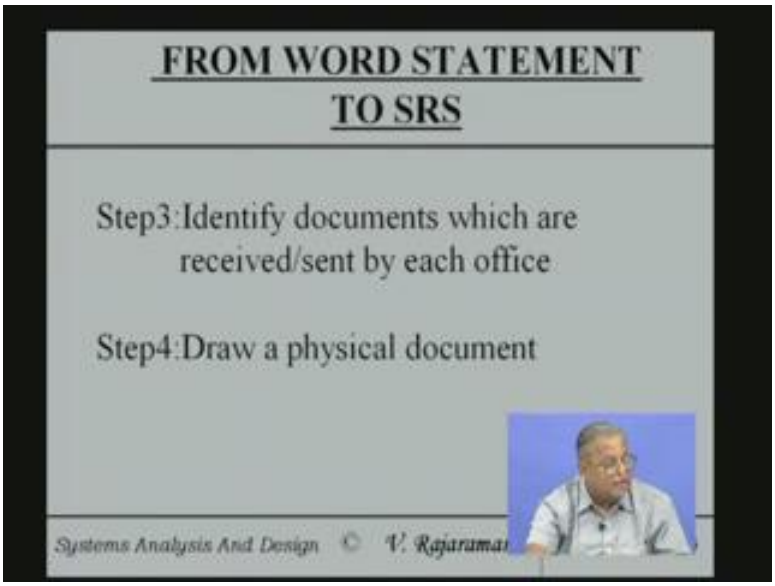
(Refer Slide Time: 45:59)



Normally one starts with a narrative. The requirements by users are given as a set of statements. Some time written, sometimes oral and mostly oral, which you get through interviews. And you take down notes and as I said at the end of interview and so on, you write down what you understood and let me get cleared by the user.

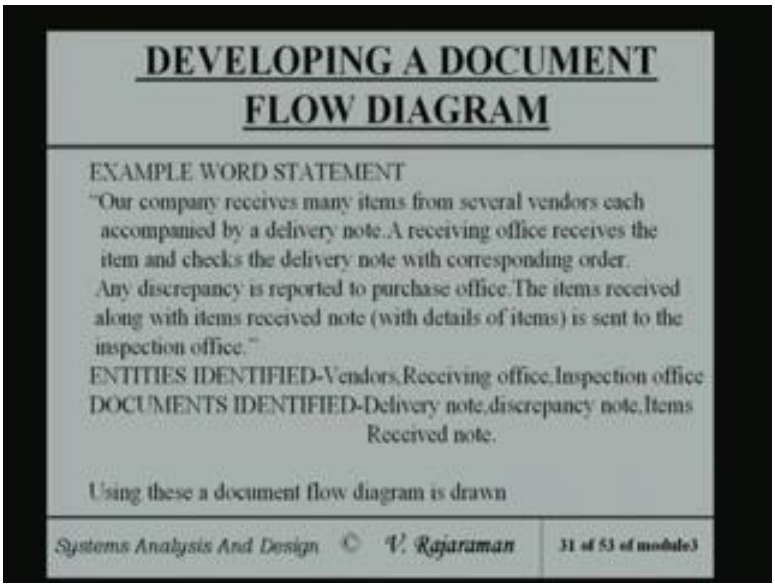
So, there is a at the end of the interviewing process and fact gathering process, you have only a what is known as word statement or a document written in plain English about what is required. And this has to be analyzed and quantified in some sense. That is identify physical entities, such as vendors receiving office, inspector office and so on. I will give you an example to explain this.

(Refer Slide Time: 47:03)



And documents and then, how the documents get from place to place to place, within the organization. This will become clear with the example I am just going to read out certain words statement.

(Refer Slide Time: 47:20)



That is these are very, very simple word statement, which can be setting a small in a short period in a class. Much longer word statement for the same problem, which include other steps in the process is given in the text book, which I pointed out. In fact, in this

text book there is a long word statement in page chapter 5, which essentially gives a may be what is at the end at an interview.

And tries to kind of spend a little bit time to extract from that statement, more quantitative information, which can ultimately lead to a graphical representation. The ultimate graphical representation, we want to have are two. The first one is called document flow diagram. The second one is called data flow diagram. We will now concentrate first on document flow diagram. And then get on to the data flow diagram.

Because, document flow diagram is closer to what really goes on physically in the organization. Whereas, data flow diagram is something which is more appropriate for programming in a computer. The true or kind of the data flow diagram is normally derived from document flow diagram. But, the purpose are somewhat different. The document flow diagram is something which is understood very clearly by the user.

He may not understand the data flow diagram. Because, it is may clearly understood by the designer. But, then these two should correspond. And one can of course, educate the customer on data flow diagram also, once he understand the document flow diagram. Now, this statement says our the normally the manager of a company receives many items from several vendors each accompanied by delivery note.

Now, observe the sentence, he says our company receives many items from several vendors. It is completely emphasized. How many items is it 100 items, 1000 items 10,000 items depending upon the number, you may have to kind of look at different methods of solving the problem. If small number, there will be one good method, if it is very large number another good method altogether.

So, it is also important to that stage to be able to get. So, little bit quantification, saying normally how many items are received. And how many items are received in a day or in hour. And what types of items come, again you say several vendors. And how many vendors or the same vendors are supplying everything or there are different vendors for different items and so on get some more detail.

And each accompanied in a delivery note. Delivery note, what does a delivery note contain that is important. Because, largely basic data from which you are going to proceed and come up with further analysis. So, receiving of receivers item, the physical

items flow. And checks the delivery note, which comes along with the item with corresponding order.

There is an order for the item, which is placed in the vendor. And the vendor is supplying the item. When, he supplies the item it comes to the delivery note. And he should actually specify, the delivery note the order number against which the delivery being given. So, the design of the delivery note also, you have to make sure there is a linkage between the order and delivery.

There is no linkage, you will not able to essentially find out, those what order it came. And you do not even know, whether it is being send by some body by mistake. So, whether these are issues, which we will look at as we proceed. And any discrepancy between what is in the order and what is actually in the delivery note is reported to the purchase office.

Now, the question is what is meant by discrepancy? Discrepancy could be that, he supplies more items or he supplies less items or he has supplied the wrong item. So, there are number of possibilities or you know you put a dead line, saying a by each time he should come. And he has delayed it by a long period and he may not any more require that item and so on.

So, these are discrepancies and any discrepancy reported to the purchase department. Because, purchase office is one which really initiated the order. And the item which is received along with the item received note details of item is send to inspection office. In other words, items have come you find no discrepancy on the face of it, in terms of at least document.

Because, you are not comparing only documents. The document delivery document, with the ordered document and this is document comparison ((Refer Time: 53:33)) that the item may be of poor quality or may be wrong item. The note may say something, you may ordered nuts instead of that he may supplied bolts.

So, there is a need for a inspection office, which inspects physically the items which are delivered. Against the items which are ordered, based somewhat on the description also of the item. And this discrepancy again at the inspection office has got to be reported to

the purchase office. So, these are essentially what is a word statement, which is made by the user.

So, once this statement is made, you have to identify the entities involved. What I mean by entities are the, you might say nouns in the statement or the actors who are involved in this entire process. In this case, the actors or the vendors who sends the items to you. Receiving office is an actor, in the sense that receiving office is got somebody, who receives the items. And who compare manually or may be on the computer.

If they are all computerized, ultimately if you want to computerize it. Then, the delivery note should be in the computer. And computer will be formed and the order would always be already in your computer in the data base. And you compare the two, receiving office is an entity. Inspection office is another entity and also purchase office another entity I have not specified here.

But, there is a purchase office which is also entity all right. What else is there, receiving office, the receiving note is a document. It is very different from entity, entity are the actors you might say to act on documents. So, in this case the entities are vendors, receiver, inspector and the purchaser. So, these are four entities involved in this simple type of a word statement or simple expression of what is done.

Observe again, that this only says what is being done. And that is ((Refer Time: 56:08)) about how it is being done, even now or how they want to be get it done later on. To the point I made about computer and so on is based on how it will be may be done. So, it is not at this time anything about how it is done. And you also identify documents. Documents on this case delivery note, because it comes with the items.

Discrepancy notes, that is you compare delivery note along with the order. In fact, you can see here, there is a order received item, received note is there is quite different. And the delivery note is the... In fact, they one of the documents, which is identified which is not stated very clearly here. In fact, I think it is an over site, intentionally I did it. Because, I thought you should actually look at it.

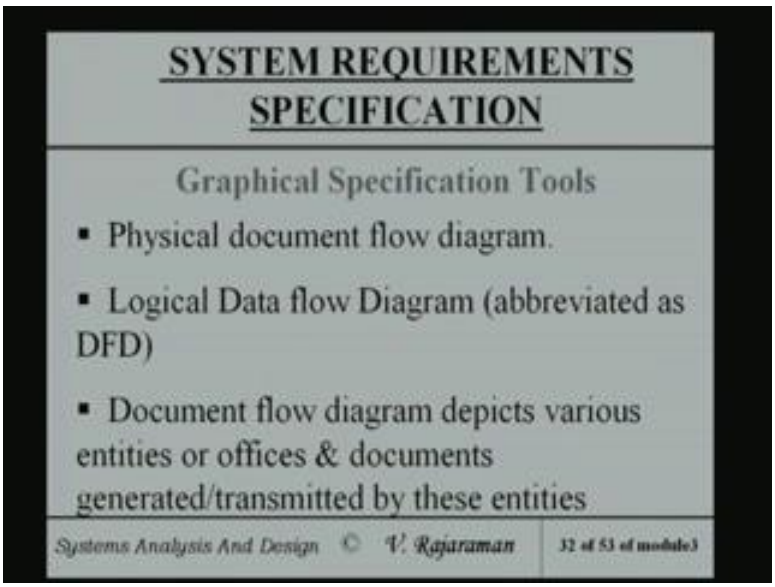
And if it is a class, you would you put your hands and say sir you made a mistake. Because, there is a document which is the order. Because, unless the order is there I cannot compare with delivery note. So, order is missing, so order is also document which

is got to be identified. So, order purchase order, delivery note and items received note. Because, items received note could be different from the delivery note.

Because, at inspection you may have find that he has said is delivered 100 items, but actually 90 have come and discrepancy. Discrepancy is in terms of different item, what you did not require it comes ((Refer Time: 58:05)). So, going back, so given the narratives, you analyze the statement identifying physical entities such as vendors, receiving office and so on inspection office ((Refer Time: 58:17)).

And identify documents, which are received. And sent by each office and the physical get a physical document.

(Refer Slide Time: 58:31)



So, based on this you come up with something called physical document flow diagram. And physical document flow diagram, will consist of the parts, which are all the entities the flow documents. And the this dispersing the documents. So, it is a graph connecting entities with other entities and through documents, which flows between these entities.

So, I will revert back to this or how to draw a detailed document flow diagram next time with certain amount, because we have to discuss it greater detail. I do not want to hurry it through that because, I am already getting to the end of this lecture. So, you think a little bit about it and say see how you can kind of draw a document flow diagram using entities and documents.