Cause & Effect: Tools

Introduction

What is covered in this course?

Introduction

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- What is covered in this course?
- What is the purpose of this course?

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- What is Lean Six Sigma?
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- What are the benefits of LSS & the toolkit?
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Cause and effect tools
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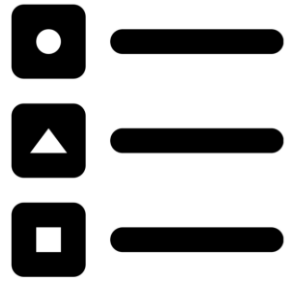
- 5 Whys.
- Pareto Chart.
- C&E Matrix.

Close out
- Review the key learnings.
- Glossary.
- Thank you.



What is the purpose of this course?

Introduction

- Lean Six Sigma is a really powerful methodology that, if applied correctly, can yield really fantastic results within organisations.
- It can reduce waste, errors and defects whilst increasing customer satisfaction, savings and productivity.
- This course will introduce you to the key Root Cause Analysis tools and techniques used in Lean Six Sigma.

- At the end of this course you will:

- Understand the main tools to root cause your problems.
- Understand how to actually conduct each of these tools.
- Understand when these tools need deploying.
- Understand at what stage of the DMAIC framework they should be used.
- Understand the benefits of using this approach and these tools.

- Armed with this knowledge and the templates attached to each tool, you will be able to start deploying these either within Lean Six Sigma projects or on a daily basis.
- It is also worth training this knowledge out to others within your teams / organisation to ensure the benefits are felt more widely.
- These tools really can have a positive and lasting impact if deployed correctly!

Lean Six Sigma: An overview

What is Lean Six Sigma?

What is Lean Six Sigma?

Lean Six Sigma: An overview

- Lean Six Sigma is a systematic approach to fixing the issues and problems that plague many organisations.
- To apply it, it is often referred to as Lean Six Sigma, but the two concepts of Lean and Six Sigma are actually separate. Let's investigate.

Lean

- Lean is an approach to quality that focuses on reducing waste, waiting time and saving money.
- The outcome of Lean is to deliver a process which has higher productivity and efficiency.
- With Lean, you need to think about your approach in terms of the purpose (the end product), the process (that which leads to the end product) and people (those that create the end product).
- There are a number of tools which can be used within Lean including Kaizen, Gemba, Poke Yoke, 8 wastes etc.

Six Sigma

- Six Sigma is more data driven and analytical.
- The focus of Six Sigma is on understanding the variations in a current process, and what can be done to reduce that variation.
- The aim of Six Sigma is to make a process effective with 99.99966% defect free (or 3.4 defects per million).
- Six Sigma's focus when it comes to the process is to improve its performance in relation to what is critical to the customer.

DMAIC

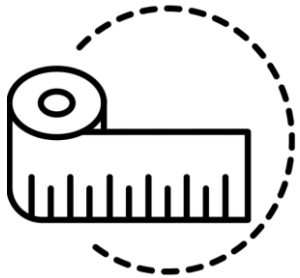
DMAIC

Lean Six Sigma: An overview

- Within the framework of Lean Six Sigma, if you want to launch a structured project, there is a particular model you should follow – DMAIC.
- This structure is a great way of ensuring all of the key elements of a project are realised.
- It uses tools and techniques to try and ensure you achieve Six Sigma, or as close to it as you possibly can be.

Define

- Select the project.
- Plan the project.
- Define scope and objective.
- Form the team.
- Map the process.
- Identify customer requirements.
- Identify prioritises.

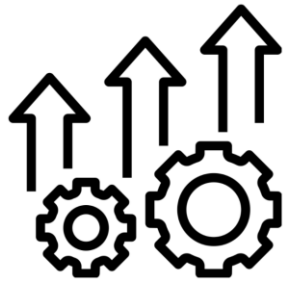


Measure

- Define your measures (Ys).
- Check data integrity.
- Check process stability.
- Check process capability.
- Set targets for your measures.
- Measure all data to understand current state.

Analyse

- Develop detailed process maps.
- Identify waste, blockers, rework etc.
- Establish the root causes.
- Identify critical Xs.
- Map the ideal process.
- Conduct gap analysis.



Improve

- Brainstorm potential improvements.
- Select chosen improvement strategy.
- Plan and implement pilot.
- Verify your improvements.
- Implement countermeasures.

Control

- Control critical Xs.
- Monitor your Ys.
- Build a control plan.
- Identify further opportunities to improve.
- Close the project.

What are the benefits?

What are the benefits of Lean Six Sigma & this toolkit?

Lean Six Sigma: An overview

- The Lean Six Sigma approach yields many benefits to organisations and individuals alike. A focus on using this approach and the tools that come with it can deliver the following:

- Reduced costs of operating.
- Reduced time spent working.
- Reduced waste in your processes.
- Reduced errors in your operations.
- Reduced customer complaints.
- Reduced employee complaints.
- Reduced staff turnover.
- Reduced risk.
- Increased savings (money and time) which can be reinvested back into the organisation.
- Increased customer satisfaction.
- Increased employee satisfaction.
- Increased value adding work vs. non value adding work.
- Increased quality of products and services.
- Increased chance of hitting SLAs and KPIs.
- Increased sight of what is happening daily.
- Plus many, MANY more!...

Scenario to be used

Scenario to be used to explore the tools

Lean Six Sigma: An overview

- For the purposes of this toolkit I am going to set up a scenario that we will follow when looking at practical examples of how to use these tools.
- This flow will enable us to maintain consistency throughout and give us the opportunity to link tools in where needed.

Scenario

A customer contact department within a large, global insurance firm.

The department has been facing a number of problems recently including:

- Wasteful processes.
- Errors, issues and defects.
- Increased customer complaints.
- Increased staff turnover.
- SLAs and KPIs being missed.
- Accuracy reduction.

- The tools we are going to explore in this toolkit will be able to address such issues.
- Please note: Even those these tools are Lean Six Sigma based, you can utilise them in a range of projects.

Cause and effect tools

Introduction to cause and effect

Cause and effect

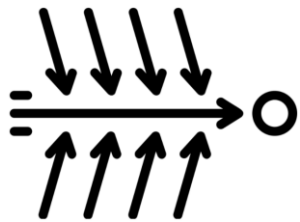
- Cause and effect tools are central to the Lean Six Sigma approach. Understanding *why* something has gone wrong with a process or product is a must if you are to actually fix it.
- The purpose of the tools we use within LSS are not only to ensure we can identify the potential causes of a problem but increase our chances of identify the *right* cause.
- They enable you or your team to brainstorm and think creatively about what the potential cause could be.
- Often people land on a particular cause without thinking it through. A team member may say – “We don’t need to look into this, I know what the problem is.”
- This may be the cause, but often it is not, and what has impacted your product or process is in fact a wider issue.
- The great thing about the cause and effect tools we will explore in this section is that they enable team members to think more broadly about what is happening in your process.
- Cause and effect diagrams enable you to identify all possible contributing factors (critical Xs) whilst simultaneously enabling you to prioritise them.

Ishikawa Diagram

Ishikawa Diagram

Cause and effect

Name: Ishikawa Diagram (also known as a Cause and Effect Diagram or Fishbone Diagram)
When to use the tool: If running a project, these tools are best used in the analyse phase. This tool can also be used from a cause-prevention perspective.
Purpose of the tool: Helps the team to see root causes through the symptoms, provides a good structure to the effort of root cause analysing and ensures you get a balanced list of ideas generated through brainstorming.
Preferred outcome / effect: A list of potential causes, categorised. These causes can then be analysed further to understand which are having the biggest impact.
Data to use: The ideas generated by yourself or the team involved in the brainstorming session. Some of these ideas may be based on data that is showing you where the problem may lie.

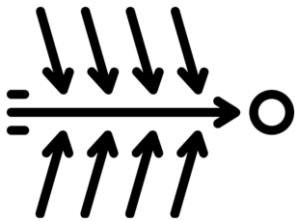


Ishikawa Diagram

Cause and effect

How to use an Ishikawa Diagram

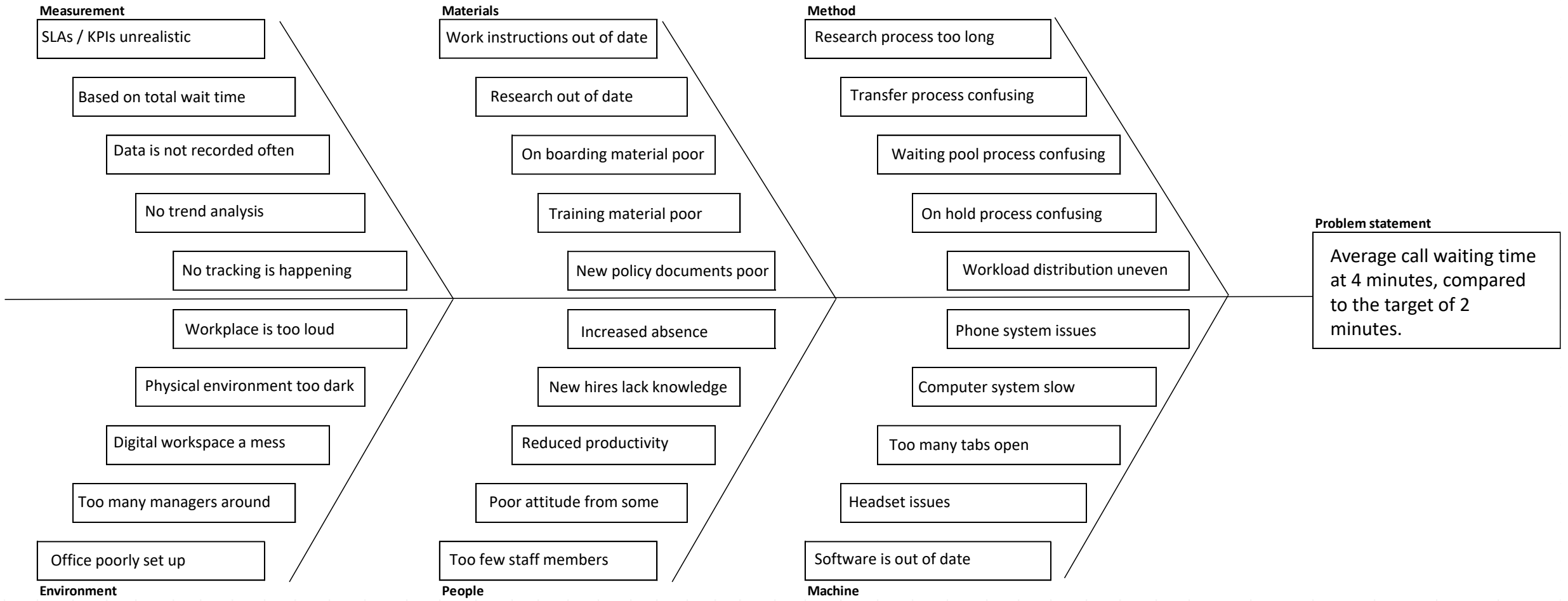
1) Define the problem exactly and write this in the head of the diagram.
2) Decide on the potential major categories that could be causing your issues. Categories that are commonly used include measurement, materials, method, environment, people and machine.
3) As a team, work through each category, brainstorming all the potential causes that could fall under each one. In a group scenario, no idea should be deemed as unworthy – all ideas are welcome. An alternative to this is to do the same exercise but silently – and then all ideas are added after.
4) Once all ideas are on there, review to ensure the diagram is complete. If any categories have a lot less ideas than others, see if this can be expanded out further. Once you have the full picture, you can eliminate any of those causes you and the group know do not apply.
5) Discuss with the team those causes they think are the most viable and have the biggest impact on your symptom. These are the causes you need to take away to investigate further.
6) You can now plan how you are going to verify that these causes are the *actual* causes. This will require utilising data and a statistical tool to do this.



Ishikawa Diagram: Demonstration

Ishikawa Diagram

Cause and effect



5 Whys Diagram

5 Whys Diagram

Cause and effect

Name: 5 Whys diagram
When to use the tool: If running a project, this tool is best used in the analyse phase.
Purpose of the tool: To get down to the absolute final cause so an action can be identified. This method forces people to think about the root cause as it consistently asks “why”. With this tool we want to explore one of the causes further as opposed to the symptom. It can often follow on from the Ishikawa diagram to explore the potential causes further.
Preferred outcome / effect: You want to leave this tool with an actionable item you can work on to fix the problem.
Data to use: Ideas generated by the team either through a brainstorming session or Ishikawa Diagram.

5 Whys Diagram

Cause and effect

How to use a 5 Whys Diagram

1) Select any problem you are currently seeing occurring. You need to ensure everyone is aware of the cause and what it actually means.
2) Ask the team (or yourself), why does this occur? Why does this thing happen in the first place?
3) Then ask why the next problem you have identified occurs, and then the next problem, and so on.
4) Continue asking why until you can see there is no further to go in identifying causes.
5) When you have reached your identified root cause, identify the actions you need to take to fix this. These actions can be either short or long term, depending on the scale of the issue.

5 Whys Diagram: Demonstration

5 Whys Diagram

Cause and effect

Define the problem

Email case queue ticket load backlog increasing on average 10% a week, meaning at the end of each day there are more and more cases going unhandled.

Why is this happenening?

Agents are not getting around to these additional cases by the end of each day.

Why is that?

The number of cases coming in on a daily basis has been increasing over recent weeks.

Why is that?

Spike in number of cases due to increased insurance claims because of recent bad weather.

Why is that?

Customers are seeking to understand what their insurance covers and what they can claim for.

Why is that?

A sizeable number of our customers have weather related insurance based policies.

What action now needs to be taken?

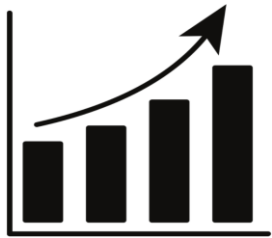
Immediate action is to put more staff on at critical times of the day, offer overtime for those working additional hours and cancel any requests for holiday for the coming period. Longer term we need to plan appropriately for times of bad weather (i.e. winter) or when we are aware of increased flood risk. Utilisation of data needs to improve to pre-empt this.

Pareto Chart

Pareto Chart

Cause and effect

Name: Pareto Chart
When to use the tool: If running a project, this tool is best used in the measure or analyse phases.
Purpose of the tool: Pareto Charts are aimed at showing you how much of an impact certain causes are having on your overall symptoms. The aim is to identify, if possible, which 20% of causes are leading to 80% of the issues. That is the Pareto principle.
Preferred outcome / effect: To have a bar chart showing the impact of each errors in terms of count and a cumulative line to show when you get up to 80% of your defects / errors accounted for.
Data to use: Try and have a specific time frame for your data so you can see accurately which defects are having the biggest impact over the time period. The data can be continuous or discrete.

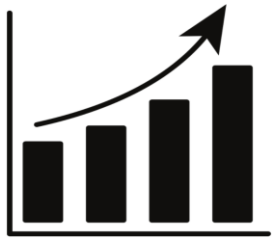


Pareto Chart

Cause and effect

How to use a Pareto Chart

1) Collate the data you require, looking at different types or categories of problems.
2) Tabulate the scores for each category. You will need to understand the total number of problems that have occurred and the total impact of each of these problems. (If you have a number of small / infrequent problems, you may want to group these together as “other”).
3) Sort the problems by frequency or by level of impact.
4) When establishing your vertical axis, make sure the number it goes up to is the total number of data points (errors) you are observing, not the number of the one error with the biggest amount.
5) Generate bars for each category ensuring you set your graph so it goes in descending order, with the category with the most errors first and then the smallest last. If you have an “others” section which is higher, add this to the end.
6) Now you can add in your cumulative percentage line.
7) Interpret your results to see if there is a clear Pareto effect or no clear Pareto effect. The decisions you make post this will be determined by that.

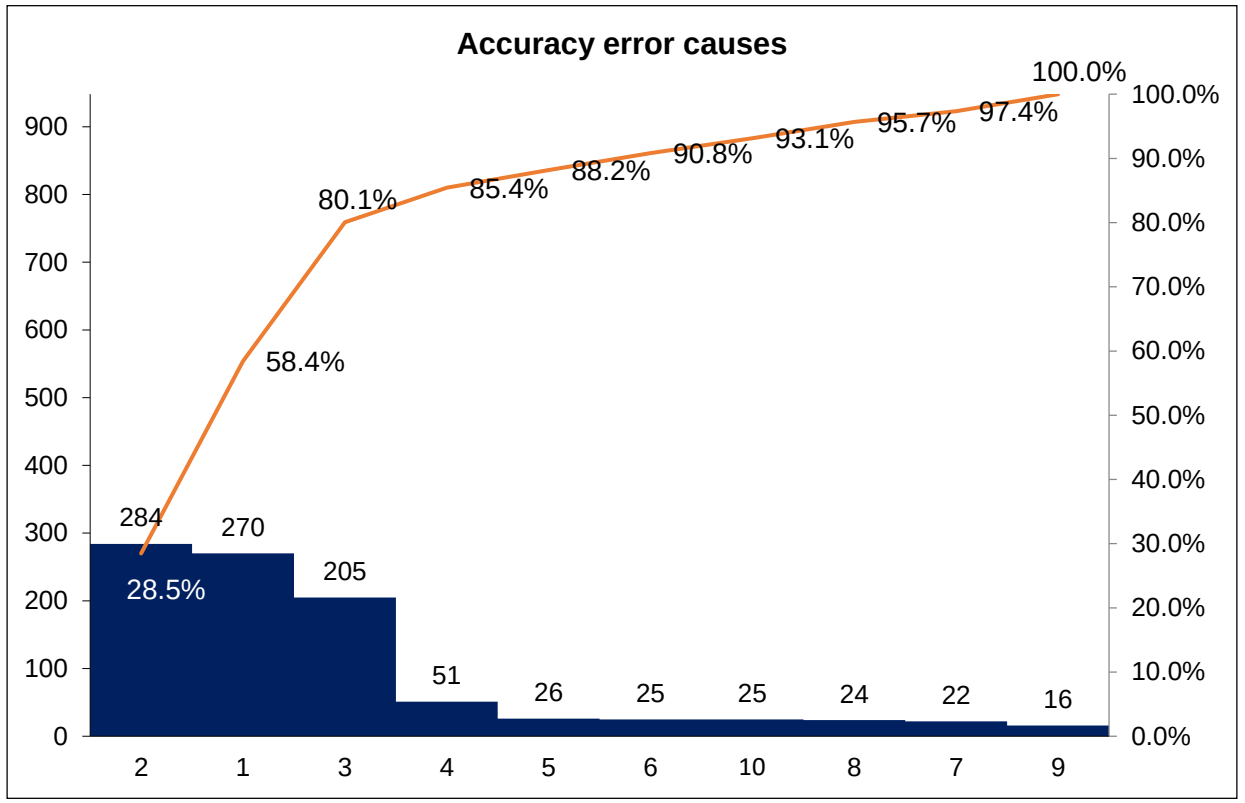


Pareto Chart: Demonstration

Pareto Chart

Cause and effect

Defect instance	Dates							TOTAL	Cumul.
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday		
1	40	35	45	45	32	35	38	270	28.5%
2	34	45	45	45	42	41	32	284	58.4%
3	25	28	31	25	27	28	41	205	80.1%
4	5	3	8	6	9	11	9	51	85.4%
5	9	2	3	3	4	2	3	26	88.2%
6	4	4	0	2	7	4	4	25	90.8%
7	3	6	6	0	4	0	3	22	93.1%
8	2	8	4	0	2	6	2	24	95.7%
9	4	4	3	0	4	0	1	16	97.4%
10	6	3	0	4	5	5	2	25	100.0%
TOTAL	132	138	145	130	136	132	135	**948**	**100%**

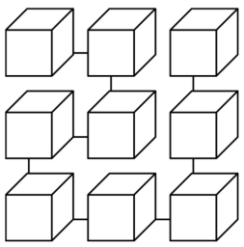


C&E Matrix

C&E Matrix

Cause and effect

Name: C&E Matrix or Cause and Effect Matrix
When to use the tool: If running a project, these tools are best used in the measure (to prioritise inputs being considered for data collection) or improve (to pinpoint the focus of improvement activities) phases.
Purpose of the tool: To identify the limited number of input variables that need to be addressed if you are to improve your key process output variable(s).
Preferred outcome / effect: You can see the relationships you need to focus on improving.
Data to use: The priority rating given to you by your customer for each item.

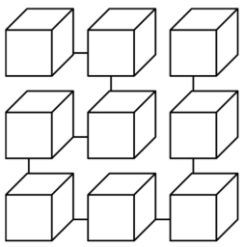


C&E Matrix

Cause and effect

How to use a C&E Matrix

1) Using a process map or voice of the customer tool, identify the key requirements of the customer. These requirements are what the customer expects to come from the process / what they expect of the product.
2) Assign a priority score to each of these requirements according to importance, as identified by the customer. Usually this will be on a scale of 1 to 10. Make sure this accurately reflects your customers needs.
3) Identify all of the process steps that are required to make the requirements a reality and list these process steps down for review.
4) Rate each input (process step) against each output (requirement) based on the strength of their relationship.
5) Once you have worked these out, cross multiply your correlation scores with your priority scores and add these up. This will give you an idea of those relationships that need to be explored further.
6) To see this visually, create a Pareto Chart.

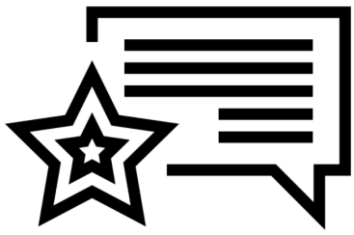


Close out

Review of key learnings

Close out

- Lean Six Sigma is a systematic approach to fixing the issues and problems that plague many organisations. If delivered correctly, Lean Six Sigma can yield many significant benefits.
- Lean focused on waste reduction, Six Sigma on variation reduction – with both using the DMAIC framework.
- Cause and effect (or Root Cause) tools are used to understand *why* something has gone wrong in a process or product, and can be used to pre-empt something going wrong further down the line.
- Cause and effect diagrams enable you to identify all possible contributing factors (critical Xs) whilst simultaneously enabling you to prioritise them.
- Remember. Often, many of these tools will precede or follow on from one another, so in projects it won't be uncommon to have to utilise several of them at one time.
- The team is important in all of these approaches as generating ideas, interacting with one another and building out these tools collaboratively is at the heart of many of these tools.
- This toolkit will now always be here, and I will look to expand this out over the coming time period to ensure more tools are represented. Don't see this as just a course you need to close off now and walk away from – ensure you use the resources, the tools we have discussed and the approaches as a proper and effective kit.



Glossary

Close out

- **Six Sigma** A quantitative approach to reducing defects and variation in a process.
- **DPMO** (Defects Per Million Opportunities): The metric that Six Sigma uses to measure performance.
- **BPMS** (Business Process Management System): A structured methodology to defining, measuring and controlling process performance.
- **VSM** (Value Stream Mapping): A type of process mapping that focusses on waste reduction.
- **Kaizen** Japanese word that represents small improvements.
- **VoC** Voice of Customer – customer feedback.
- **VoP** Voice of Process – process measures.
- **Quality** The totality of features and characteristics of a product or service that bear on its ability to satisfy given needs.
- **CTQ** (Critical to Quality): Process metrics that help deliver performance.
- **Kano model** A framework to understand and leverage customer expectations.
- **SIPOC** (Supplier-Input-Process-Output-Customer): A type of high level process mapping.
- **CFD** (Cross-function deployment): A type of process map that focusses on hand-off's across teams.
- **Pareto** A graph that aims to separate "vital few" from "trivial many".
- **Fishbone** A team problem solving tool that aims to collect diverse possible causes of a problem.
- **Histogram** A plot to highlight the distribution of data.

Thank you for taking this course!

You have now been introduced to the world of Root Cause Analysis tools. The tools discussed in this course have been tried and tested many times – so please look to utilise them in your next project!

Best of luck ☺