Six Sigma
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Lecture – 08
Fundamentals of Total Quality Management

Hello friends. Once again I welcome you to our journey of Six Sigma. And let us move one step further with the topic on Fundamentals of Total Quality Management. This is lecture 8 of this six sigma course series; and we will discuss some of the salient features of total quality management.

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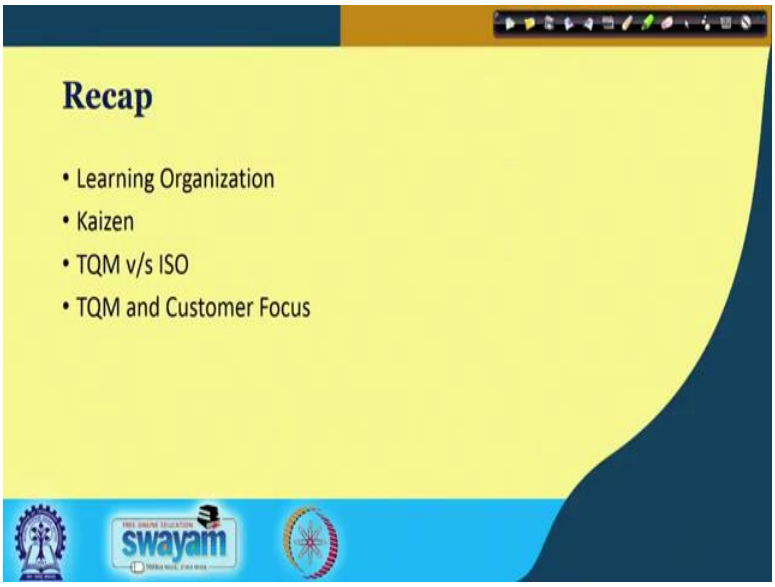

Before we move onto the crux and the content of this particular lecture, let us have a small recap. In the last lecture, we have seen what is learning organization; and there are certain prerequisites of the learning organization. If your organization is struggling on many day to day issues, then it is difficult for it to opt for any kind of continuous improvement program. We have also seen the importance of Kaizen, small-small improvements, TQM versus ISO, and TQM and customer focus. So, already the concept of TQM we have introduced in the last lecture.

Now, this lecture will take you further and appreciate the various philosophies advocated by various quality gurus on total quality management.

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So, this lecture, we will basically focus on fundamentals of TQM, common messages from quality gurus, Deming's chain reaction, quality enablers, seven basic tools of quality by Ishikawa and leadership issues. So, this will help you to create a solid foundation in the organization for implementing six sigma and not only implementing, but also realizing the excellent benefits in terms of money value of the six sigma implementation.

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So, TQM concept it is a comprehensive, organization-wide effort to improve the quality of products and services, applicable to all organizations. So, here I would make a point that TQM is not specific to only manufacturing or service organization; it can be applied to all sorts of organizations manufacturing, service, large scale, small scale, medium scale, all sorts of product variety. And these concepts are effective in bringing the right spirit and culture for quality in the organization. So, let us see the contributions of quality gurus and what basically they reflect upon the concept of quality.

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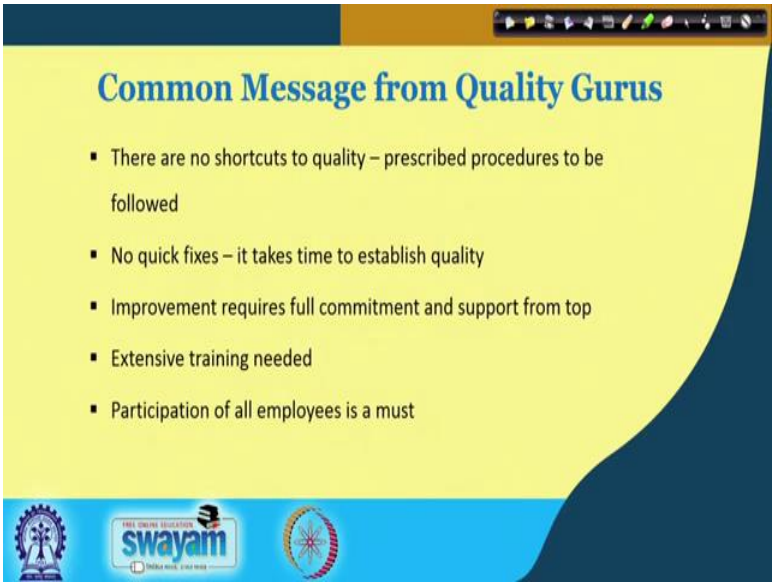

So, there are some common messages. I will go through in detail the various points important dimensions they have highlighted, but there are some common message from quality gurus. Number 1, there are no shortcuts to quality - prescribed procedure to be followed. So, you must believe in your SOP. You must believe in your quality document - vision, mission and the objectives, and you cannot just adopt a shortcut to realize the sustainable quality in your organization.

No quick fixes - it takes time to establish quality. Repeatedly I am emphasizing that your process might be at three sigma, and you can set a realistic goal 4.5 sigma. Then subsequently once you reached to that milestone, you can further improve it; and certain new milestone let us say five sigma or 5.5 sigma. So, it takes time to establish quality. And if an organization people, they practice passion and patience in achieving this standard, then they can realize the sustainable benefits of the quality.

Improvement requires full commitment and support from top. So, be always say that when you look at the bottle, always you will find the bottleneck at the top. So, in management in organization also we say that executive sponsorship, their support for all sorts of initiatives in terms of continuous improvement is extremely important, and they must support this kind of initiatives throughout the organizations which can enhance the moral and motivation of the people, so that is the support.

Then extensive training needed. You cannot escape from the training requirement, people they need to embay the different competencies, different skills at different point in time, and organization must have a charter to build the gradual competence of the people depending upon the various processes and the challenges organization is facing.

And finally, participation of all employee is must. So, quality is not only the responsibility of quality department or few people we have to have the commitment of all the people. The moment your product or service is passing from one stage to another stage, ownership is transferred. But if you think little bit critically then with the ownership good or bad quality is also transferred. So, participation of all employee is must, and they must realize that the final product or service whatever we are delivering to the customer or we are giving to market, it is because of all the people and functions in the organization.

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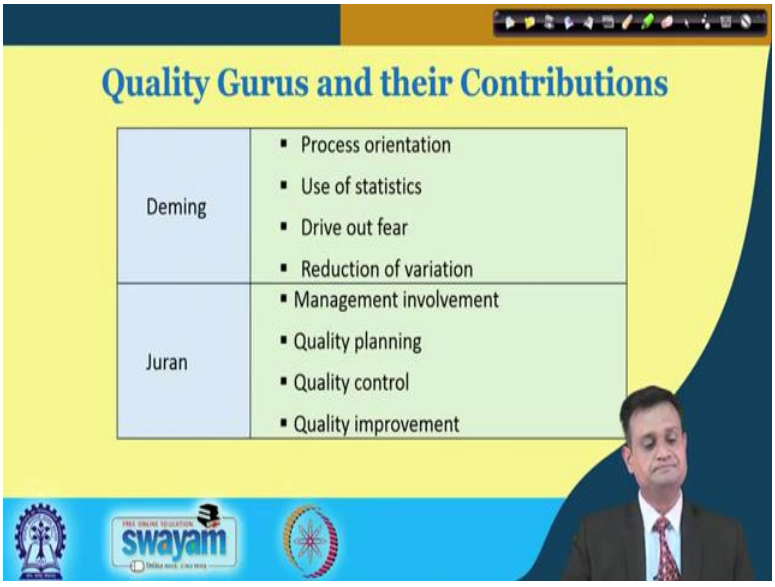

Let us see some key contributions of the quality gurus and what basically they were emphasized. So, Deming is heavily emphasized on process orientation and control of process for having better variability reduction and that is why use of statistics is recommended. He was the great advocate of drive out fear. So, Deming believe that people living under fear suspicion everyday say maybe a fear of losing job, or fear of getting a memo from the top management, they cannot really show their passion and commitment for the quality. So, drive out fear let us have an open minded culture where people feel extremely motivated to participate in quality initiatives, and reduction of variation.

Juran, if you see, then he mainly emphasize on management involvement. So, Juran was a believer that top management must execute their sponsorship, and they must provide all source of support whether in terms of technology, training or recruitment of the right people for the right function. And this can really boots the moral of the people in the organization. He proposed quality planning, control and improvement as a trilogy for establishing, maintaining and achieving the various quality standards, so that we will see.

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Feigenbaum, another quality guru, and he emphasize on total quality system. So, used to say that whether it is maintenance, production, sales, marketing, this function should be seen as a system in totality, and then you can really say achieve the desired quality standard and the customer satisfaction. Design quality in. So, quality is to be design right

at the concept stage. As we have seen in the last lecture say subsequently as you move further and further from your concept stage, cost of building quality increases. And then there is a customer orientation which is a common part in all the TQM philosophy.

Ishikawa has again emphasize the use of statistics quality circle. Ishikawa says that you have quality circles operating maybe including 10 to 12 people of different cadre. Let them come together discuss the problem on a time to time basis and figure out some amicable solution. So, that will ensure the involvement of the people as well as it will empower them, motivate them for proposing the new solutions to the existing quality problems.

Crosby: he emphasize that zero defects. So, he advocated that let us achieve a quality which is close to zero defect, and cost of quality is one of the important factor in achieving this kind of standard. So, if you measure quality in terms of cost - dollar value, rupee value, then you can really sensitize the management as well as people for opting the higher and higher quality standard sigma level in our language and that is where the real crux of zero defect lies. He emphasized on hidden factory. We have seen in detail in the previous lecture that hidden factory is the concept which basically say does not uncover the amount of effort or resources employed, extra resources employed in meeting the customer requirement. This is mainly because of rework and scrap you are producing and this hidden factory must be exposed in order to improve upon your role throughput yield as well as achieving the standard like zero defects. Slogans he says that many a times, slogans if they are not appropriately used then this slogans they create some kind of demotivation and to the extent possible such kind of slogans should be avoided.

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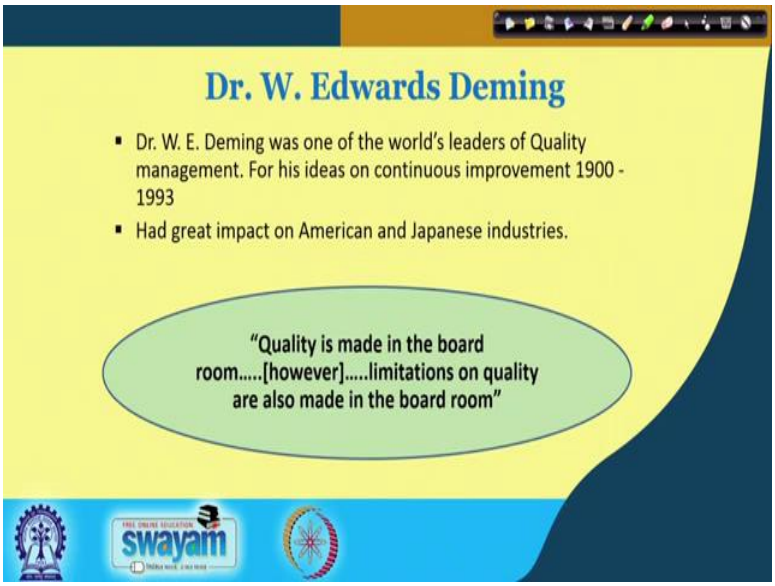

So, let us see one by one some of the key contributions and philosophies. Dr. W Edwards Deming, so he was one of the world's leader quality management. And for his ideas on continuous improvement 1900 to 1993, a long period he has served as an academician, consultant and provided his say professional services to many topmost organizations. And this is where Edward Deming say contributed a lot and created a great impact on American and Japanese industries.

So, quality is made in the board room. He is strongly believed; however, limitations on quality are also made in board room. So, just see that Deming advocates that the failure and success is decided in the board room, and the moment you decide the policy you decide the quality ideology the time that decides the success or failure of your quality initiative.

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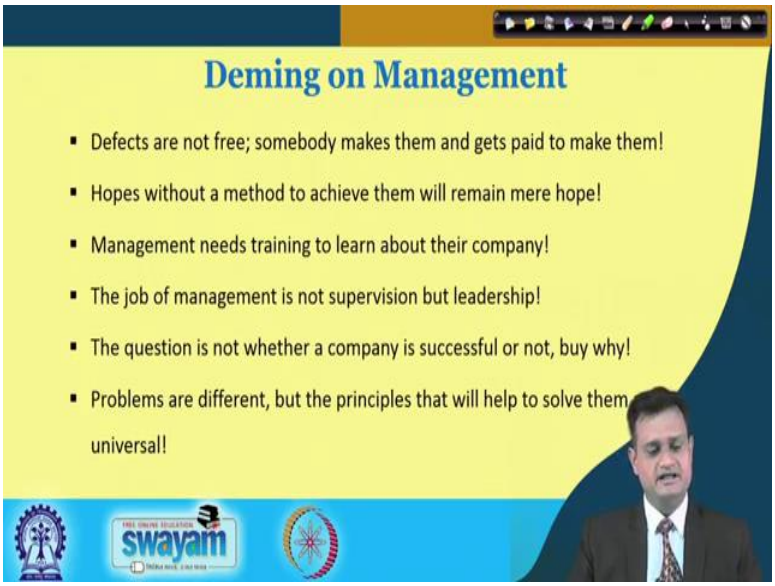

So, Deming on management let us see what philosophy he extents. I would just like to say that majority of the quality gurus, their principles are quite generic, and many a times they are appreciated as general management principles, but when they applied for the quality improvement then they drastic improvement and results are realized by various organizations.

So, defects are not free; somebody makes them and gets paid to make them. So, please see that again there is an emphasize on hidden factory deploying extra resources and that is where say defects needs to be controlled. Hopes without a method to achieve them will remain mere hope. So, you need to have a systematic methodology, use of statistic, use of scientific tools and techniques in order to dig out the cause root cause say problem, and then subsequently address this root cause with a systematic methodology.

Management needs training to learn about their company. So, the training part cannot be ignored and continuously you need to improve upon the competency to learn about their company and the new practices. The job of management is not supervision but leadership. We will see some dimensions of the leadership subsequently, but this is very important that you as a top management cannot just act as an inspector you must impart necessary directives, policies, whatever technological support, infrastructural support as well as the motivation to the people through good HR policies and that is where the role of company organization is more than a supervision which is the leadership.

The question is not where whether a company successful or not, but why. So, repeatedly we are saying that DMAIC approach has benefited many many organizations across the world and that is where the secret of success lies. So, it is not important just to say that some company is good or excellent, but we need to dig out that what is the reason why this company has achieved such a standard, and that reason can be replicated or it can be adopted for achieving the quality standards.

Problems are different, but principles that will help to solve them are universal. So, this is very important Deming says that the philosophies advocated as a part of total quality management. They form a bigger gamut and whether it is a manufacturing service or any scale of organization, the principles are universal and they can be adopted for a greater benefit to the company.

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Now, if you see one of the important contribution of Deming, then Deming has advocated something called Deming's chain reaction. And how it operates, let us see. So, improve quality is my objective is my desire, then cost decreases because of less reward, fewer mistake, fewer delays, snags, better use of machine time and material, this results in we have already seen rolled through pulled yield, your improved productivity improvement and subsequently captures the market with better quality and low price. So, you are offering better quality but at the lower price, so your competitiveness compared to the other players in the market improves. Then you stay in the business means it gives

you sustainability, and subsequently this leads to better job opportunity, better employment quality and further it improves the quality.

So, if you see the spiral, then the spiral keeps on repeating and the organization which believes in such say amplifying getting amplifying advantage cycle, then they will always move from one sigma level to higher sigma level. It means they will always show their passions, spirit and motivation, for achieving better and better quality standards.

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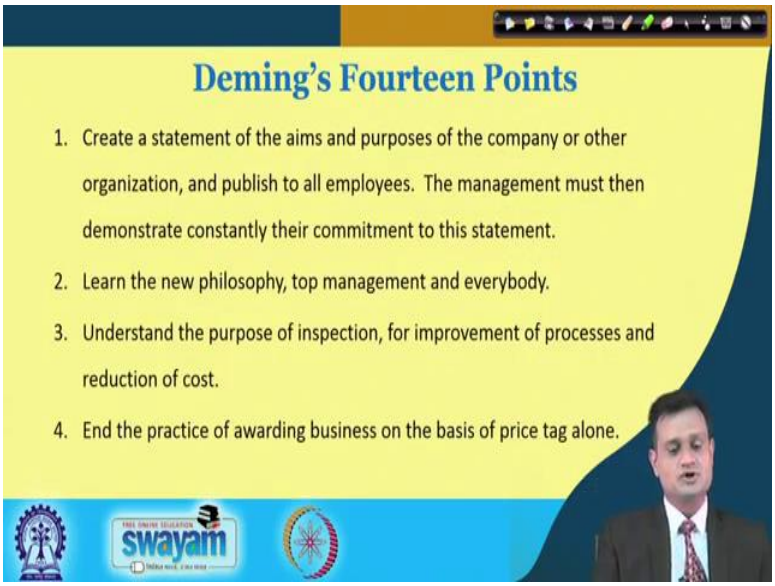

So, Deming has basically advocated fourteen points in order to create the quality culture in the organization, and hence to see the success of continuous improvement initiatives such as six sigma. So, we will see couple of points. So, number 1, create a statement of the aims and purposes of the company or other organization, and publish to all employees. So, he says that we should have some aims, purposes, vision and mission statement and let people to realize.

For example, IIT Kharagpur, they say dedicated to the service of nation. Everybody can understand what is expected from them. Caterpillar, when they were very new, and say subsequently another earth moving equipment company Komatsu came in picture. Caterpillar had already established their say world best in class quality and standards; Komatsu do they said fine we want to have a very simple vision statement encircle caterpillar.

So, caterpillar is the benchmark let them let us encircle them in all the way in terms of practices, in terms of culture, in terms of quality standard, in terms of product features and variety and this organization has seen a phenomenal improvement in their growth as well as quality standards.

Second learn the new philosophy, top management and everybody. So, we need to have an organization continually striving for learning, adapting new practices for improving the quality.

Third understand the purpose of inspection, for improvement of processes and reduction of cost. So, inspection is totally the a wasteful activity, but we must appreciate the necessary adequate inspection just to see that we can reduce the cost by reducing the defect.

End the practice of awarding business on the basis of price tag only. This is very important. And you cannot just say award or reward your business in terms of price tag alone, you must ensure the sustainable quality.

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So, 5th point in the list is improve the system of production and service constantly and forever. So, it is a continuous improvement say advice. Institute training and built the competency. Teach and institute leadership. So, then he says that let the leadership be realized at all the points in the organization. Let people to take the command, take the

leadership of quality. And this should percolate right from the top to bottom, and this is where the culture of leadership is created.

8th point already I emphasize drive out fear; create trust; empowerment transparency and climate of innovation. 9th optimize the efforts of team, groups, staff areas towards the aims and purposes of the company. So, let people come together, let them work in team and they should feel motivated to achieve a common goal which is in the benefit of the organization. 10th is eliminate exertion for exhortation for the work force. So, this is another important part that really hampers the motivation and moral for the workforce and we must see that such kind of exhortations for the workforce can be minimized.

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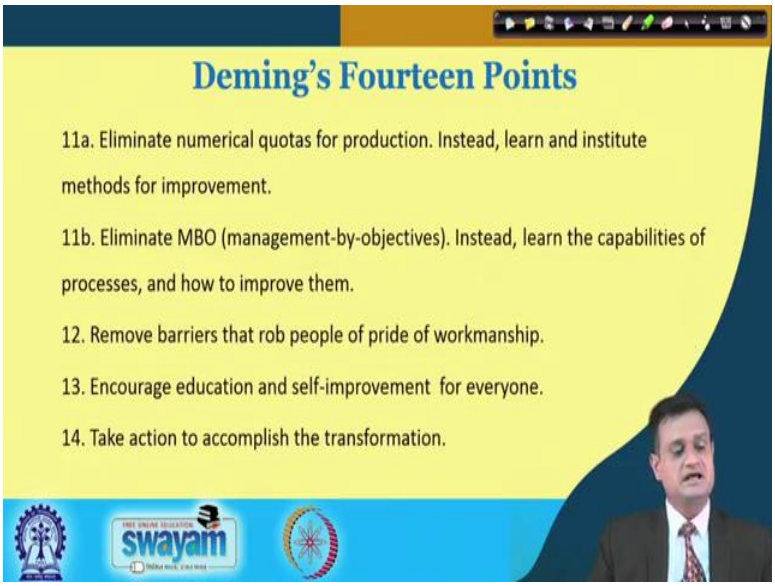

The point 11 is divided into two parts 11a and 11b. So, 11a - eliminate numerical quotes for production instead, learn and institute methods for improvement. So, do not say he say he believes, Deming believes, do not say 20 percent improvement in productivity 30 percent, but instead you try to learn any institute or implement the methods which can help you to realize even better standards. 11b, eliminate MBO that is management-by-objectives; instead, learn the capabilities of processes, and how to improve. So, point number 11 emphasizes on same spirit that instead of having number instead of having very strange and objectives it is better to emphasize on the learning of new methods and implementing them to strive for the better results.

Point number 12: remove barriers that row people of pride of workmanship. Many a times we have seen typically that people working at different level, they do not derive the equal pride in executing their work. And there are certain barriers may be bureaucratic barrier, too much administrative procedure, lack of empowerment. So, Deming strongly advocates that remove such kind of barriers that row the people from taking pride from their work.

Number 13, encourage education and self-improvement for everyone. So, people can be trained that is one part, but another thing that encourage education and let people to feel motivated in self-learning and improving their own functional processes and finally, take action to accomplish the transformation. So, when you are looking for continuous improvement, you have to bring the transformation change as a part of your culture, and this is the 14 point that take extent do bring transformation.

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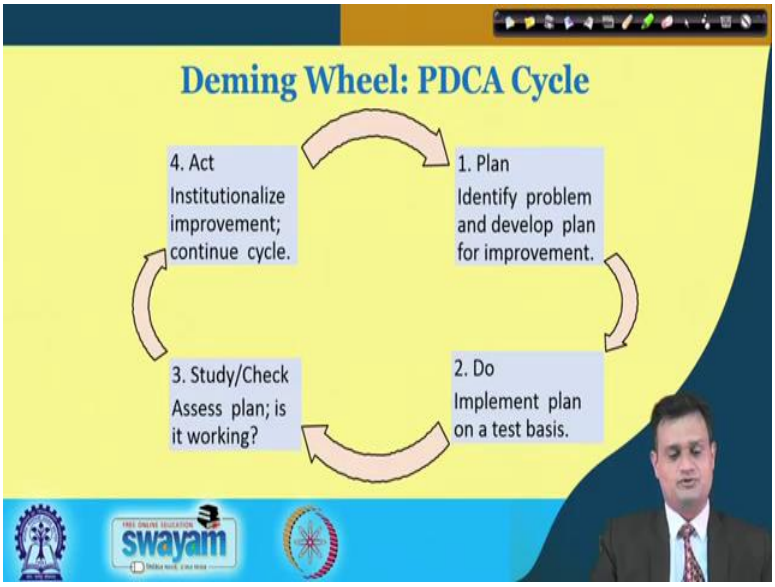

So, typically the PDCA cycle plan, do, study or check, and act, was advocated by Deming. And it is it was very much in use, but I emphasize that later on organizations realize that DMAIC is a better cycle, because it also accommodates the improvement and sustainability of the improvement and that is how this cycle has little bit loss the importance. And PDCA instead of PDCA, organization they are more following DMAIC or DMADV approach.

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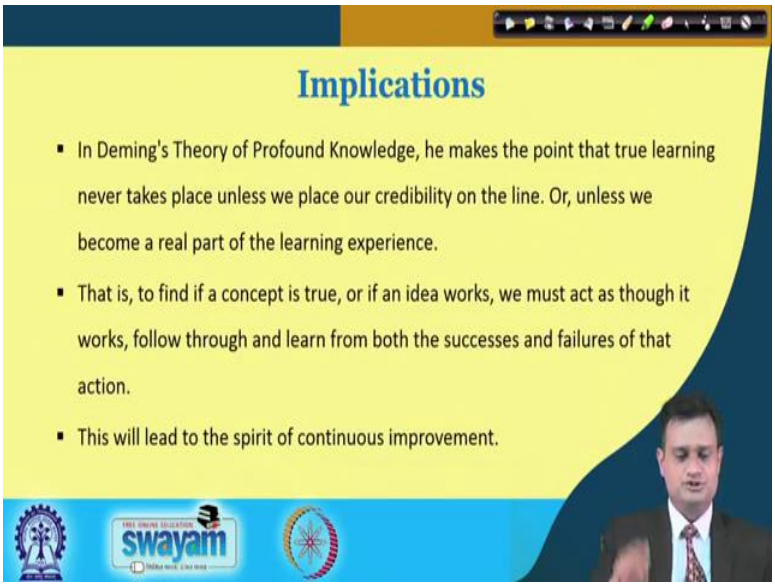

So, there were implications and Deming's Theory of Profound Knowledge, he makes the point that too learning never takes place; unless we place our credibility on the line unless we become a real part of learning experience. So, for example, you are attending this course and I am talking about lot of concepts, but unless you put couple of concepts in practice or you visit the industry and try to appreciate the relevance of these concepts, you can really never realize or internalize the importance of these concepts and it remains superficial. So, you may execute a project, you may visit and industry and that helps you to build your profound knowledge, internalize knowledge and that is something Deming emphasizes that is to find a concept is true or if an idea was we must act as though it works and follow through and learn from both success and failure of that action. So, this is where the theory of profound knowledge, internalization of knowledge comes in picture.

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If you see the contribution of another great quality guru, he is Joseph Juran, and typically he proposed quality trilogy - quality planning, quality control and quality improvement.

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So, briefly if you see the three phases quality planning, quality control and quality improvement. Then as a part of quality planning, he advocates that sets the quality goal let you have the quality policy, customer requirements must be identified and analyze and must be translated into our language. So, customer has their own language, we follow some language that is more technical in nature. And you need to develop the

products for these needs only. So, you cannot develop a product and force the customer that fine I have build an excellent product and you must accept it. We must try to say get the voice of the customer in their language; and convert it into our language, and then you optimize the product features for these needs.

Quality control through the process can produce under operating condition transfer process to operation, and this is where you established the stranger control over variability and finally, quality improvement seek to optimize the process via tools of diagnosis. So, it is not important that you control the process. We will see couple of tools and techniques later on, but you also need to optimize the parameters of your process can see that quality improvement really takes place at its best.

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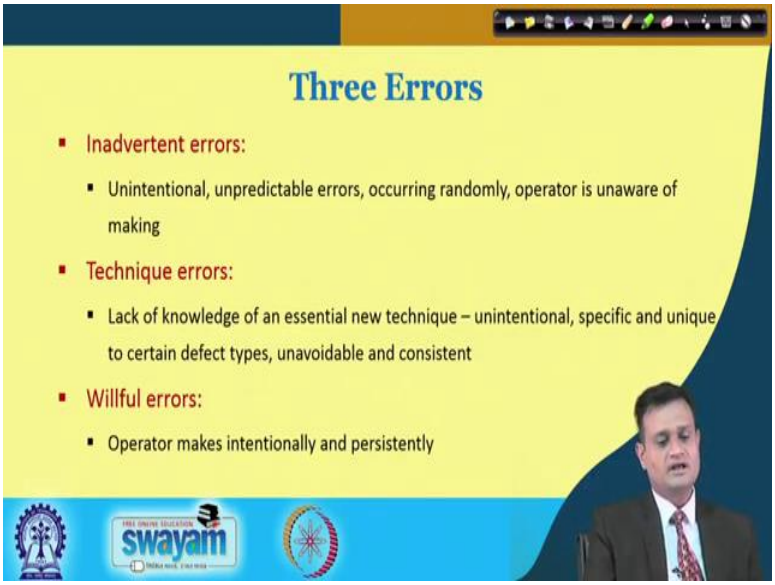

So, three errors basically Joseph Juran advocated that inadvertent error in achieving the quality. So, this is unintentional, my operator has no intention, unpredictable errors, occurring randomly, and operator is unaware of any such kind of error. Technique errors - here lack of knowledge of an essential new technique – unintentional, specific and you need to certain defect types, unavoidable, inconsistent.

So, these errors are mainly because of lack of knowledge, or I am not adopting the new method and this can only be rectified if you improve upon training or awareness to new methodology. Third error which is dangerous which is willful errors; so in first two

cases, operator is unintentional, person is unintentional. In the third, one he makes the error willfully and this is intentionally and it is persistently.

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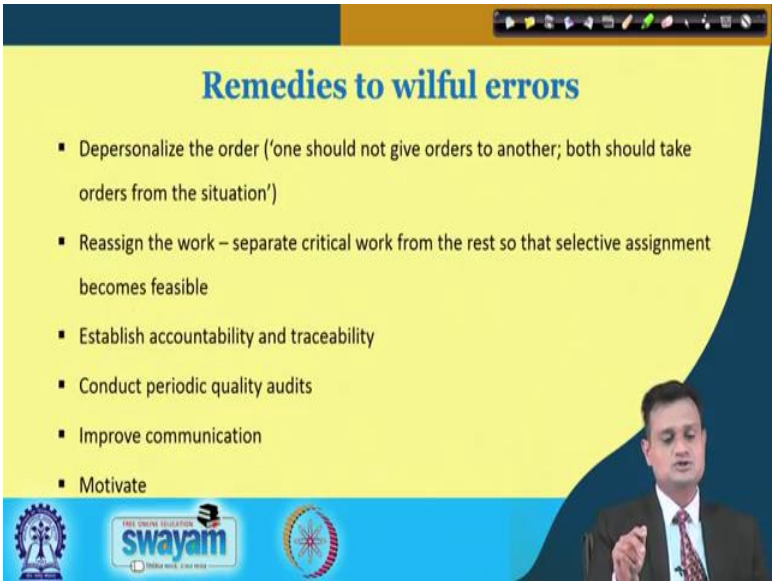

So, now there are some remedies to counter the willful error number 1 is depersonalize the order. So, one should not give orders to another, both should take the orders on the situation. So, there is a demand and let me follow in a team this particular situation and the solution and let the order giving process be stopped. Reassign the work, so separate critical work from the rest, so that selective assignment becomes feasible. So, many a times people they feel more as say difficult to handle, so you can separate out and then people can say handle a particular component well.

Establish accountability and traceability, select people not just pass their inefficiency to the next stage let them be feel more confident in taking up the accountability and traceability. Conduct periodic quality audits to sensitize the people, quality communication to improve the quality, and motivate the people so that they can always aspire for achieving better standard in that process of function.

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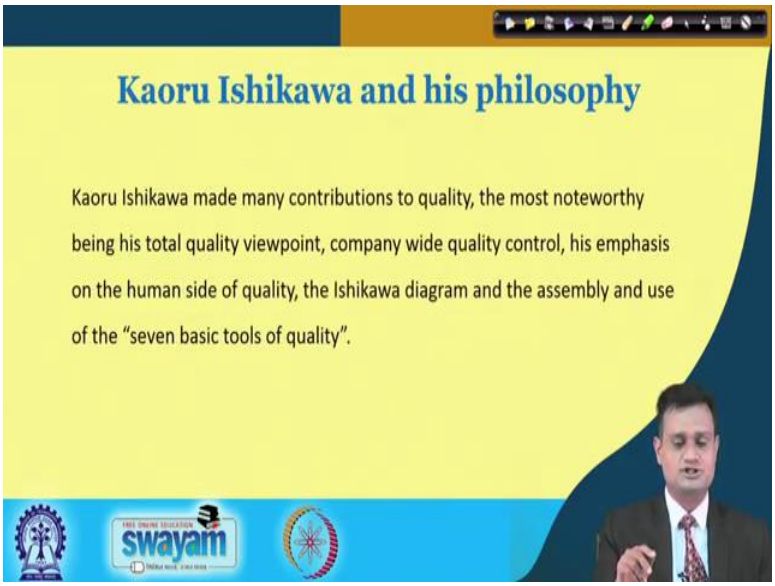

Then Kaoru Ishikawa and his philosophy; so he has many contributions to quality and the most not worthy being his total quality viewpoint, so company wide quality control basically emphasizes on human sight of quality and he proposed Ishikawa diagram and the assembly and the use of seven basic tools for quality improvement.

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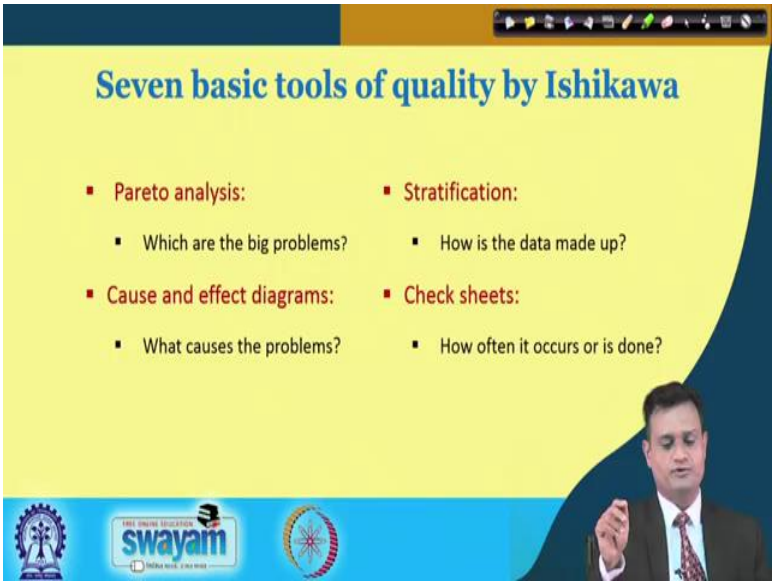

So, briefly let us see later on we will see with the example also. So, Pareto analysis what are the big problems how can we separate them out. Cause and effect diagram, so what is the real root cause of the problem. Stratification, how is the data made up. So, what is the

overall variability and what is the overall composition of my data, so that is stratification. Check sheet, how often it occurs or it is done.

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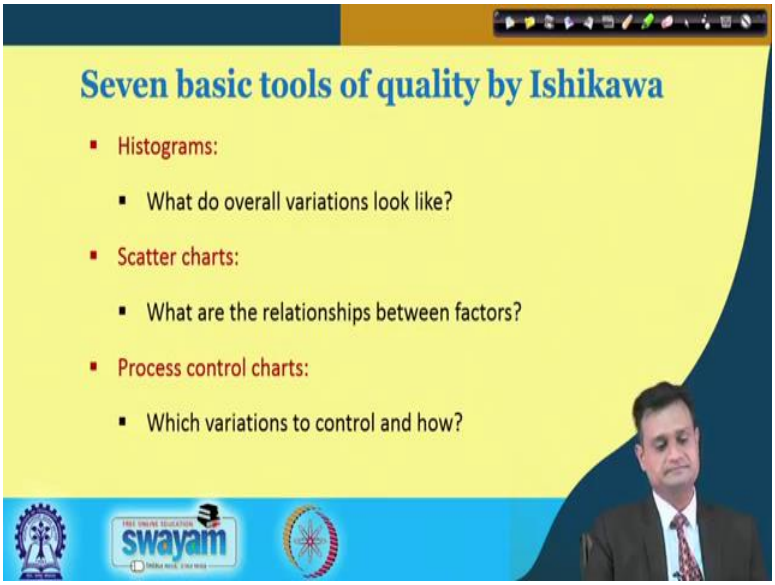

Histogram, what do overall variation looks like. So, what is my most likely distribution, how the data is distributed. Scatter charts, what are the relationship between factors productivity and maybe let us say implementation of new technology I want to figure out, so you can use this scatter chart. Process control charts, I must set a system by which I can keep my process under control and we will have a detailed discussion on process control chart.

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So, typically total quality management is about customer identified quality, involvement of the people and their empowerment, use of SQC, shared problems solving, leadership and team management.

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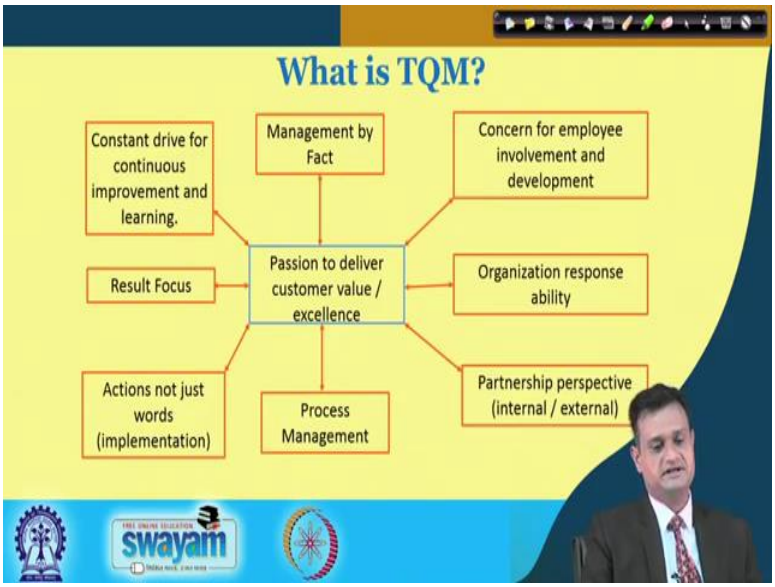

So, this is the overall domain of total quality management that it is management by fact. Second - process management, focus on process the result will definitely be in terms of product or service be better, concern for employee. Action not just words and result focus. So, drive out the fear these are some of the well known features of TQM.

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So, total involvement of all continuous forever sustainable and improvement, elimination of waste, reduction in variability, and innovation, this is all putting together becomes total quality improvement or total quality management.

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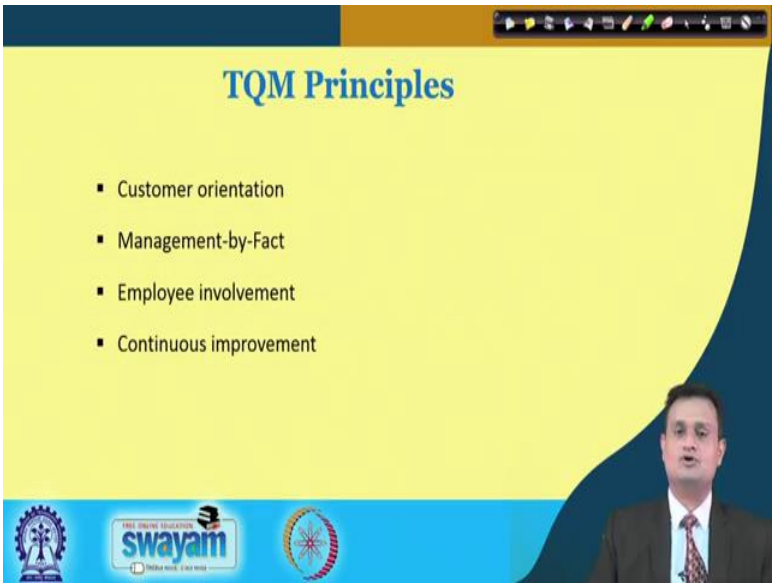

So, this is just a summary of TQM principles.

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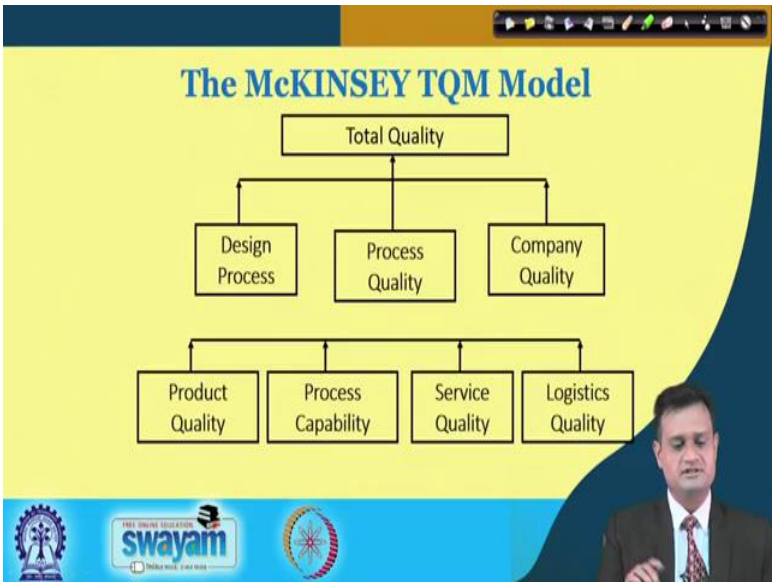

And you can see that the McKinsey, a well known say consulting firm, they proposed a TQM model and the broader dimensions of this; design process, process quality, and overall company quality in terms of policies, culture, administrative procedures and this basically is reflected in product quality, process capability, service quality and logistics quality.

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So, there are various quality enablers as we have seen appropriately instituted awards reward system, benchmarking, customer survey, effective leadership, just in time,

housekeeping, 5-S is a part of lean, quality circle, audits, quality function deployment, and commitment of the top management.

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So, quality improvement and roles of employees, it is very much important to emphasize that without having the total commitment of the people, I cannot achieve the quality across the organization, so there has to be participative problem solving.

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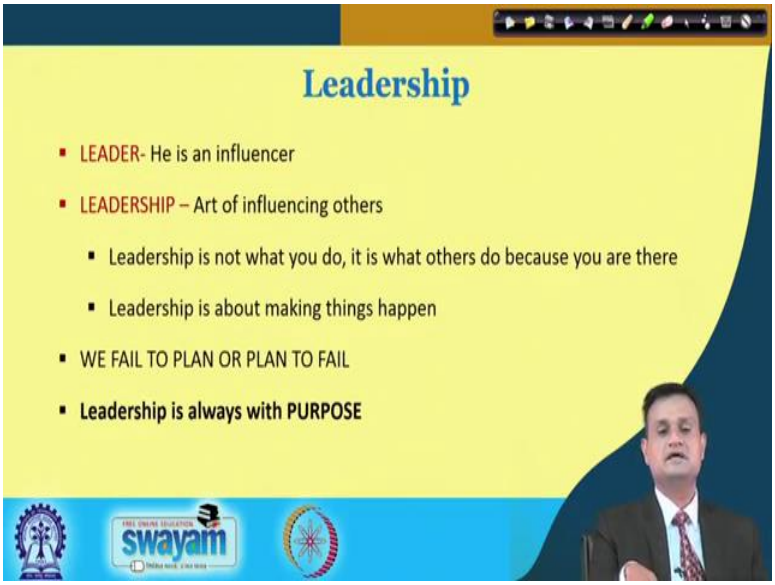

That should be a leadership; and leadership must be influential in terms of the purpose in terms of the objectives.

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So, you can just see that there is a difference in leadership and management. Leadership is all about creating, vision, installing new practices, developing a culture of creativity and fearlessness. And this is something different than management. Management mainly focuses on stability, administrative procedures, problem solving within the structure and so on. So, we need to focus more on the leadership, development of the leadership at various points in the organization.

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So, there is a well known say Hersey-Blanchard Situational Leadership Theory and you can see that on x-axis, there is a directive behavior; y-axis there is a supportive behavior. So, a leader cannot apply just SOP in dealing with the people maybe subordinate appear and establish a culture of leadership. So, many a times people they are finding it difficult to execute the task, and they may need more kind of directive behavior or they might be feeling low in terms of their motivation. So, they might be needing supporting behavior.

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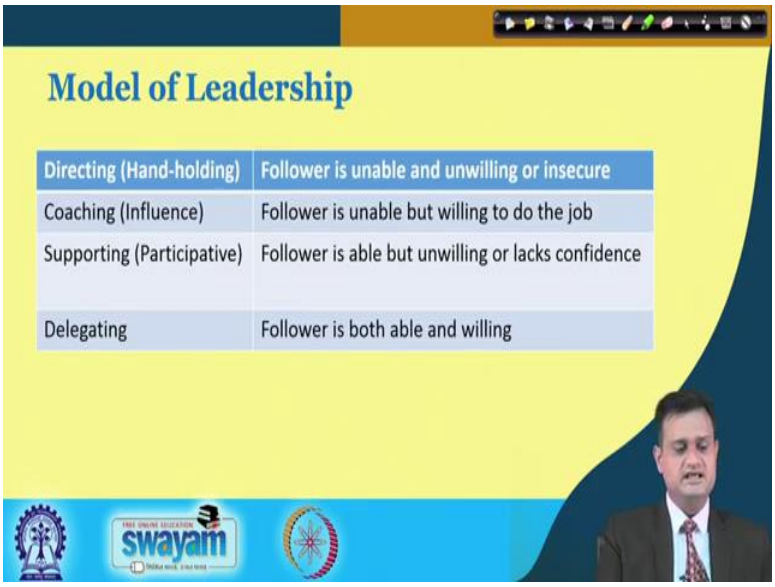

So, let us just see that directing means hand holding follower is unable and unwilling or insecure. Coaching is influence; follower is unable, but willing to do the job. So, he is lacking some competence what is willing to do the job. Supporting is participative; follower is able, but unwilling or lack of confidence and delegating, fantastic your follower or subordinate or peer is comfortable in executing the task as well as willing and this is where you must try to bring all the people over a period of time where they enter into self-learning, they enter into self-motivation and without much observation the execute the task.

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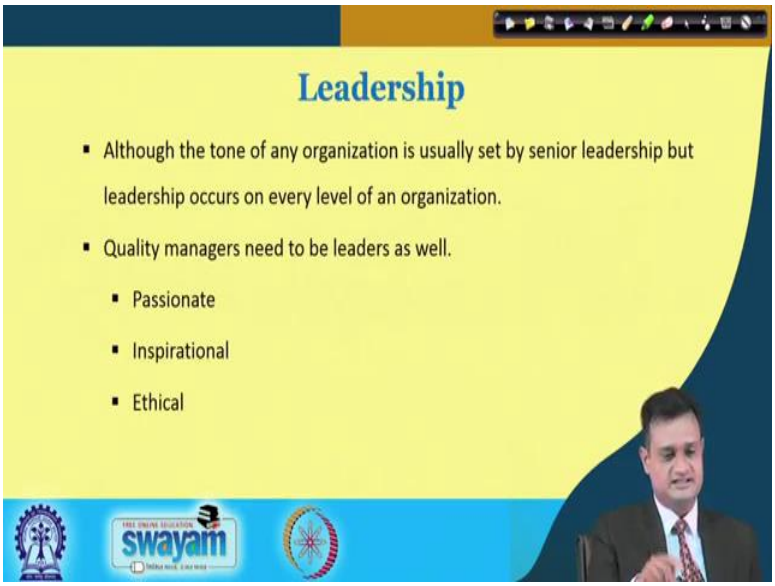

So, leadership is about three dimensions; passionate, inspirational and ethical which can really impress the people and build the culture.

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So, communicate is one of the important leadership skill, empathy and understanding others listening them, constant learning and visualization ability to receive realize and convey the results of the process.

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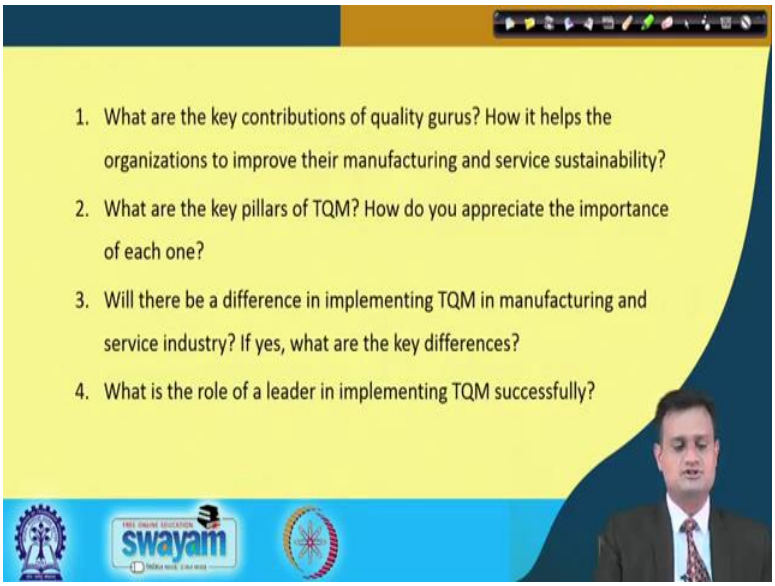

Now, before we end I would just like to put you under little bit thinking process and just try to reflect upon this questions and you would be able to appreciate the concept start in this lecture. So, what are the key contributions of quality gurus? How it helps the organization to improve their manufacturing and service sustainability? What are the key pillars of TQM? How do you appreciate the importance of each one? Will there be a difference in implementing TQM in manufacturing and service organization? And if yes, what would be the differences? And finally, what is the role of leader in implementing TQM successfully in the organization?

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These are the references you can say refer for say deeper learning of the thought concepts. Logothetis is one of the very good book on TQM. You can also refer Forrester Implementing Six Sigma. And some other books on green belt and black belt Six Sigma.

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So, the conclusion, in order to effectively implement quality – people must understand what quality is and how it benefits everyone. It is leadership's responsibility to lay the foundation and support a quality culture within an organization or program. And finally, the quality management program is essential for the implementation of successful quality assurance and the application of quality controls.

So, with this I thank you very much for your interest in learning the concepts of TQM. Please revise it, internalize it. If possible visit a nearby industry, and try to see the application of such principles. We will meet again in the next lecture with the new topic.

Thank you very much, be with me.