

Organization of Engineering Systems & Human Resource Management
Prof. Vinayshil Gautam
Department Of Management
Indian Institute Of Technology, Delhi

Lecture - 1
Introduction to the Subject and the Course

This is a basic course, devoted to the understanding of organizational and human resources management issues, in the functioning of engineering systems. It assumes that the listener has had a basic understanding of the courses, which are normally run, in engineering institution in the first or the second year, and has a sub understanding of what engineering systems are about. His orientation as an engineer would be of a person who operates a system. This course seeks to build upon that by developing his competencies as a person who operates an engineering system. To a person who puts the engineering systems to productive use therefore, making a better engineer of a good engineer, it seeks to build upon his basic strengths of the functioning of engineering systems.

And then add to it concerns of decision making and problem solving from the perspectives of organization of the systems, and dealing with the human element their off. It is well recognized that to operate any system, to operate any process, there has to be an organization behind it. The principles of organizing and put in together different elements is fundamental to civil life, and fundamental to any productive operation. This concept is very often attributed to the coming in up modern management thought, which however is only a limited truth. Organization as a function is neither a modern phenomena, nor is it routed in a post-industrial society.

Develop civilizations have existed globally, in different parts of the world at the reached high levels of productivity and cultural and civilizational excellence, even in the pre industrial era; typically one can go to the river valley cultures of Nile, Tigris Euphrates, Sindhu popularly referred to as Indus, Ganga, Yangtse-Kiang and list is large; the whole had civil society which had as the underpinning principle a system of organization. Therefore, we begin this course by an appreciation of the fact that organization as a function or as a concept is as old as civil life on this planet.

In fact, in the Asian texts there is a statement, translated it would mean that it is difficult to find the person who can organize. That is one of the classical truths captured in Sanskrit

statement and holds valid today just as many classical truths transcend time and space. The ability to organize is, central to the successful operation of an activity, and it has elements of both analysis and synthesis, which are difficult to master and requires discipline to operate.

This course will be focusing on the organizational function of engineering systems and as I mentioned earlier will be also looking at the human elements, which go in to productive systems. And human elements would cover areas of basic human functioning like motivation, planning, the legal frame work in which it operates, but whether it be the organizational aspect or the human resources aspect. The course will not be exhaustive because as usual there will be limitations of time, but it is hoped that the course will be able to orient the listener and the student, in to a basic competency of appreciating the elements of an organization, the need for the organization, just as much as the elements of human resources management and function it plays in handling engineering systems.

The objectives which we seek to fulfill through this course are 5. And I would like to when you briefly through it is so that your expectations, from listening to these recordings may be put into perspective and you and I can work together for fulfillment of those objectives. The first objective is to impart to the senior undergraduate engineering student and engineering student here is open to people with a science background also, an understanding of the theory and principles of organization of engineering systems and human resources management. In other words at an aspirational level, you will be able to appreciate the broad contours of the theory and principles of both organizing and the human elements in engineering systems.

The course will also give to the listener, the ability to perceive issues from an overall management perspective; besides the means to analyze developments in organization systems, functions and capabilities. It has 2 other objectives, the means to effectively understand organizational functioning and its human elements will be imparted to the listener and he will be able to have some ability to become a performance oriented manager of systems, or to go back to what I said earlier, a person who puts the systems to productive use. It would be useful if recordings are heard after some basic reading in the subject matter, because it helps to follow the flow of the argument. And it also, enables one to critically integrate what one is hearing in to one's cognitive system.

The reference list is available please go through it. But it is not as if those are the only books, which need to be read they have been selected, because of the way they relate to the course and the way they amplify upon some of the topics. But just in case those books are not available, it would be useful to read a book, which generally orients a person into understanding, what are the driving principles of managing and to that extent established author dealing with organization management and functional elements of productive systems, no matter under what title he captions his work would be worth relating to.

The course itself is divided into 3 modules, the 3 modules are basics of organizations and human resources management, under which five elements will be covered; the second module is effectiveness and performance and the third module is human elements of functioning organizations. It seems useful to recognize, that each one of these topics is capable of independent and separate treatment, and in some of the post graduate management programs, they do constitute the subject matter of a course. But in our case these will be introductory elaborations preparing you for a higher level of learning; it seems to me important to establish 2 of the driving elements of the breakup of the topics.

So, that you can have a higher level of comfort in understanding the presentations as they are made; there is in management literature as specialization, which deals with organization theory and practice. Organization theory and practice deals with concepts such as what constitutes a job, how you would do a job design, how you would pull jobs together to create an organization design or indeed how you structure the flow of work, in any organization going on to understand how the processes function in an organization. In other words which is the organization in the question, there is a bound to be structure, there is bound to be certain tasks which put together will come jobs, there is bound to be flow of work which is perhaps best captioned as an organizational process.

We will be touching upon all this in module 1; we will be also recognizing that none of this is possible without understanding the basic nature of an organization. Because, if the subject matter is focused on organization as a key concept; then it cannot be used in a general commonsense use of the word, but there are bound to be certain technicalities. Given the medium of communication that we have adopted between us; it is not possible to get into large definitional elaborations, which would innovatively in courage and debate which would need a personal iteration. But it is simpler to communicate, if you decompose the content to its basic elements which it is, I will be doing in my next lecture with you.

And also I will be drawing your attention to how human element does effect organization much in the same way in which, no matter what the mechanism system is say typically in a 2 wheeler or in a 4 wheeler. Repeated usage creates an impact on the mechanical system itself. For example, you will find that know to used cares will ever have the first second, third or fourth gear, you name it; coming in precisely same angle, to be absolutely it identical mode one to the other.

Repeated usages would have affected the angle of movement in visible an identify manner. Now if that is the impact which use mix even on the machine systems. Then one can imagine, how human element will be effected the structure, the process or indeed the design of work. Even if technically structures are common, usage gives to it a unique slant and much of this will be clear as the elaboration goes on.

Therefore, in the first module, you will be taken through 5 topics and let me list them for you so that, you get conditioned to listening to it in more elaborate manner in the arts of listening to come and the 5 topics to be covered under module 1 which you heard me say, is caption basic organization and human resources management are: 1 - understanding organizations, 2 - concerned of organizing engineering business and systems, 3 - structure and process issues in running organizations, 4 - design issues it running organizations and 5 - capping it all up operating organizations. We believe that if you go through these 5 components of module 1, after having done some essential reading of the kind of book which I have described some time ago. Then your ability to receive the inputs would be higher, than if you were hearing all this for the first time, having said that.

We are going to emphasize the understanding component and referring to the applicational aspects, that is essentially how it is structured at any under graduate level where this course is pitched. As and when and if, you choose to perceive a management education at a post graduate level, you will find that they will be increasing emphasis on the applicational aspects, because it will be assumed that the understanding of the elements and the appreciation of the elements has equipped to you, to look at the applicational aspects. For the present; however, if you have clarity on what to aspect, then you will be in greater sink with; what is being elaborated.

The second module if you will recall, is captioned effectiveness and performance any managerial system, is devoted to pursued of results. It is committed to be effective indeed, of

the many definitions of management which a bound and several of them are not even worth repeating. Say typically a statement that managing is getting other people to do your job, is a definition which is not only palpably inaccurate, but not worth repeating or disseminating. That is the popular definition in many quarters, is one of those ironies which can neither be effected nor changed here.

Management as a subject, as a discipline, as an action oriented cognitive effort is essentially focused on the making of a practitioner. The making of a practitioner can come through formal learning and through experience. Management education therefore, is committed to the creation of this practitioner; in other words reinforcing the competencies of individuals, which make them better problem solvers and decision makers. Hence it is possible to suggest, that management deals with problem solving and decision making, with clear cut concerns of optimizing resources.

Effective management cannot brook any wastage. So, you can clearly see that, there are three components; problem solving, decision making and optimization of resources. Management action should be able to put the three together. So, if we are dealing with problem solving, again it needs to be emphasized that in management discipline. Problem as a word does not have an identical meaning to that of the word difficulty; problem in management is not necessarily defined as a difficulty, it can be yet difficult, but the problem is understood in management action has a situation. So, when you are dealing with problem solving, you may have the situation which is working fine, but which needs to be improved further and that will be and can be called problem solving, which is why in many cases, when the discussion takes place and as you may be aware case method as an important element and skill formation in management at the higher level?

You may be asked to discuss a situation just to improve it, to its next level of growth. As a decision maker in an organization, you may be having a perfectly functioning system, but as a manager in that position, you would be expected to raise the level of performance; so that is the connotation of problem solving. Decision making is a choice amongst options, but to exercise the choice amongst options, first and foremost you must generate the options. Hence it is, that management competency requires both; a generation of options and an ability to eliminate options after having generated them, by doing a strength and weakness analysis to arrive upon the most appropriated course of action. But before decision making or problem solving or however, you put the sequence an important touchstone is optimizing on resources. For

those of you, who are familiar with golf or if you have not and when you have an opportunity look forward to becoming familiar with golf; you will realize that it is possible to get a bad break with a good shot or a good break with a bad shot, but irrespective it means that you must play a ball where it is.

Management is there for dealing with the art of the possible. You cannot wish a situation away; those are the facts of life. Very often the facts of life are, neither something you wished for or did anything to earn, but they are givens; which is what brings in these need to understand longitudinal thinking in management.

Be that as it mean, management requires sound reality perception and doing the best you can; where you are? Which is why? Reference to resources. There are always limits to resources and you have to function within those resources and it is expected of a manager; that he will optimize on those resources. So, now to share with you the content of the second module; which you heard me to say is dealing with effectiveness and performance and this elaboration was necessary. So, that you understand the logic of the selection of the components of the second module.

They are cybernetics and system frame work, having some appreciation of engineering as a domain of learning. The assumption is that the word systems is not all that know to you, and you obviously, would know that cybernetics is an important tool in system's frame work. It is an important concept. We will be also dealing with socio technical systems, which for many managerial decisions making is a significant approach. The remaining 3 topics will be dealing with efficiency and excellence together, they will constitute effectiveness; dealing with man, machine relationships and off course, as you would anticipated some reference to longitudinal thinking.

This elaboration will help you, to understand some of the basic building blocks of effectiveness and performance. This will be followed up by the third module; which we have captioned human elements of functioning organizations. In this module, we recognize an inevitability in management action. No matter how well an organization is structure; no matter how clear the processes are, no matter how scientific they be and no matter what simulation and programming went in to doing up the job design.

Ultimately it is human beings which will run the system; which is human beings, which will make a system work. Any of us; who believe we are in adult mode, would have had the

pleasant and unpleasant experiences of life. We would have been surprised where we least expected, both in an unpleasant manner and in a pleasant manner. Indeed, human resources management have very limited predictive validity. In fact, the story goes that; somebody was shooting scene of an altercation and the he was not getting it right. So, imagine the busiest bazaar of your city and imagine the director instructing the hero, to walk down the pavement of busy street, and instructing that hero to accost the first couple; which came down the road and here is the story. After several shots of the altercation were spoilt; this director decided to convert it into a real seen and before it got out of hand, explain to the people concerned what had happened. So that nobody was really hurt, but it would be a live seen.

So, the hero started walking down the pavement and the first couple that he met coming from the other side, he accosted them; said hello to them and the man asked what is it? So, the hero took a step back and he said; sir, as you come down the road, looking at both of you; I asked myself, how a distinguished elegant person such as you, could ever be with such a wretched women; who is so ugly and sultry not fit in up to be your companion. Now, the hero was expecting the man, to get infuriated at this kind of very uncouth and an ugly reference to his wife or whoever there, the lady was with him. But instead the man turned around to the women who happened to be his wife and said, you see darling, now people on the streets are saying, what have been telling you all my life. As you can imagine, the shot again got spoilt and the director was at it his wits and how to get a scene of physical altercation; either simulated or real, which would be convincing enough in the story, but that is another matter altogether.

The purpose of this narration is to put a cross to you a simple realization; which some engineers have difficulty and take time to grasp. There is no predictive validity in dealing with human beings. It is possible to be deterministic and it is possible to forecast with her reasonable degree of tolerance. When you are dealing with in animate objects; when you are dealing with materials; when you are dealing with elements, do which do not drive themselves; what when you deal with live substances; when you deal with live beings and sultry when you deal with human beings. There is no way in which you can control their behavior; to a point which is entirely to your expectations. Which is why? Management of human beings becomes such a tricky issue and a lot of people, who are precision oriented and who believe that act of management is an application of operations research theory to

decision making options. And therefore, must lead to some kind of an optimization of resources in a programmable manner; simply find it in possible to understand, how on earth do you deal with human resources and if you think that is the end of the problem it is not. There are people within the domain of human resources; who object to calling human beings a resource, their take very simply is human beings cannot be a resource.

Human beings are ultimately the recipient of all human endowers and all human effort is meant to support human beings. So, how can human beings be converted it into a resource. Therefore, the use of the face human resource is not something which the feel good about. Be that as it may this is not the place; where debate can be resold, but this is sultry the place where in an introductory lecture, or conversation, or presentation you choose your world. You should be sensitized to what the concerns are; what the debates are; what the perspectives are and what the treatment is going to be in the coming set of hours?

So, the elements of the third module are concerns of recruitment selection, skill formation and redeployment. Why do we begin with recruitment selection, skill formation and redeployment? And here comes (()). The sooner it is internalized in decision making and problem solving, the better it is. Nobody is employed as a person or paid as a person, but a person is employed or paid for the skills; which one brings to the tasks, which is supposed to be accomplished. Therefore, the recruitment is of the set of skills you have and your compensation is for the skills you have; because, if you not a part of the productive process of the organization. The organization itself cannot function and will find it difficult, even to find means of paying of your wages.

So, the emphasis on recruitment; you recruit for a set of skills and when you recruit you obviously, will have to select. And so, the story goes on to cover skill formation, which is a continuous process; Skill formation is never one time and average work carrier spans anywhere from 35 to 40 years. The environment changes, the technology changes and if somebody is carrying only the skills; which he came into organization with will clearly be obsolete, quicker than he can even sink.

Therefore, it is important to realize that, skill formation is a continuing business. To make skill formation a continuing business, there are interventions which reinforce learning and development. And finally, it is not only the skills which need review, but even the jobs get changed. For example, in telecommunications; when stoeger systems moved over to ESS to

it caused, a need for a huge redeployment effort of the engineers; who were recruited with a given set of abilities and competencies, but to stay alive in that domain. They would have to go into a whole set of new competencies and new operations. Meaning there by that redeployment would need interventions and planned effort; we will then go on to looking at concerns of teams and leadership. Now again these towards are used in a technical sense, as they should be in the management domain and team work is not just I like you; you like me, let us work together; off course, if you like each other and you find it easy to work with each other.

It is simpler to perform better, but facts of organizational life establish; that very often you have to work with people, whom you do not like very often, people will deal with you in a manner; which is palpably an cold form, but as a doyen of a Indian management Prakash Tandon is use to say; you cannot ask the world to rotating because, you want to get off. It is important to realize that in a work situation, there is a role relationship, the person behind that role; off course is important, but ultimately your there to do a task. If you do the task well, the organization remains healthy and effective; what I am trying to convey to is that team work is for task accomplishment. Therefore, in any job there are a set of receivables and there are a set of deliverables.

If there is integration between receivables, and deliverables; then your job is justified and the relationship between receivables, your job and deliverables creates the (()) of a team and I (()) go want to add a continuity for accomplishment of the targets, and the quality standards which have been set, similarly leadership is not just exhortation. It has different components and we shall cover it in course of time, but for the present leadership is gradually beginning to be recognized, as a quality which is universally needed at all levels of an organization. In all manners and whoever is doing a task is the leader, there and then. So, there is almost pensiveness in the concept of leadership.

The remaining three elements in the third module will be understanding motivation, elements of human resources planning; an industrial an Indian industrial law and managing industrial relations. That is where the course concludes obviously, nothing gets accomplished unless there is motivation to do it. One can get into action of accomplishing a task, with no involvement and in a manner; which makes it impossible to breathe life into the action of the tasks.

The quality of the outcome, there will never be as good as it would be with deep motivation, forget deep-motivation even routine action requires some motivation; what is it? That motivates people there are a lot of (()); some real, some in light hearted wean. Like for example, when are you motivated to go along with someone? It is not by reminded being reminded what that person has done for you, but by a feeling of what that person is likely to do for you in future; now that is motivation. There is (()) about it; there is a eye runny about it; skills lie in understanding the certainty in excepting the eye runny and being able to cope up with it, best of your ability to keep yourself optimally operational and that is being a good an affective manager. This discussion will be followed by understanding human resources planning. Because like in any other component of decision making and problem solving you need to plan for human resources; what do you plan in human resources? You planned for the facing out of the skills and the anticipation of the skills required in line of production or business. You plan for methods of recruitment; you plan for providing amenities, facilities, growth options to your employees; to your decision makers.

So, that they have level of comfort so, that they can focus on the actual action which is needed in the production and the decision making process of the organization. Rather than being worried about nano details; which have got nothing to do with the organization, but which touches the real lives; you plan also for a carefully calibrated exit policy. The each factor in many organizations is changing; the average agent; certain industries is becoming progressively lower; in certain other industries it has not being lower to the same extent and there are any numbers of variations. You plan for a carefully calibrated impact on this process of separation. You plan for the salary and wages. In fact, just about any resource which touches human beings; you have to plan for that and finally, this has to be done in the frame work of the legal setup. Which exits in the land there are labor laws; there are laws which touch finance; which touch economical operations; which touch retirement benefits; employ benefits. In fact, just about any aspect of management would have some law and land governing it. It is important to understand that, a lot of management action requires an understanding of what the legal frame work is all about and then the ability to handle industrial relations is important, to operating engineering systems, because industrial relations have to do with relationships with groups of people in the productive process.

To sum up therefore this course on organization of engineering systems and human resources management, will give you a broad bird's eye view of how appreciation of

managerial principles and operations is important to be effective in an engineering system. Engineering is important of course, it helps you to operate the system to be a good engineer is critical, but to be a better engineer, you will require an appreciation of how engineering systems are impacted by decision making and problem solving, which is often captioned as management. This course focuses on organization of engineering systems and human resources management. Welcome to the elaborations which I hope you will enjoy listening too.