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Improvement Cymru Academy Toolkit Guide

Radar Charts

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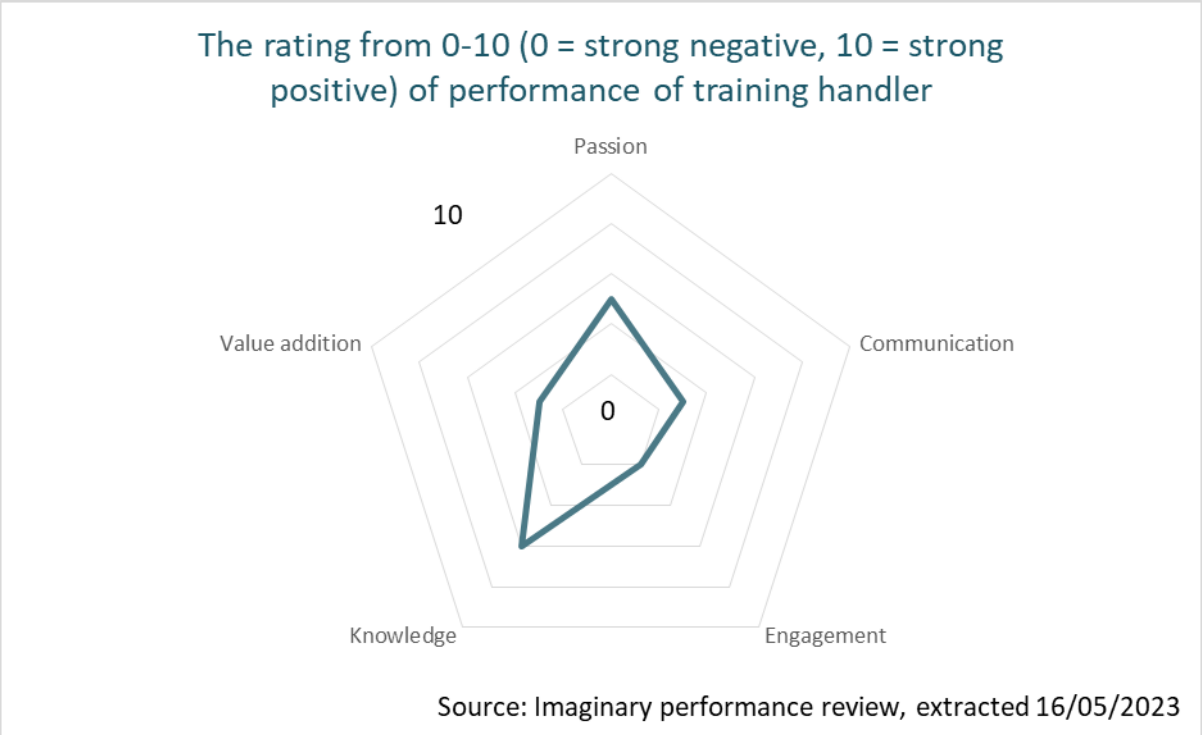
What is a Radar Chart?

Radar charts, also known as spider charts or star plots, showing three or more measures/variables in relation to a central point, which must be on the same scale. This creates a shape showing all the measures/variables at a glance. This chart looks like a spider-web, on which data is arranged to form different shapes. This type of chart is used for representing multidimensional data, in a two-dimensional chart. Radar charts are a valuable tool for visualising and comparing data across multiple variables. By following the steps outlined in this guide and applying the tips for effective usage, you can create informative and visually compelling radar charts to enhance your data analysis and decision-making processes.



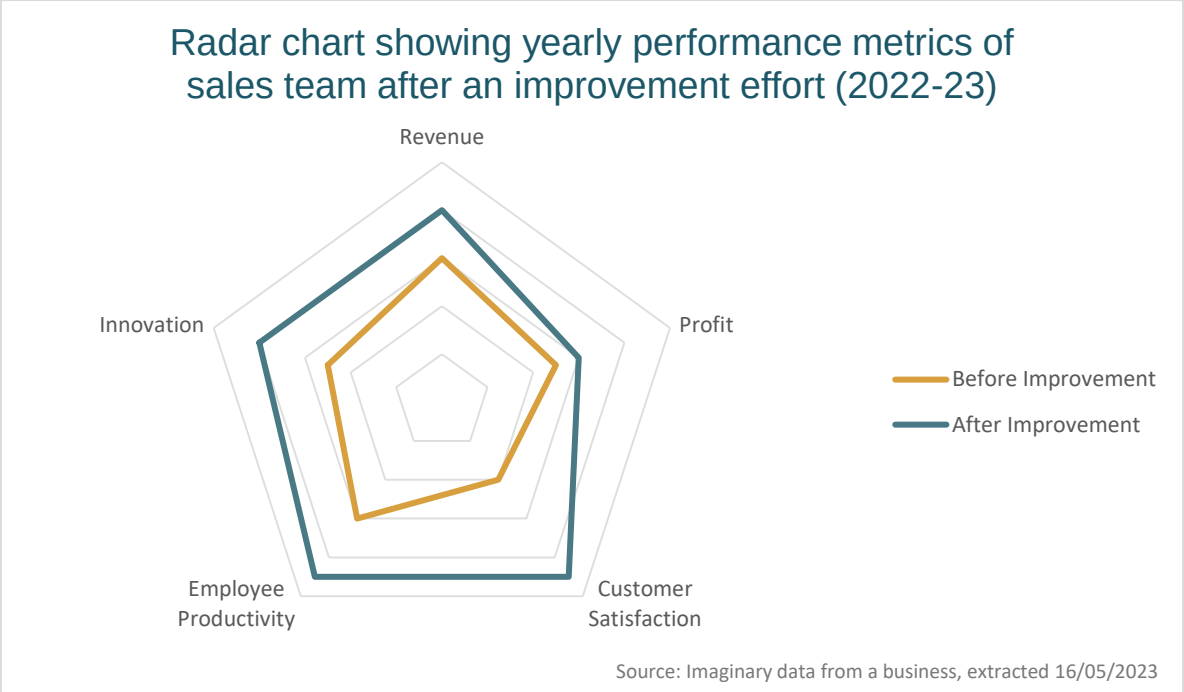
Background

The inventor of this family of charts was a German named Georg von Mayr, who published the first known radar chart in 1877 using the radar or spider web plots for

data representation. Georg von Mayr stated, “It is somewhat easier to see patterns in the data if the observations are arranged in some non-arbitrary order”.

An example:

This radar chart shows the five key performance metrics (revenue, profit, customer satisfaction, employee productivity and innovation) of the sales department in a business. The metrics are on a scale of 1 (lowest) – 10 (highest). These metrics were calculated before a service improvement, then a year later to evaluate performance at each time.



As you can see, the blue shape is larger than the orange indicating higher scores in all categories for performance metrics after the improvement. The largest difference in shape is near 'Customer Satisfaction', which indicates this is the metric that experienced the biggest improvement.

This visual representation allows for quick comparisons and insights across categories or groups.

How to Use Radar Charts:

- Define Improvement Objectives: Clearly outline the specific improvement goals you want to achieve using radar charts in healthcare.

- Identify Key Metrics: Determine the relevant metrics, measured on the same scale, that align with your improvement objectives, such as patient outcomes, process efficiency, safety measures, or patient satisfaction.
- Collect Data: Gather accurate and representative data for each identified metric.
- Choose a Suitable Radar Chart: Select an appropriate radar chart type that effectively represents and compares the selected metrics.
- Plot the Radar Chart: Input the data into visualization tools, assign metrics to axes, and ensure clear labelling and colours for readability.
- Interpret the Radar Chart: Analyse the chart to identify areas of strength and improvement, observe patterns or anomalies, and guide decision-making.
- Drive Improvement Actions: Develop action plans based on insights, collaborate with stakeholders, implement interventions, and monitor progress.
- Communicate Findings: Effectively communicate insights and progress to engage stakeholders and foster a culture of improvement.

When to use radar charts

Radar charts are particularly useful in the following scenarios:

- Comparing performance across different categories or groups
- Evaluating the strengths and weaknesses of something
- Analysing trends, patterns, or variations in data (especially looking at two series on the same graph and comparing ‘shape’)
- Illustrating profile/s over time

Using aggregate data in a Radar chart

Radar charts can hide some of the detail when applied to datasets created by adding values from multiple individuals/groups. This is because high values from one set of data can cancel out low values from another and hide key messages.

If radar charts used, we recommend using multiple radar charts with different metrics to understand the aggregated impact more. For example, as well as the sum of the values, look at the minimum, average/median and maximum values for the combined data to understand if these are changing. This may give you more of an understanding of the whole picture.

Helpful tips:

- Use a consistent scale across all axes for meaningful comparisons.
- Avoid overcrowding the chart with too many variables or categories.
- Ensure clear and informative axis labels to aid interpretation.
- Consider the appropriate colour scheme to enhance visual appeal and convey meaning.
- Provide a legend or key to explain the variables or categories represented in the chart.
- Interpret the radar chart in the context of the data and the specific analysis or decision-making process.

Additional Resources

If you would like more information on how the improvement model can support you or your organisation, we welcome you to visit our website. https://phw.nhs.wales/services-and-teams/improvement-cymru/improvement-cymru-academy/

Or email us improvementcymruacademy@wales.nhs.uk to find about the improvement courses we offer.

Further Reading

Langley, G. J., Moen, R. D., Nolan, K. M., Nolan, T. W., Norman, C. L., & Provost, L. P. (2009). *The Improvement Guide* (2nd ed.). Jossey Bass Wiley

ChartExpo. (2023). How to create Radar Chart in Excel. Available at: https://www.youtube.com/watch?v=pcXmLyop1E4 (Accessed 17 July 2023)

Eugene O’Loughlin. (2011). Problem Solving Techniques. #15: Radar Charts. Available at: https://www.youtube.com/watch?v=Fy-sru6q4GU (Accessed 17 July 2023)