Six Sigma
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Lecture – 12
Management and Planning Tools Part – 1

Hello friends, how are you? I hope you are doing well in your studies, in your job and simultaneously say enjoying our journey of Six Sigma. Systematically and we are going ahead with the concept to tool and then application of the various tools and interpretation of the results.

Today, I will help you to appreciate the importance and application of Management and Planning Tools sometimes these are also called as new management tools. So, in general there are very good management and planning tools, typically we analyze the qualitative and quantitative information and this tools really help the planners, process engineers, product designer to get lot of important information right at the first stage.

So, because I want to discuss the complete portfolio of management and planning tools, this lecture is divided into part 1 and part 2. So, as a part of lecture 12, I will discuss the part 1 of management and planning tools.

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If you just see then the previous lecture we deliberated on voice of customer, concurrent engineering, QFD as an enabler to make the voice of customer in built into the product design right at the concept stage and there are various phases in QFD, so that right from the customer requirement to technical specification I can convert it into parts assemblies and process requirement. So, this was at the discussion we had.

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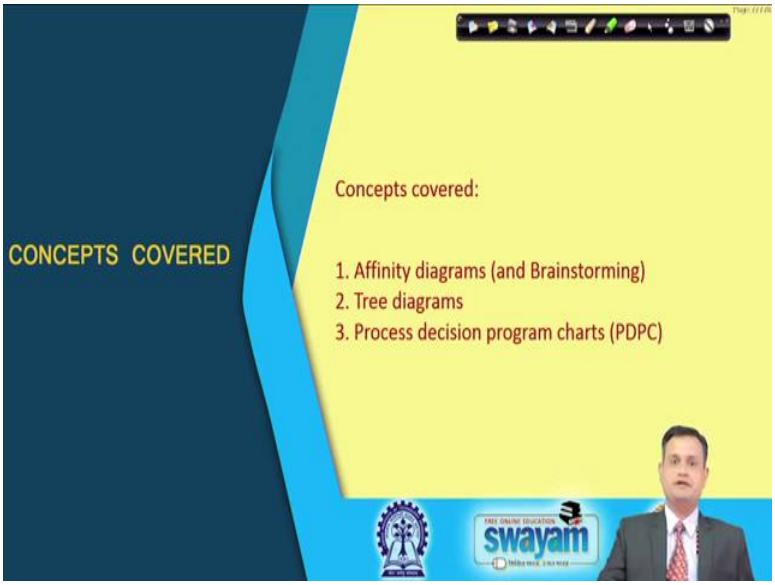

Now, let us move head in our journey and in this part 1 of management and planning tool, we will basically focus on three different kinds of tools. One is affinity diagram and brainstorming, second is tree diagrams and third is Process Decision Program Charts, typically called as PDPC.

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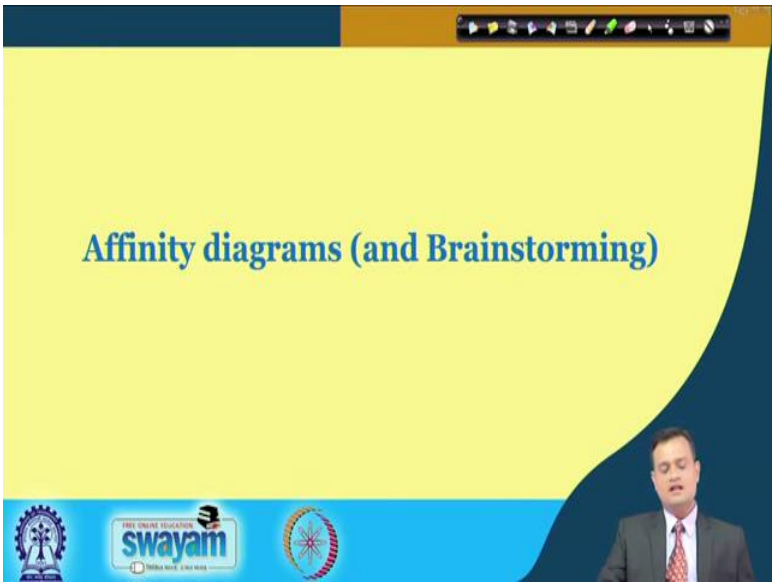

Now, when I say affinity diagram and brainstorming, I can typically consider the various approaches as a part of brainstorming and finally developing affinity diagram.

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So, putting them together brainstorming is one of the important easy to use technique with certain cautions, nominal group technique, multivoting and affinity diagram. So, let us try to appreciate these four things as a part of brainstorming in affinity diagram first and then subsequently we will discuss this tree diagram and PDPC.

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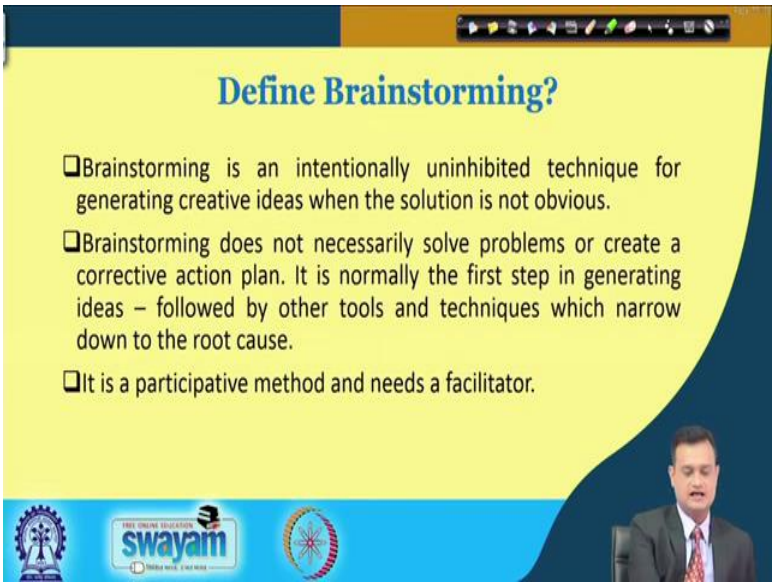

So, brainstorming is typically defined as an intentionally uninhibited technique for generating creative ideas when the solution is not obvious. I will just give you an example. See, once upon a time this US ice cream manufacturers they were struggling with the problem that what to do with this plastic containers and typically because plastic has lot of negative impact on environment they wanted to see that can be find some substitute.

So, the meeting was headed by one of the CEO and all top ice cream manufacturers were part of it discuss that length they could not figure out any solution. Many solutions were proposed that fine used the steel cups then there is a issue of hygiene and cleaning and many other things. Finally, one person was just tired and out of it is boredom he said eat it, again I am repeating eat it and then the leader of the group picked it up and this brainstorming session delivered the concept of ice cream cone. So, you can consume the ice cream along with the cone and cone acts as a container and the idea was developed.

Similarly, there are many examples you can find on net and how excellent solutions where derived when the technical solutions many a times are not feasible. So, brainstorming does not necessarily solve problems or create a corrective action plan, it is normally the first step in generating ideas. So, please remember becoming too much critical, biased, discarding the ideas, doing evaluation is detrimental to the process of brainstorming.

Our purpose is to create the new ideas and then followed by other tools and techniques which can help you to narrow down some of the feasible ideas, workable ideas. But, at the beginning we should motivate the team members to be creative open minded in giving their ideas. So, it is a participative method and needs a facilitator.

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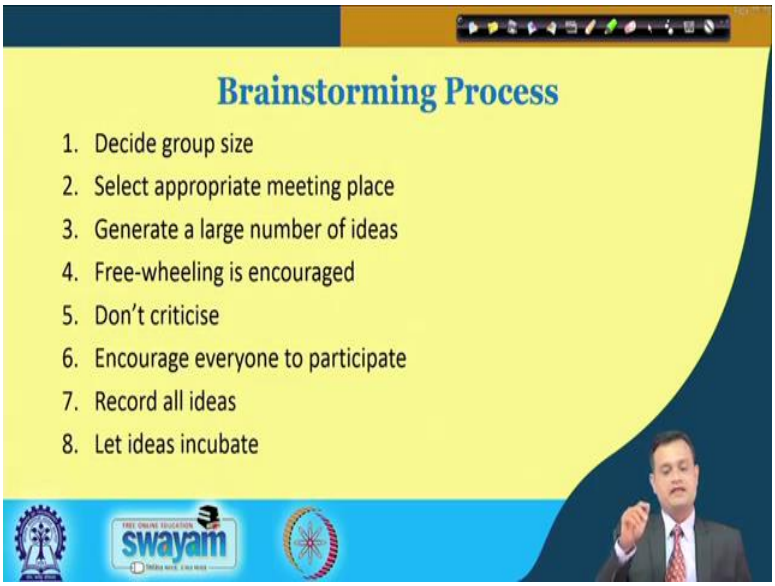

So, the process is very simple, define a group size, select appropriate meeting place where people they feel comfortable. All the positions, egos, powers, they are just left at the door steps and you can creatively participate, open mindedly discuss. Third, generate a large number of ideas. Forth, freewheeling is encouraged fine, you can keep expressing your ideas roll your ideas do not criticize, as I mentioned do not bring your bias in this process, do not try to influence the members do not criticize. Encourage everyone to participate. Record all ideas and let ideas incubate. So, this is a very simple procedure of brainstorming.

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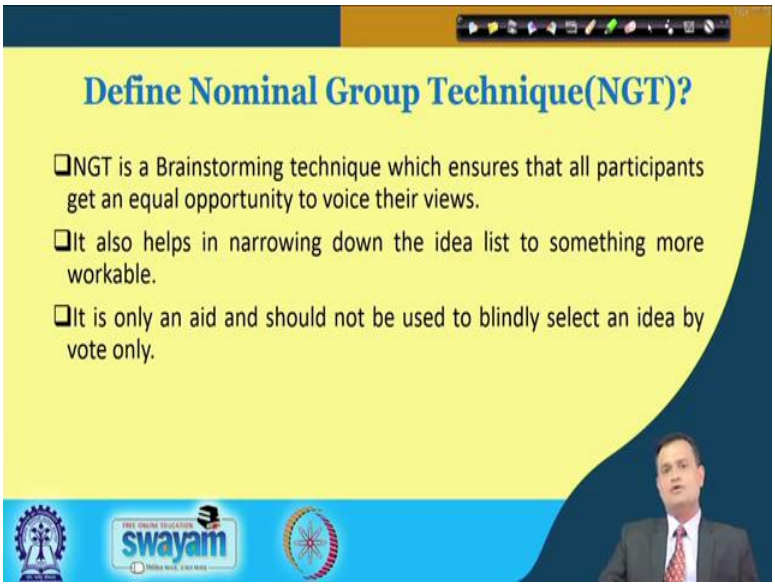

Now, in addition do brainstorming to help the people facilitate the people more, we also make use of nominal group technique typically called as NGT. So, it is a brainstorming technique, but here it tries to ensure the participation of all the people by giving them an equal opportunity to express their voice and views. So, this helps in narrowing down the ideas leads to something more workable and it is only an aid and should not be used to blindly select an idea by vote only.

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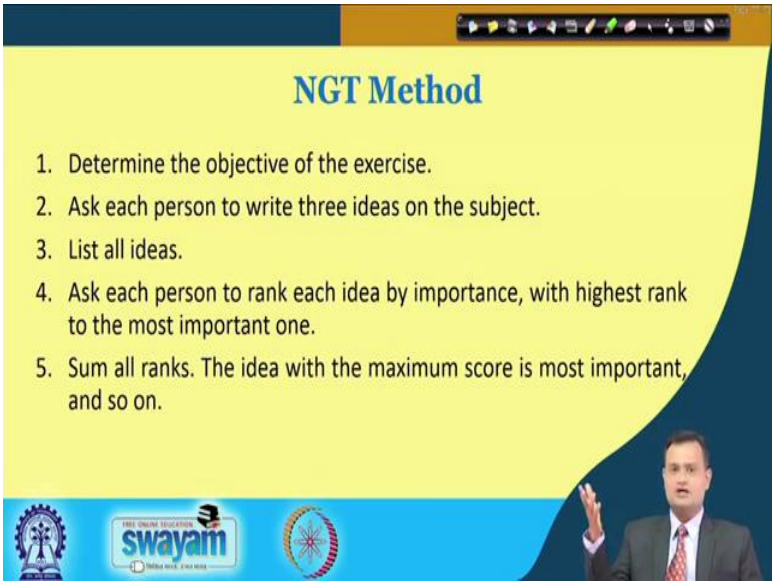

So here how it works? Determine the objective of the exercise. Ask each person to write three ideas on the subject. List all the ideas; you can use the white board. Ask each person to rank each idea by importance, with highest rank to the most important one. Sum all the ranks, the idea with the maximum score is most important and so on.

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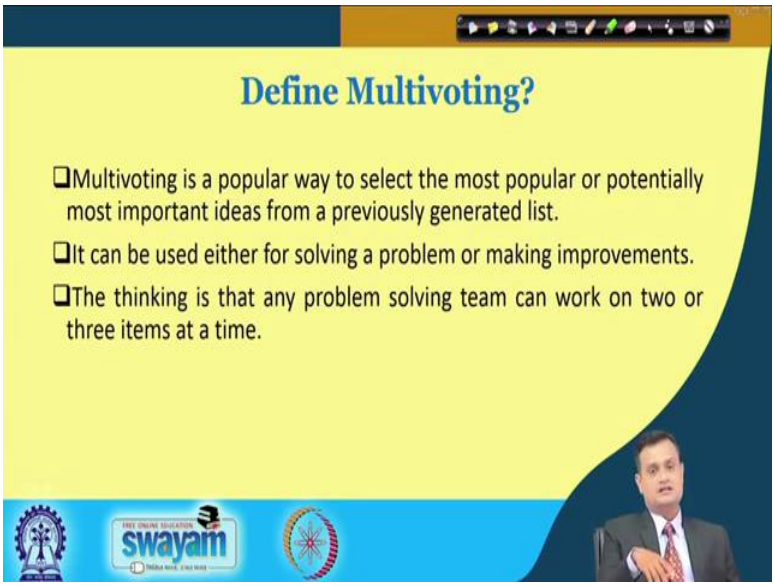

The third approach that also facilitates your brainstorming process and that is multivoting we have to narrow down. So, multivoting is a popular approach and the name suggests that here my objective is to seek or conduct the voting process, seek the opinion of the people and see that what are the most popular or potential ideas. So, this can be used either for solving a problem or making improvements and the thinking is that any problem solving team can work on 2 or 3 items at a time.

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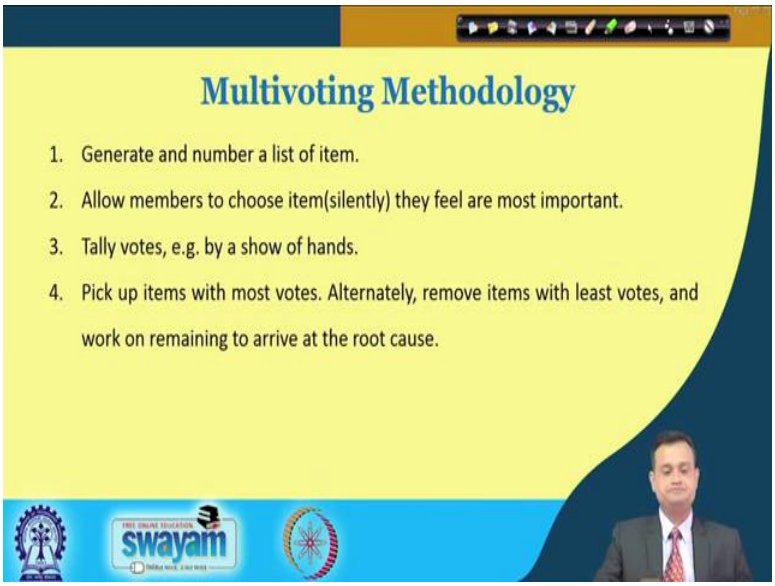

Methodology is like this, generate and number a list of items. Allow members to choose items silently, they feel are most important, tally votes, collect their opinions by a show of hands they will raise their hands, pick up items with most votes, alternatively, remove items with the least votes and work on remaining to arrive at the root cause.

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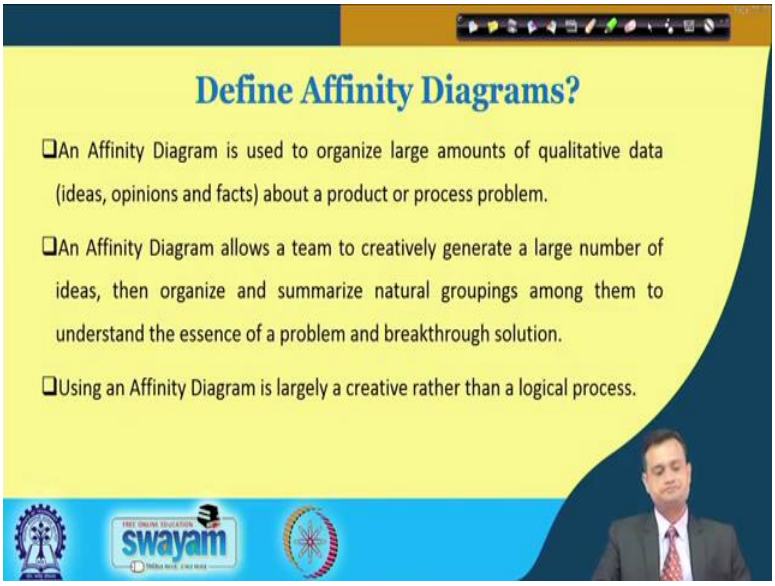

Subsequently, in order to be more systematic in analyzing the ideas generated through brainstorming we make use of affinity diagram. So, typically you can also make out the

spirit of this technique through the name affinity. So, this is used to organize large amounts of qualitative data, opinions, ideas, facts about a product or process problem.

So, here I will try to see the affinity among the ideas or opinions and try to bunch them put them into various categories. So, this allows the team to creatively generate a large number of ideas and then organize and summarize natural grouping among them to understand the essence of the problem and breakthrough solution. So, using an affinity diagram is largely creative rather than a logical process.

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So, various advantages you can realize that it adds structure to large or complicated issues and ideas, break down complicated issues into easy-to-understand categories and help groups and teams gain agreement on issues or situation and then preclude the arguments.

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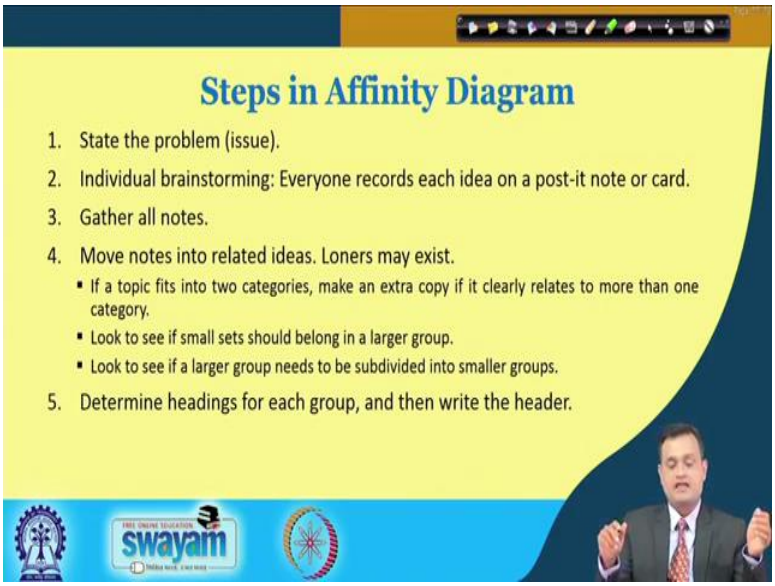

Steps are very simple in affinity diagram, state the problem or issue. Individual brainstorming, everyone records each idea on a post it that sticky note you use or they may use the cards, gather all notes, move notes into related ideas, so you try to see the affinity; loners may exist and if a topic fits into two categories make an extra copy if it clearly relates to more than one category. Look to see if small sets should belong in a larger group; we can merge it just in order to avoid unnecessarily having too many groups. Look to see if a larger group needs to be subdivided into smaller group vice versa and determine some common heading for each group and then write the header. So, it is a very interesting creative exercise and typically useful for analyzing complex problems, unfamiliar problems can be used by individual or team, hence typically it is similar to mind mapping.

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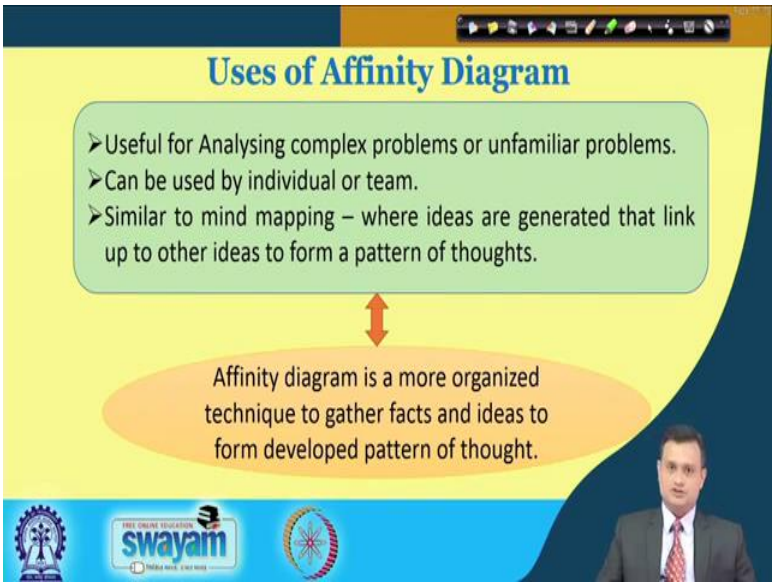

So, where ideas are generated that link up to other ideas to form a pattern of thoughts. So, affinity diagram is the more organized technique to gather facts and ideas to form developed pattern of the thoughts.

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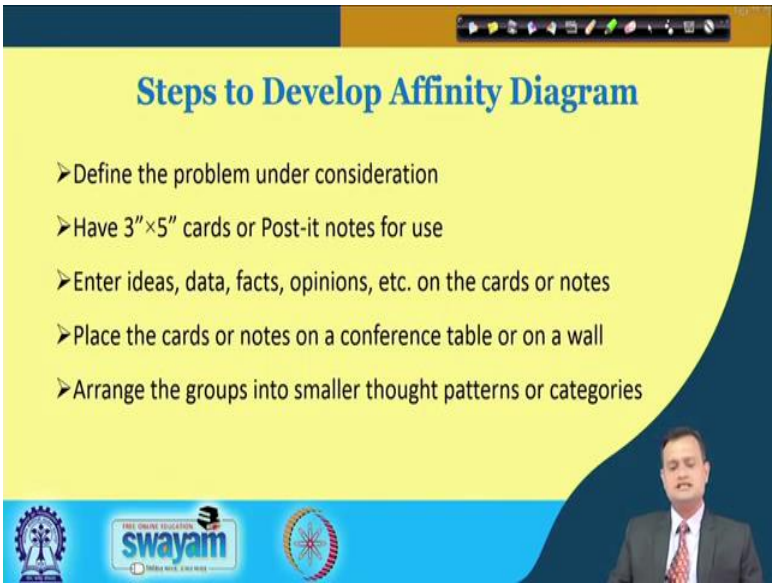

So, you see the steps that define the problem under consideration, have 3" × 5" cards or nowadays very good post it is a notes are available you can use it. Enter ideas, data, facts, opinions on the cards or post it notes then you can place or stick the post it on the

whiteboard or wall and then you can just try to rearrange them to see the pattern find the category cluster and then you give a theme to your main category.

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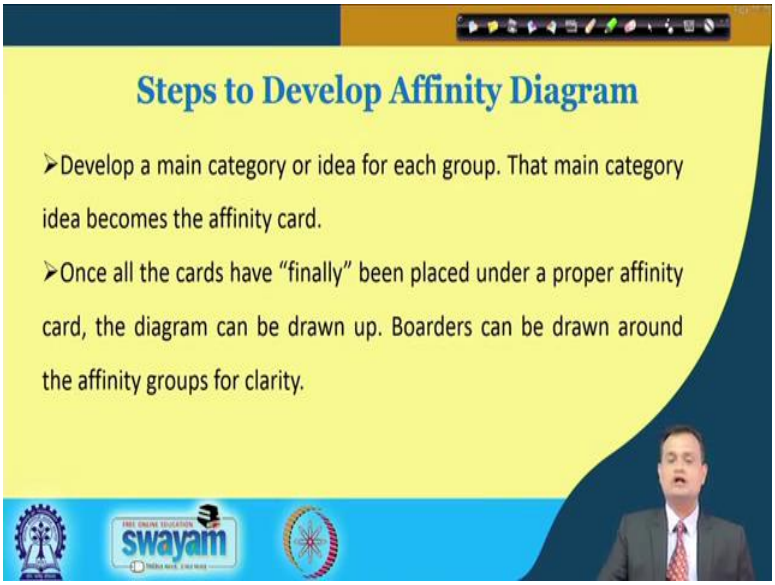

And once this is done finally, been placed under a proper affinity card the diagram can be drawn up, boarders can be drawn around the affinity groups for better clarity.

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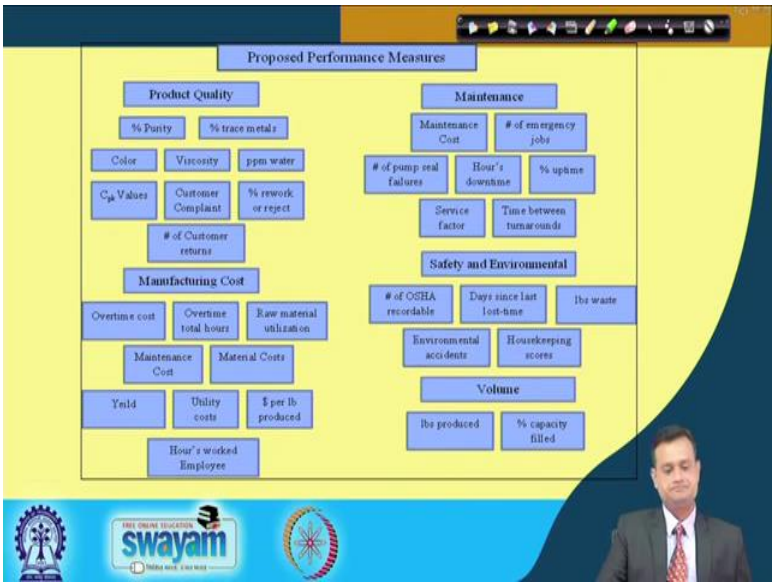

Just see the example the idea will be clear. This is the proposed performance measures. Company may be struggling with hundreds of the measures they want to really see that what are the broad categories of the measures and how they are contributing

supplementing each other? So, based on the brainstorming and based on this sticky note generation and placing them appropriately company could figure out that, if you look at the product quality then percentage purity, percentage stress, metals, color, viscosity, PPM water, percentage customer returns, all these are specifically product quality related measures.

If you look at the manufacturing cost, overtime cost, overtime total hours, raw material utilization, utility cost, yield and hours worked employee put together under manufacturing cost. If you look at maintenance cost then typically number of emergency jobs service factor time between turn arounds, percentage up time and so on. Safety and environment, percentage of OSHA recordable, days since last lost-time, then wastages in terms of kg or pound, then housekeeping scores, environmental accidents and volume if you see then pounds or kg's or tons produced percentage capacity field.

So, you can see that brainstorming can generate lot of ideas and then through a systematic process you can take the opinion of the people and properly classify, categorize the various measures and then individually category score can even be analyzed to see that which area really demands more attention from the top management.

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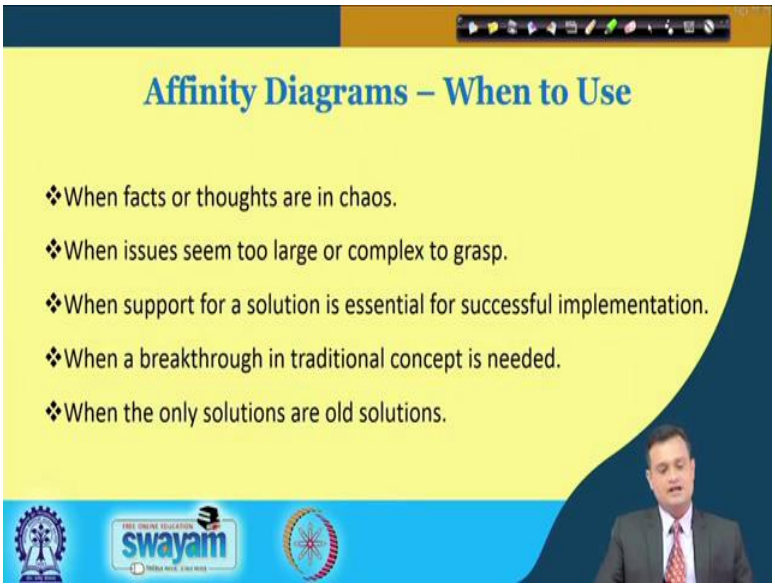

Now, when to use? This is also very important, because you need not to use the missile when rifle is good enough. So, you have to be critical when to use what. So, when facts or thoughts are in chaos. There is lot of turbulence in the mind; when issues seems too

large or complex to grasp. When support for a solution is essential for successful implementation and a breakthrough in traditional concept is needed. So, this is the situation and when the only solution are old solutions you want to get rid of those traditional solutions and looking for some new creative solution the use of affinity diagram is recommended.

There is another tool which is tree diagram and what we discussed was a just part of brainstorming in affinity, brainstorming, multivoting, your affinity diagram. So, this is an entity, this four were part of one particular category, the another management tool is tree diagram.

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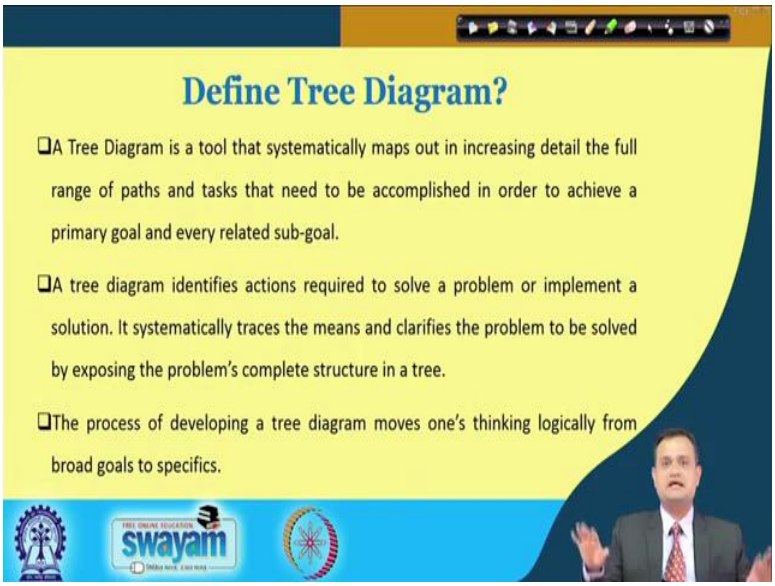

So, just see how systematically it analyses, I will present here the example of service sector, banking sector. So, typically it is a tool that systematically maps out in increasing detail the full range of paths, linkages, structure, levels and it decomposes the entire problem into a typical hierarchy an each particular level can further be investigated at a next deeper level. So, the process of developing a tree diagram moves one thinking logically from broad goals to specific. So, it is a funnel approach and converging.

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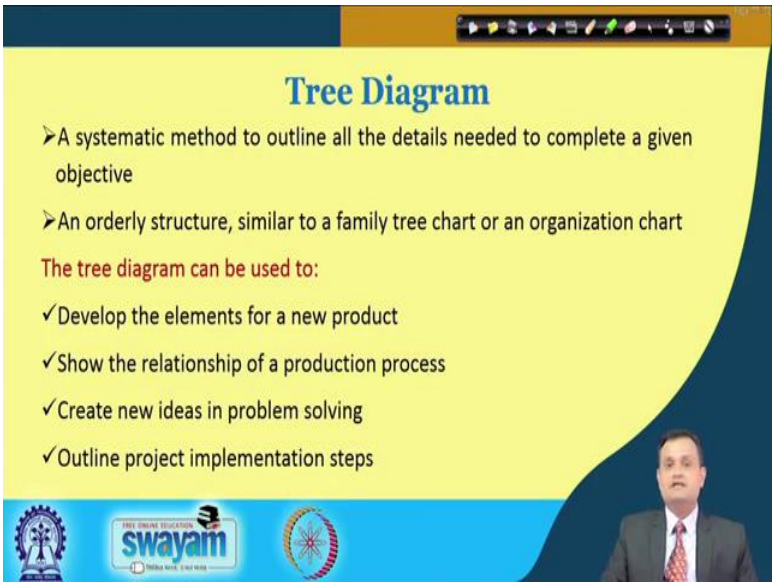

And tree diagram is a tool to achieve this so, basically you use this and develop the elements of the new product if you have. Let us say company, bank company they want to create a new product further consumer credit card, insurance they can use it, show the relationship of a production process, create new ideas and problem solving, outline project implementation steps.

So, tree diagram is an extremely useful tool in order to dig out that what could be the different layers and a typical hierarchy in my problem and how really logically I can go deeper in investigating the deeper causes or the reasons for my product or services.

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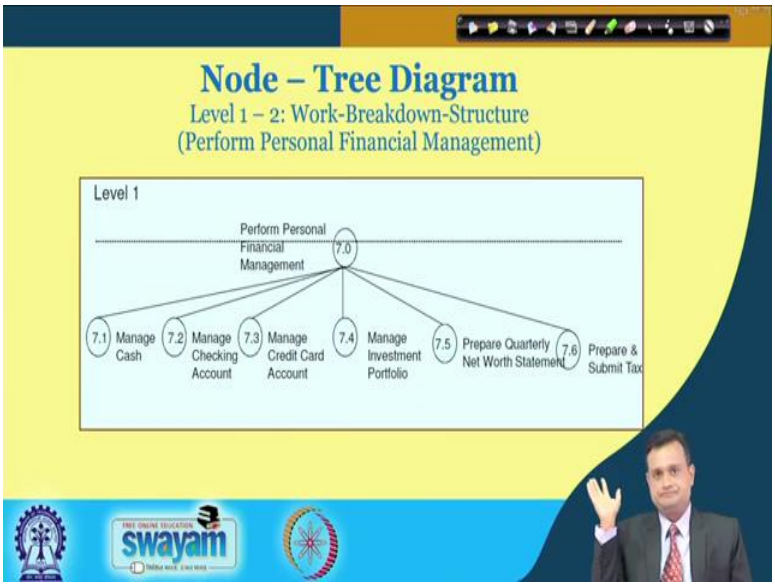

So, just see the example that there is a perform personal financial management objective and this particular objective let us say a set at level 1 and I am just trying to look into different options. For example, manage cash, manage checking account, manage credit card account, manage investment portfolio, prepare quarterly new worth statement, prepare and submit tax ok. So, now in order to manage my financial portfolio these are the various activities, options that I may like to exercise.

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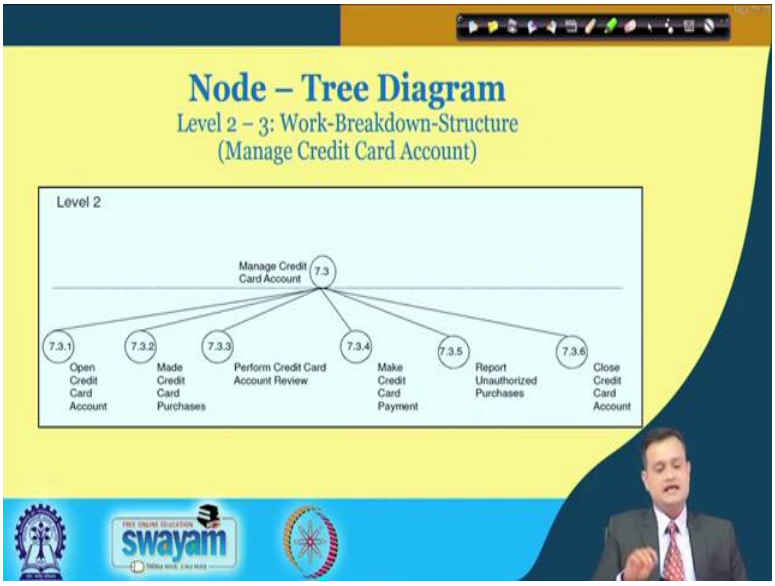

If I go deeper and jus to select one that is node 7.3 manage credit card account, then at level 2, I can just go deeper and say that 7.3.1 open credit card account, made credit card purchase obviously, you get reward point. Perform credit card account review, I have to see I should not invite the penalties, make credit card payment, report unauthorized purchases, there is fraud also, closed credit card account and this is my 2nd level activity.

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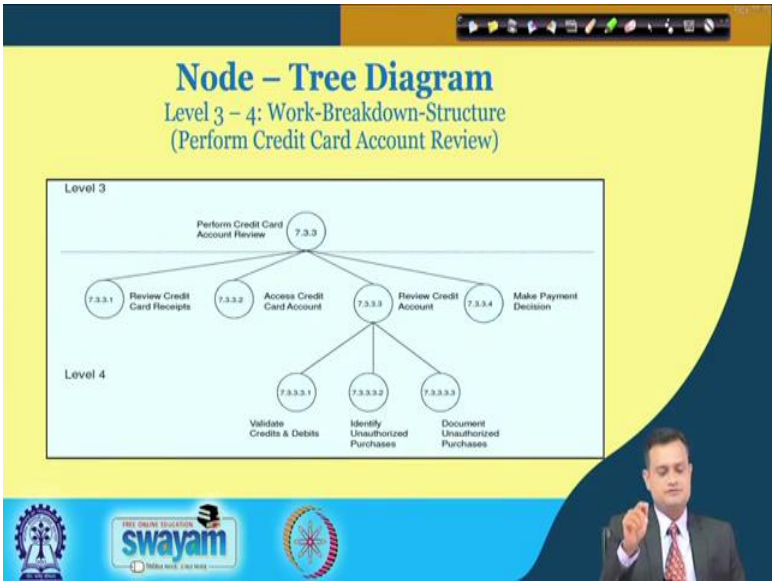

Subsequently, I can take out 7.3.3 that is perform credit card account review. Further I can divide it into a tree and I can say 7.3.3.1 it is review credit card receipts, 7.3.3.2 access credit card account, then review credit card account, make payment decision. Further, review credit card account could be divided into validate credits and debits, identify unauthorized purchases, documented unauthorized purchases and so on. So, I can go up to level 4 and you can see that such a systematic representation can help me to improve the traceability of my decision making process.

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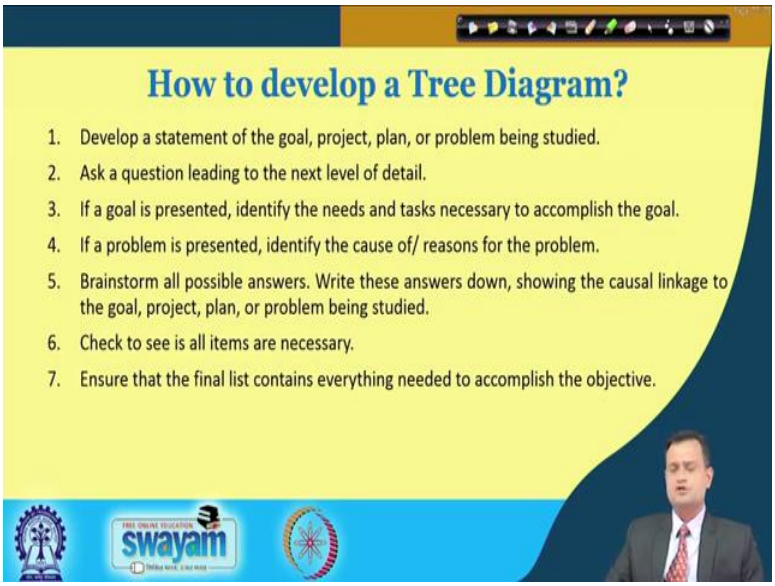

So, the procedure is very simple that you must have realized through this example that develop the statement of goal project plan or problem being studied, ask a question leading to the next level of detail. If a goal is presented identify the needs and task necessary to accomplish the goal. If a problem is presented, identify the cause of or reason of the problem. Brainstorm all possible answers and possibilities. Write these answers down, showing the causal linkages to the goal, project, plan or problem being studied and check to see if all the items are necessary or there is some duplicacy or redundancy that you can remove. Ensure that the final list contains everything needed to accomplish the objectives.

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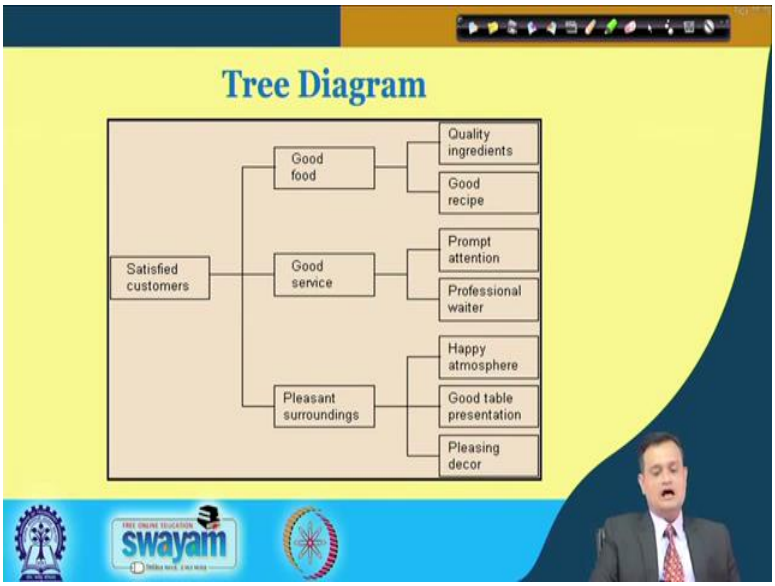

So, this is another example simple example of tree diagram. Satisfied customer, fine good food, good service, pleasant surroundings, it is an example of restaurant. When I say good food how will I ensure? Quality ingredients, I should not offer something which makes my customer unhappy in terms of health. Good recipe, I must choose we have in India different culture. If you let us say have maybe a south Indian dish in north India the taste will be different.

If you eat pav bhaji in Bengal or if you eat in Maharashtra of you go to Kerala the same dish will have a different taste. Good service, prompt attention, my customer should not be waiting there should be a waiter or a person or manager should attend, fine. There could be a waiting there could be a delay you must see how my customer can be engaged. Professional waiter, they must have etiquette in welcoming greeting the customer. Then pleasant surroundings, we do not go to restaurant just to have a food, we want a good exciting delighting experience. So, this is possible through pleasant surroundings. So, happy atmosphere, good table presentation, pleasing decor.

So, you can just see that with such a simple exercise you can ensure. Now, further you can set the benchmark values and try to conduct the internal evaluation and see that how far you are against each particular criteria. But, once you are clear about the criteria it is much easier for you to conduct the assessment.

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We will see the third one in this particular part one of management and planning tools, process decision program chart. We have seen affinity diagram in brainstorming, we have seen the other tool typically call your decision tree or tree diagram, something which is still missing that we can try to address and cover through Process Decision Program Chart called as PDPC.

So, typically PDPC, basically focuses on total quality control and advocates plan each step to solve problems and reach objectives. So, there is a catch, there is a solution which is inbuilt in this technique and a variety of factors expected unanticipated often requires changes be made to the original quality plan. So, there is a feedback loop necessary and action plan which is inbuilt, this is the advantage of this tool. So, technique design to help prepare contingency plans. So, I always say that when you are executing a project you must have a plan B and which that you never use the plan B with your excellent project management skills, but there is nothing wrong in having a plan B to see that your project does not collapse suddenly and just go to the grassroots.

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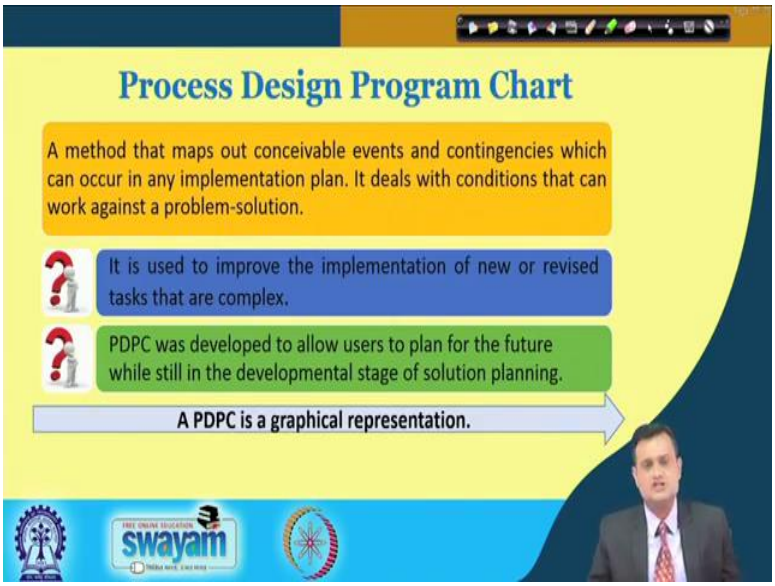

So, this is your process design program chart; a method that maps out conceivable events and contingencies which can occur in any implementation plan. It deals with conditions that can work against the problem solution. So, this is the approach we use to improve, the implementation of new and revise tasks that are complex, remember the word is complex.

Suppose a banking sector, finance sector, they are designing a new policy with the credit limit maybe they are exposed to the new environment then such technique can really help. PDPC was used or developed to allow the user to plan for future while still in the development stage of the solution and planning. You can see many banks they have very high NPA and in such situation before you say land money or give the loans you can write at the design stage visualize that what could be the possibilities and what could be the contingency plan if you are receiving higher NPA.

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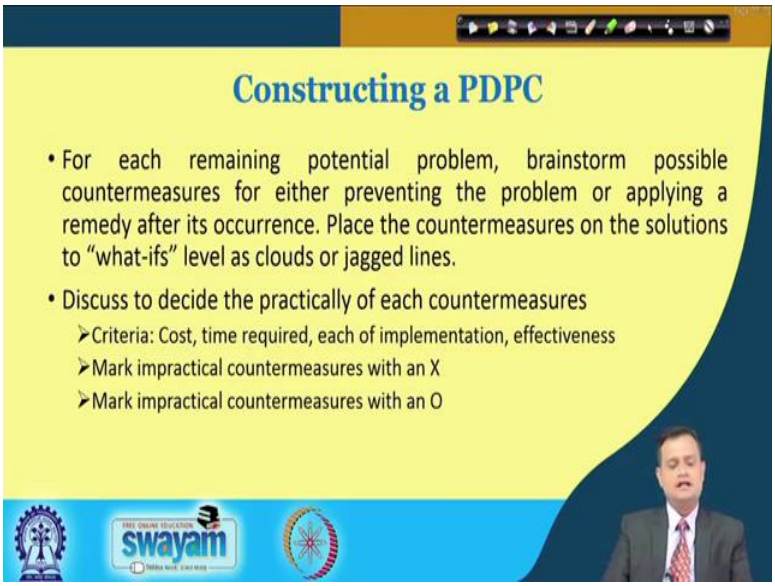

So, typically constructing PDCA is basically like what if analysis and we try to accommodate the countermeasures on the situation and we typically accommodate criteria, cost, time required, each of implementation effectiveness, mark impractical countermeasures with cross, and mark impractical counter measures with an O. So, this is something that we are trying to say and do in the PDPC.

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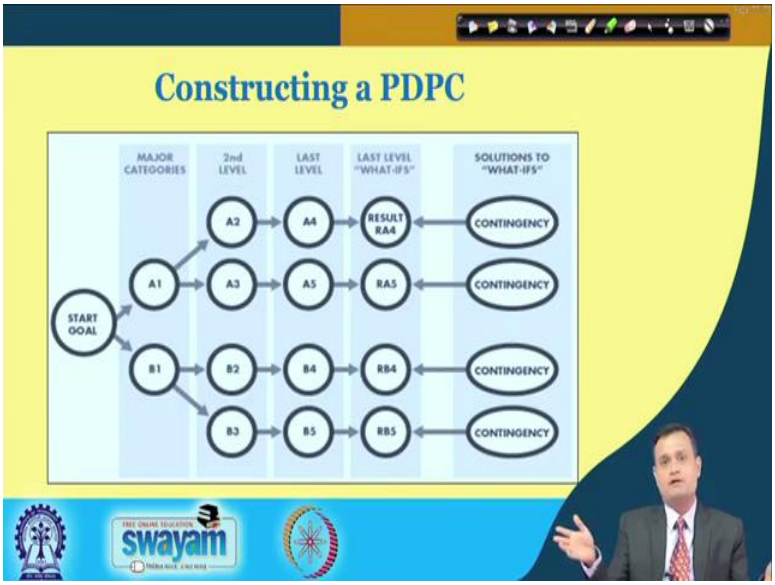

So, you can see here that constructing a PDPC, you have a start goal, then major categories, then 2nd level, last level, then you see last level what-if's; what if analysis,

what can happen, I am trying to create the scenarios and then finally, you try to propose the solution for what-if's.

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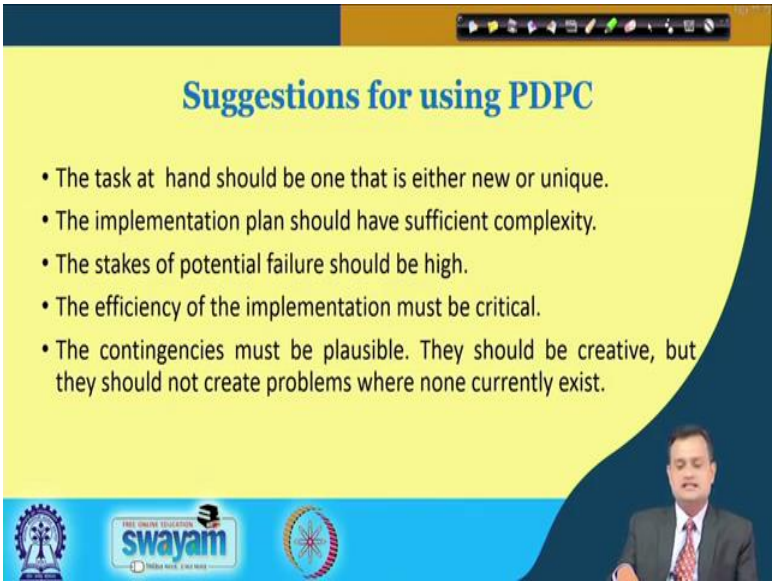

So, suggestions for using PDPC the task at hand should be one that is either new or unique. The implementation plan should have sufficient complexity. The stakes of potential failure should be high and the efficiency of the implementation must be critical and the contingencies must be possible there should be creative, but they should not create problems when none currently exist.

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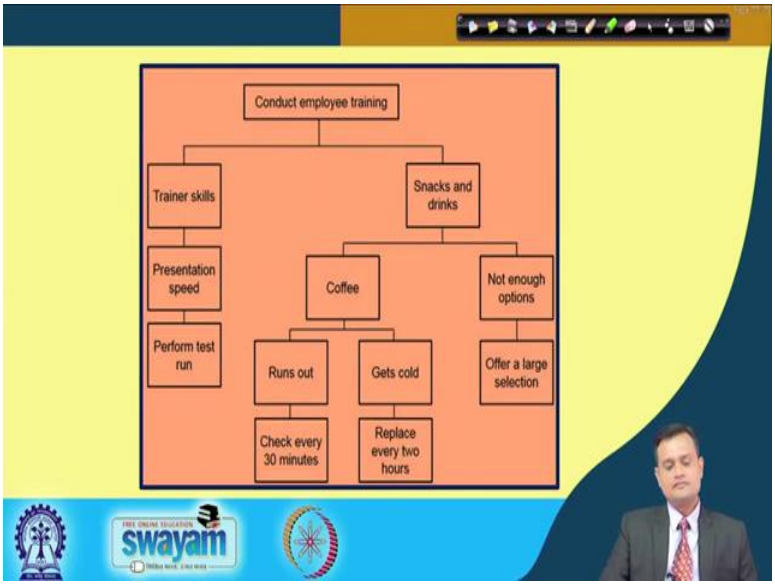

Just see a small example and you will have a better idea of PDPC. Conduct employee training fine, training skills one of the domain, another domain is snacks and drinks. I am just considering two elements to make it simple.

Within trainer skills you have presentation speed, perform test run. You can see that there is a concerned about the trainer's skill and another criteria that is important is the performance or the sorry presentation speed. So, in order to judge that whether the presentation speed will really match the effectiveness, expected through the training you test through pilot run. So, that is the contingency plan or the solution.

Snacks and drinks, you can say coffee and not enough options are two broad categories. Coffee runs out gets cold, this could be the two possibilities. What-if, now if it runs out check every 30 minutes and if it gets cold replace every 2 hours. So, this is the possible solution that you can check out by having a contingency plan not enough options offer a large say selection. So, this way you can relate the categories, subcategories of the problems to the contingency plan and you can carry out the what-if analysis to have your contingency execution in case of emergency.

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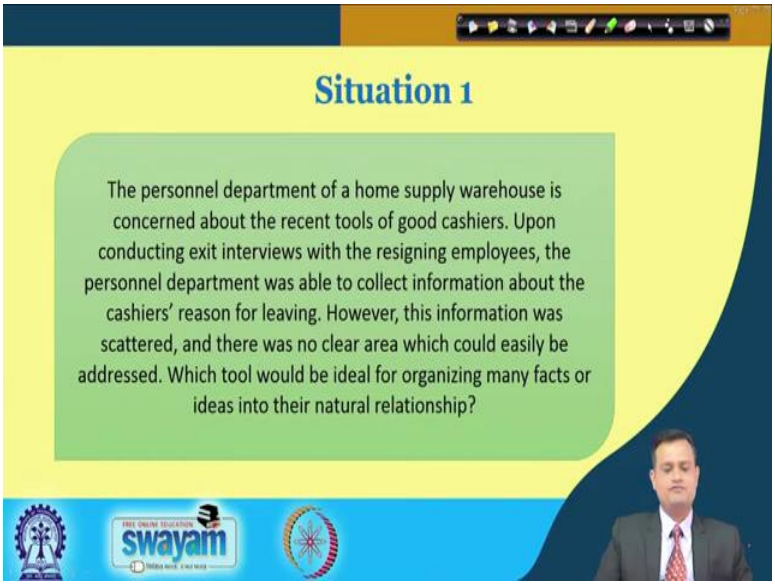

So, I would like to end this lecture with think it and the couple of situations I would just like to highlight that can really motivate you to apply this particular say management planning tools in an effective manner.

So, this situation one says, that personnel department of a home supply warehouse is concerned about the recent tools of the good cashier. Upon conducting exit interview with the resigning employees, the personnel department was able to collect information about the cashier's reasons for leaving. Why they are leaving? However, this information was scattered and there was no clear idea or understanding which could easily be addressed. Now, here I am posing a challenge to you, which tool would be ideal for organizing many factors or ideas into natural relationship and can you really execute this exercise in a group and figure out that what could be the probable solutions?

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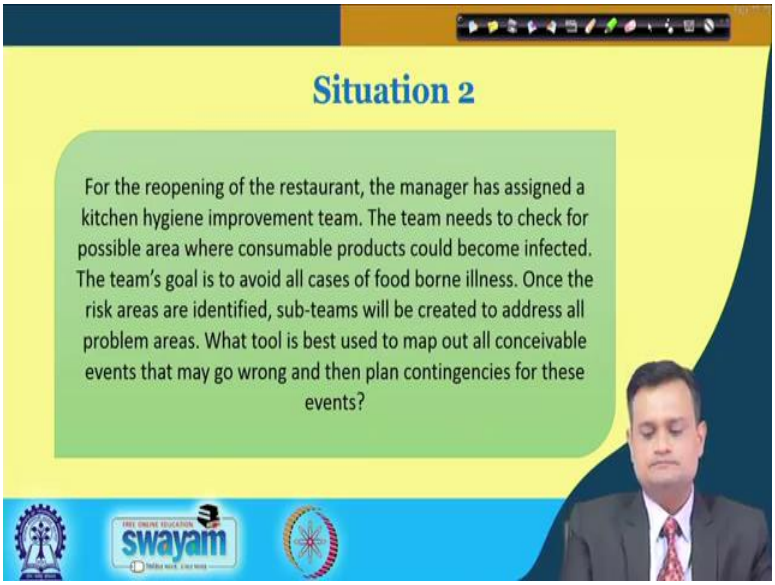

Situation 2: For the reopening of the restaurant, the manager has assigned a kitchen hygiene improvement team. The team needs to check for possible areas where consumable products could become infected. The team's goal is to avoid all causes of food borne illness and once the risk areas are identified, sub-teams will be created to address all problem areas. What tool is best to use to map out all conceivable events that may go wrong and then plan contingencies for these events?

So, pinpoint a particular tool as well as undertake the exercise and develop the particular chart to see that what additional inside you can gain by using this management planning tool.

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So, these are the references which you can use to have even better understanding on these tools and techniques.

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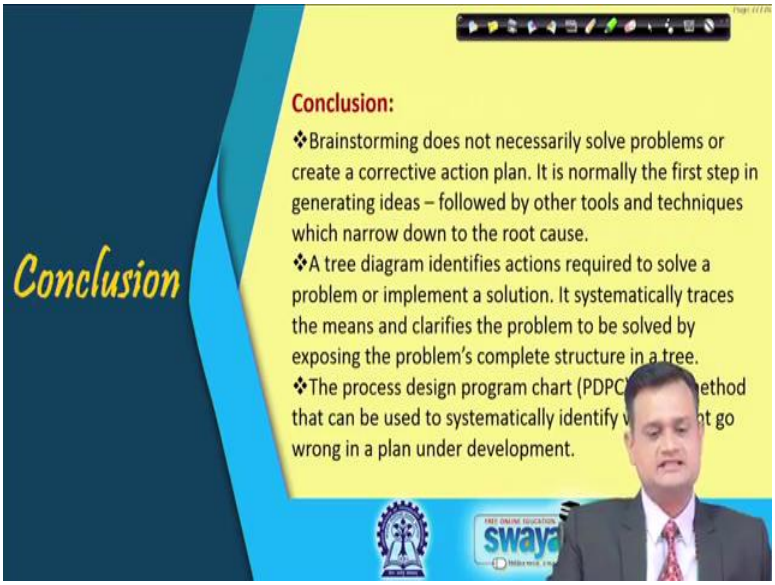

Just to sum up, brainstorming does not necessarily solve problems or create or corrective action plan. It is normally the first step in generating ideas followed by other tools and techniques to narrow it down. Tree diagram typically identifies the action required to solve a problem and in a hierarchical mode it represents the main problem with many sub problems, issues or solutions so that you can have a better traceability and action plan

and finally, the process design program chart, PDPC is one method that can be used systematically identify what might go wrong in a plan under development.

So, please remember these conclusions and appreciate the techniques we have discussed as a part of management planning tools part 1.

Thank you very much. We will continue our discussion on the same topic management planning tool in next lecture part 2 and we will see some more tools which are extremely effective in handling the complex problems in a very simple and systematic manner. Enjoy, be with me.