

ZEF-Method



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Introduction

This guide describes what the ZEF-method is and when it can be used. The method has been researched by the University of Lapland¹, and it helps keep the effects of response bias to a minimum so that survey results are as reliable and accurate as possible.

Response bias is a part of any survey process, and comes down to the fact that people cannot always answer survey questions with 100% accuracy for a variety of reasons. The ZEF method takes one type of response bias into account, making results more accurate and easy to read.

By using the ZEF method, the person who analyzes the results can make better data based decisions, because the respondents' opinion distortions are automatically removed, or normalized. This makes the results easier to understand and interpret. In addition to this, ZEF reports show the organization's strengths and weaknesses more clearly than a raw report.

What are opinion distortions?

Every person interprets answering scales in their own way. This can have an effect on the responses people give when they take surveys. Many things can affect the way an individual interprets a scale and answers a survey, such as past experiences, the respondent's current mood², differences in cultural backgrounds, etc. These differences in answering styles result in response bias and are called opinion distortions.

What is the ZEF-method based on?

The letter combination ZEF comes from the words Z-scored Electronic Feedback. As the name indicates, the method uses z-scoring as its basis for creating normalized results based on each individual's normalized answers. Z-scoring is a well established statistical analysis technique that researchers use to normalize raw scores. The practical application is that Z scoring makes your survey results more readable and scientifically accurate.

1) Ronkainen, Suvi & Karjalainen, Anne (toim.). 2008. *Sähköä kyselyyn! Web-kysely tutkimuksessa ja tiedonkeruussa*. Rovaniemi: Lapin yliopistopaino.

2) Morten Heide and Kjell Gronhaug (1991), "Respondents' Moods As a Biasing Factor in Surveys: an Experimental Study", in *NA - Advances in Consumer Research Volume 18*, eds. Rebecca H. Holman and Michael R. Solomon, Provo, UT : Association for Consumer Research, Pages: 566-575. Available from: <http://acrwebsite.org/volumes/7218/volumes/v18/NA-18> (Accessed on 8 December 2017)

3) Sara Dolnicar, Bettina Grün, (2007) "Cross-cultural differences in survey response patterns", *International Marketing Review*, Vol. 24 Issue: 2, pp.127-143

How does it work?

Each individual respondent's normalized results are determined by first calculating their overall average score for all of the survey questions they answered. The overall average score is then moved in relation to the individual's actual answers to the center of the response area. Once this is done, the overall average score remains in the middle of the response area, and the individual's actual answers to the survey questions are distributed evenly around it over the response area.

After each individual respondent's responses are normalized, the average points are calculated from all the respondents' answers to each question. Once these average scores have been calculated, they are normalized again in order to create the final normalized report.

How does it affect the report?

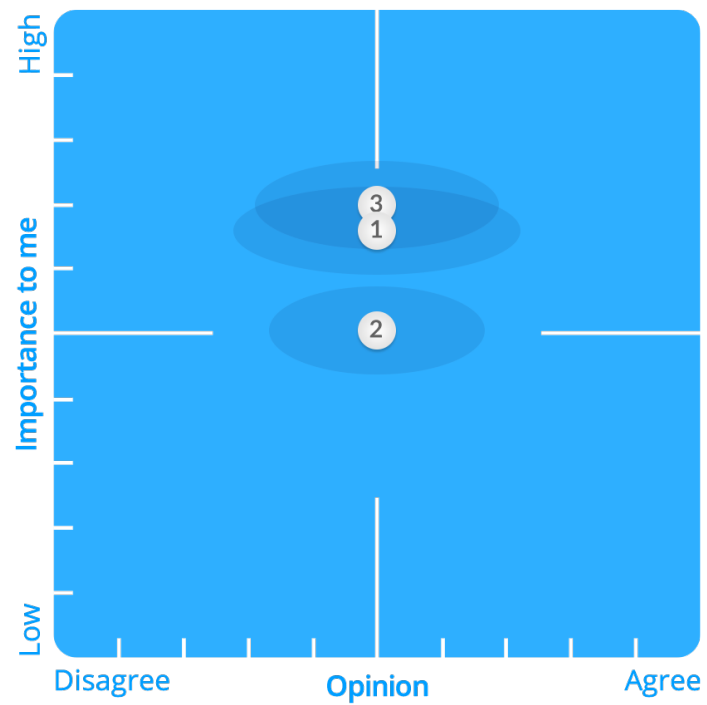
On a ZEF report, the ratios of the distances between each question remains the same, even though the actual distances are exaggerated. This makes it easier for you to see their significance. By normalizing the results like this, each respondent's opinion distortions are removed.

In what cases is the ZEF-method useful?

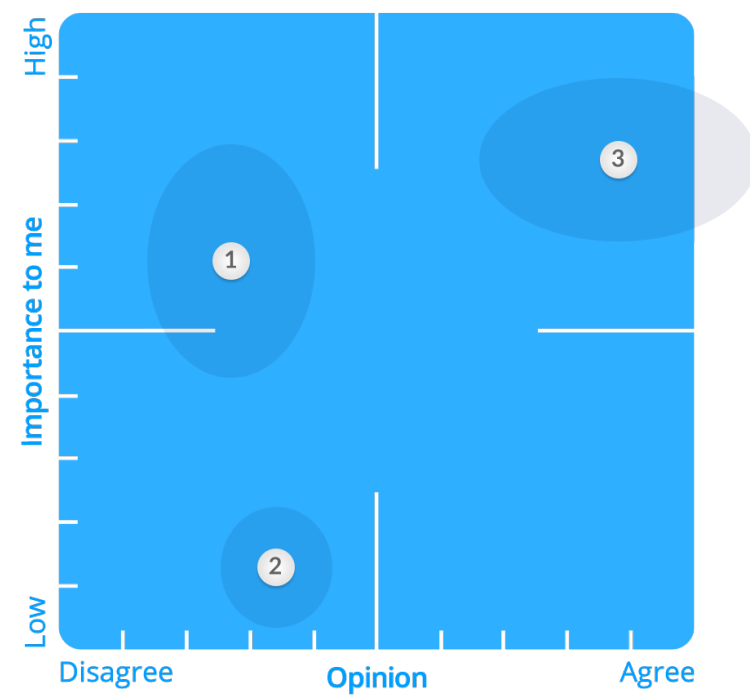
ZEF-method is recommended when differences in answering styles will affect the results. It also enables the survey creator to analyze the differences between questions in greater detail. In addition, the method allows us to see how respondents prioritize each of the questions.

The charts below show the differences between absolute and normalized results. In these reports, each number indicates that question's average point. The shadow around each average point shows the standard deviation for that question.

Absolute result



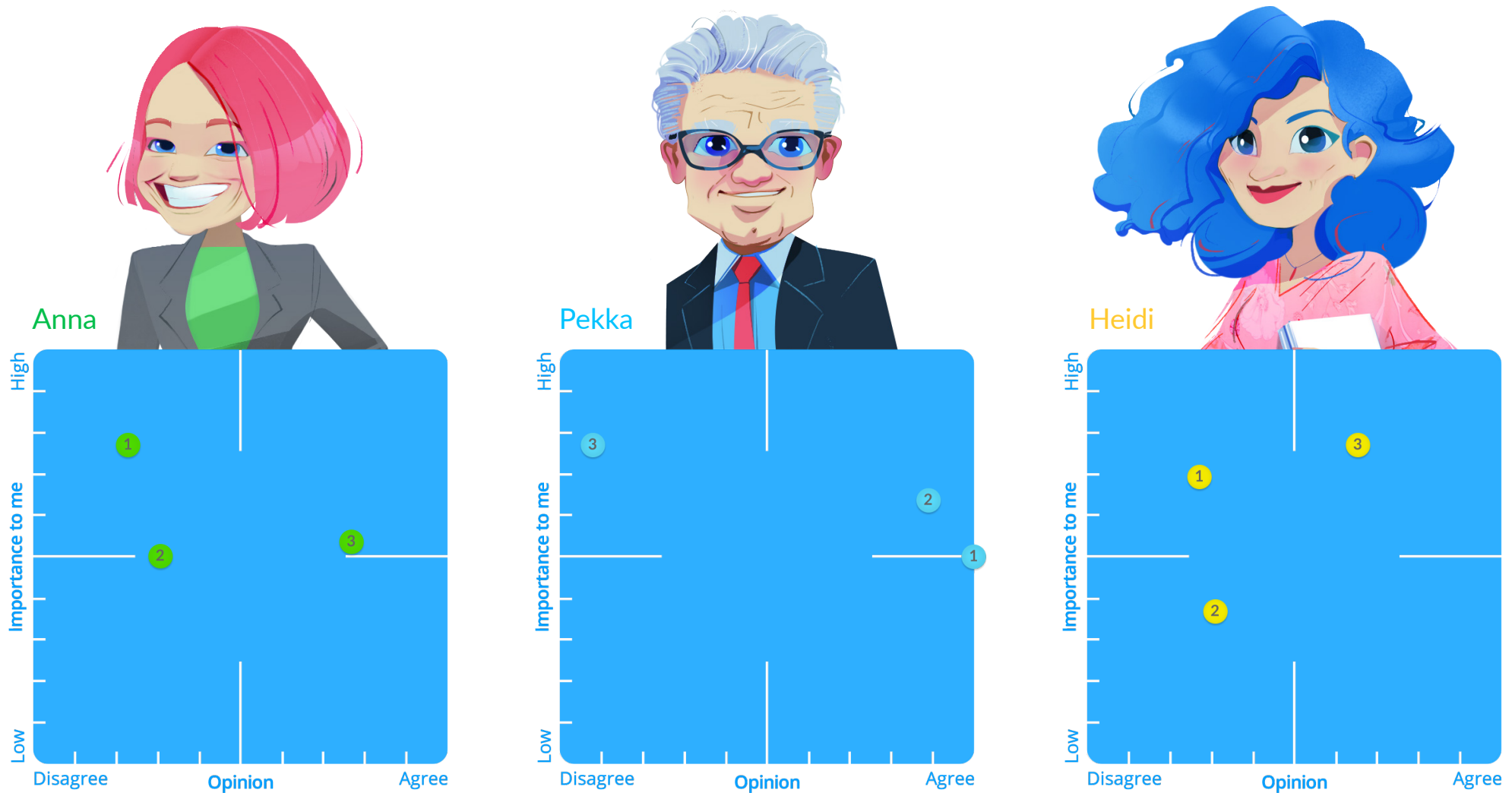
Normalized result



Introduction to the Respondents

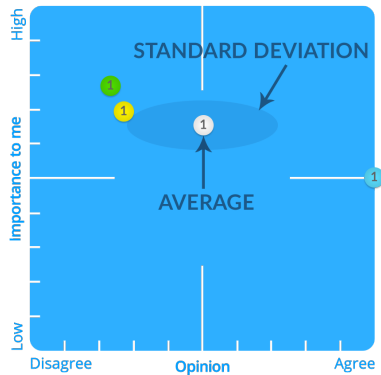
Three different types of respondents

In this guide, we will go through a real-life example of how the normalized result is calculated on a step-by-step basis. In our example, we have three different types of respondents who have answered three questions in the following ways:

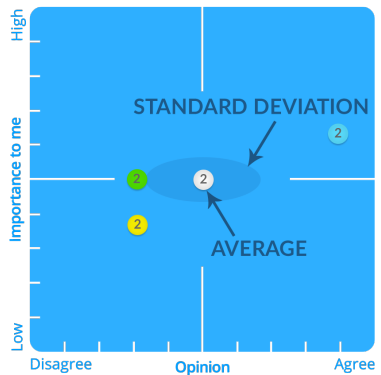


Absolute Report

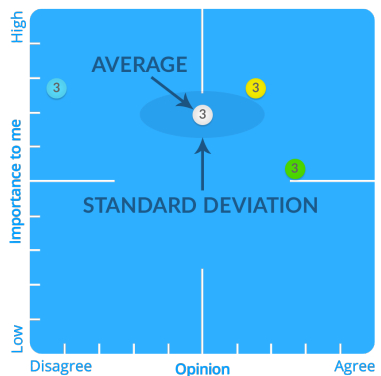
Absolute results are calculated from the averages of the exact answering points. The shadow seen around the average value is the standard deviation for that question.



The average value is calculated for question 1

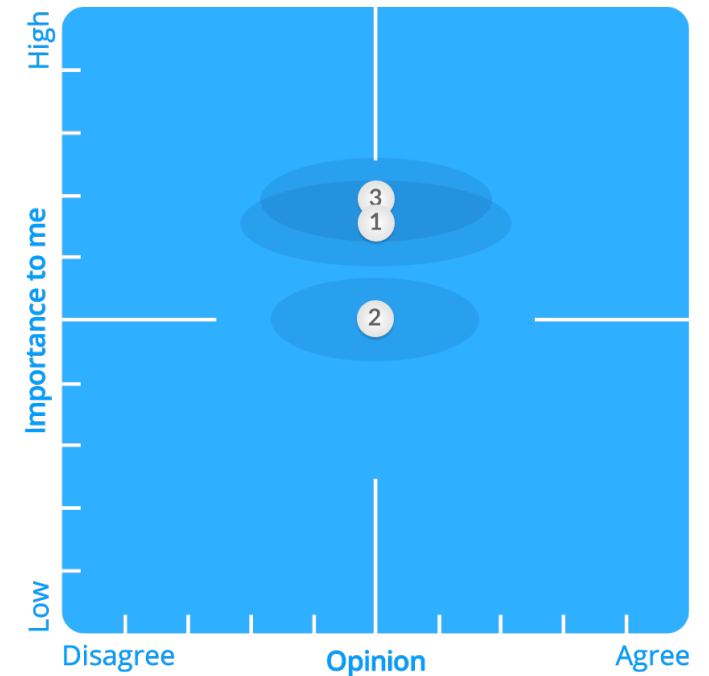


The average value is calculated for question 2



The average value is calculated for question 3

Final absolute report



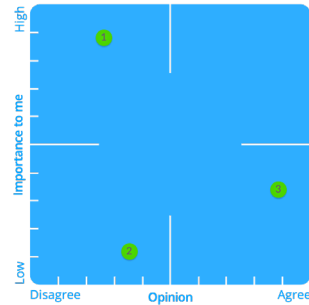
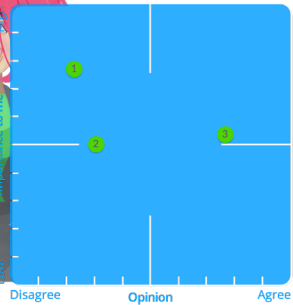
Normalized Report

1. Normalizing the responses of each individual



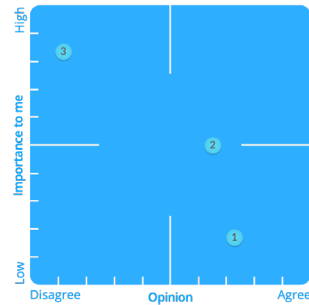
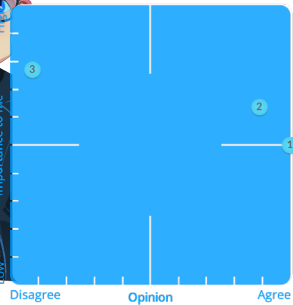
Anna

Anna's normalized responses



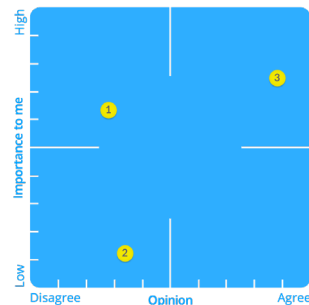
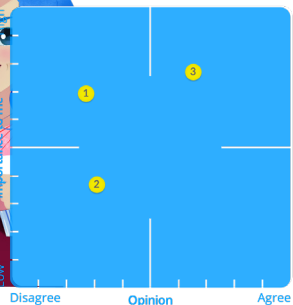
Pekka

Pekka's normalized responses

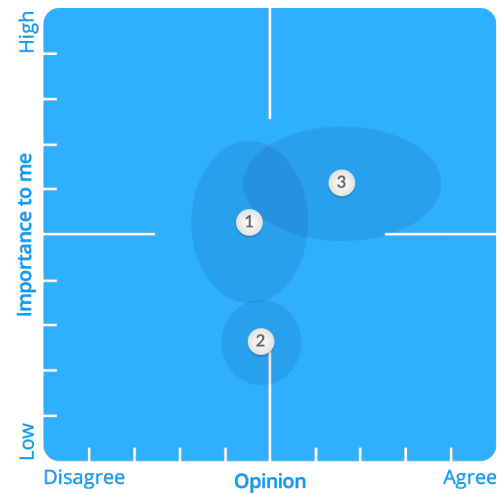


Heidi

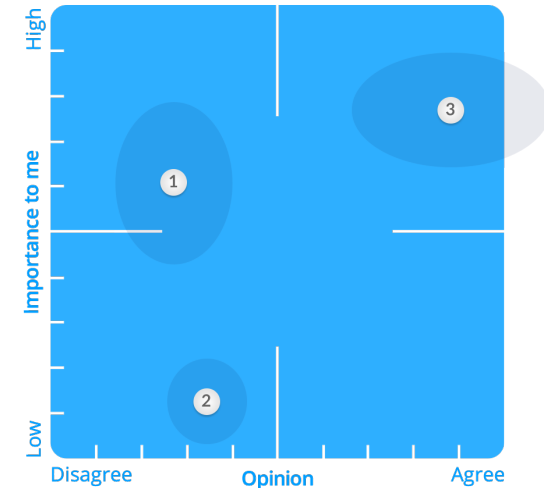
Heidi's normalized responses



2. Average values of the normalized results



3. Final normalized report



The calculations consist of three steps:

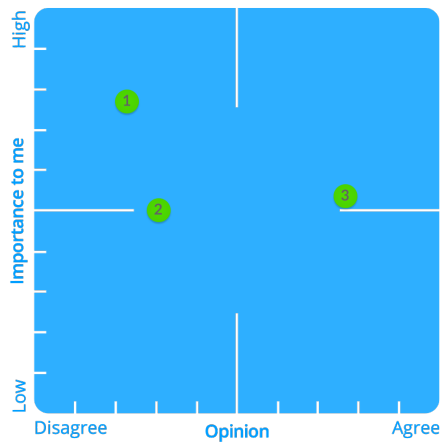
1. Each individual respondent's answers are normalized by using the z-scoring method.
2. The average value for the normalized results is calculated.
3. The average values of step 2 are normalized by using the z-scoring method.

Read more about these three steps from the upcoming sections.

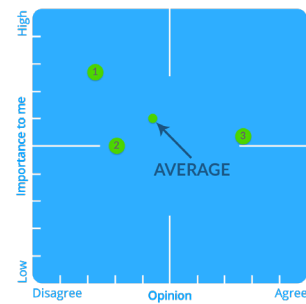
Step 1

On the left you can see our example respondent **Anna's** answers. On the right are **Anna's** normalized results. In between these two are the steps from the z-scoring process.

Anna's responses

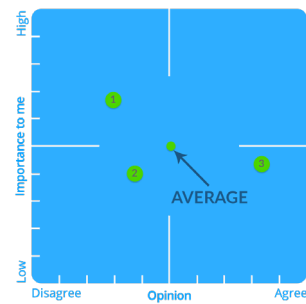


1.



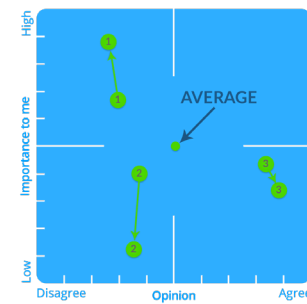
1. Calculate the average value of the responses.

2.



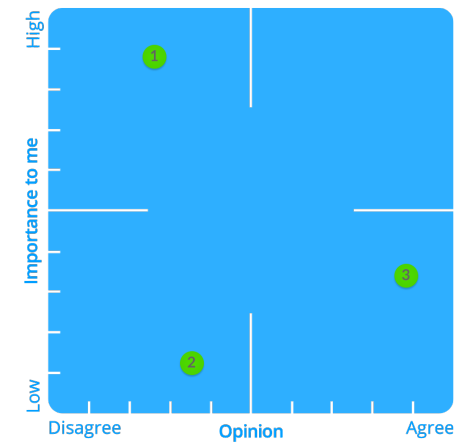
2. Move the average value to the center of the response area.

3.



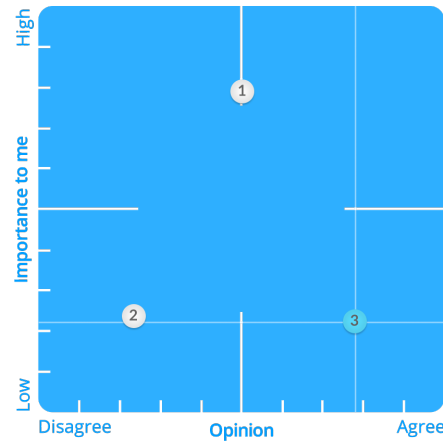
3. Spread the responses evenly over the entire response area.

Anna's normalized responses



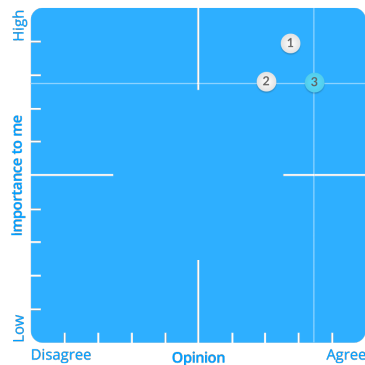
Other Examples

As a result of z-scoring, we have the same end result!



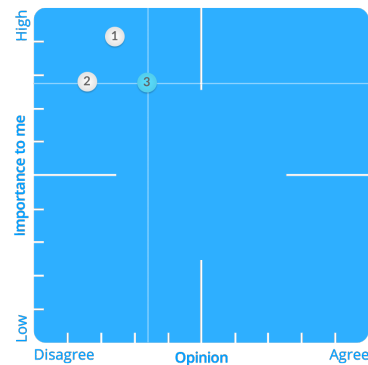
What happens?

1. Calculate the average value of the responses.
2. Move the average value to the center of the response area.
3. Spread the responses evenly over the entire response area.



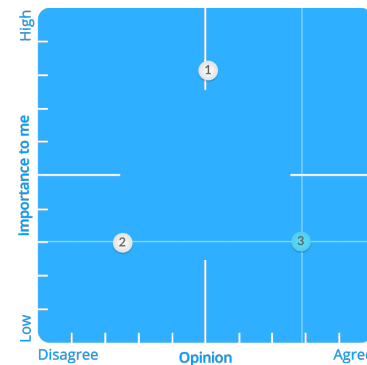
Optimistic

All evaluated questions are important and are performing well.



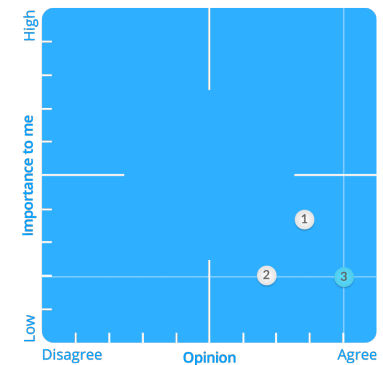
Pessimistic

All evaluated questions are important and are performing weakly.



Broad-minded

All evaluated question have clearly different levels of importance and performance.

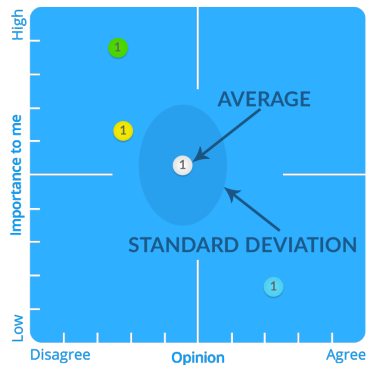


Meaningless

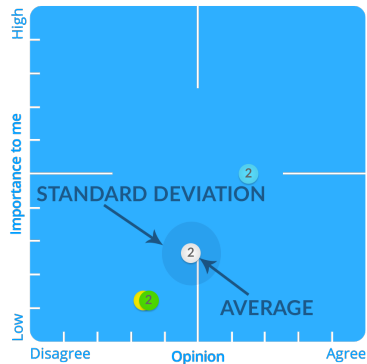
The evaluated questions are performing well, but the levels of importance are low.

Step 2

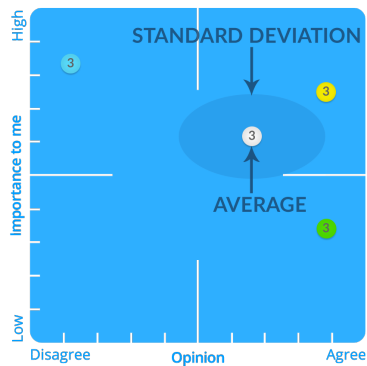
After step 1, we have normalized each respondent's responses. In step 2, we calculate the average values of these normalized responses. The shadows indicate the standard deviations that occur from these normalized results.



The average value of the normalized responses for question 1 is calculated.

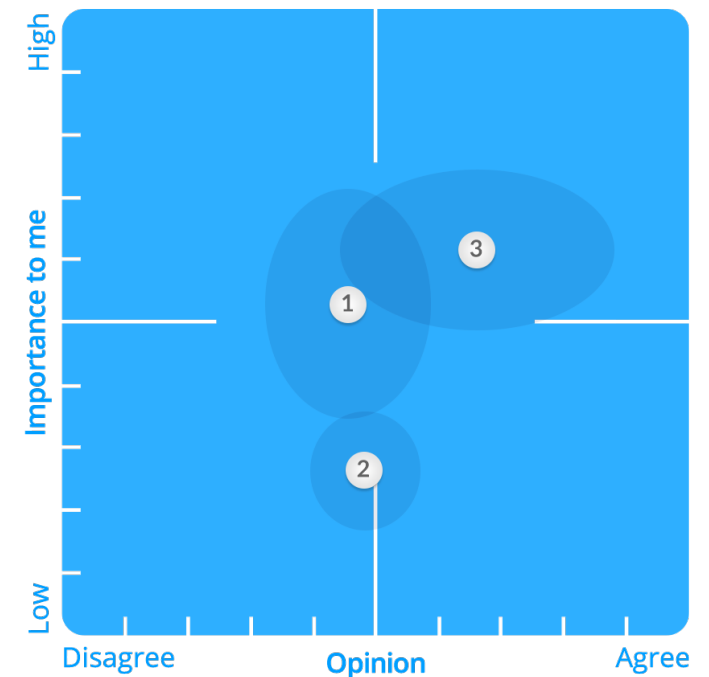


The average value of the normalized responses for question 2 is calculated.



The average value of the normalized responses for question 3 is calculated.

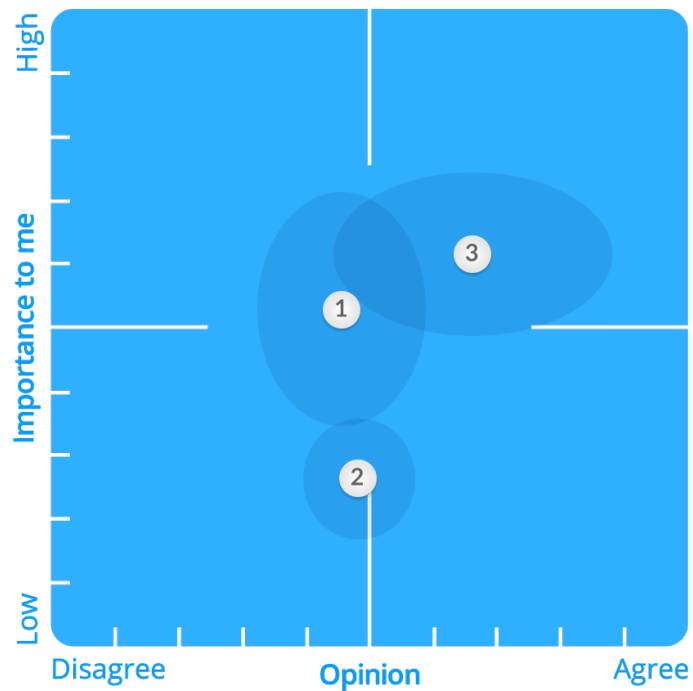
Average values of the normalized responses



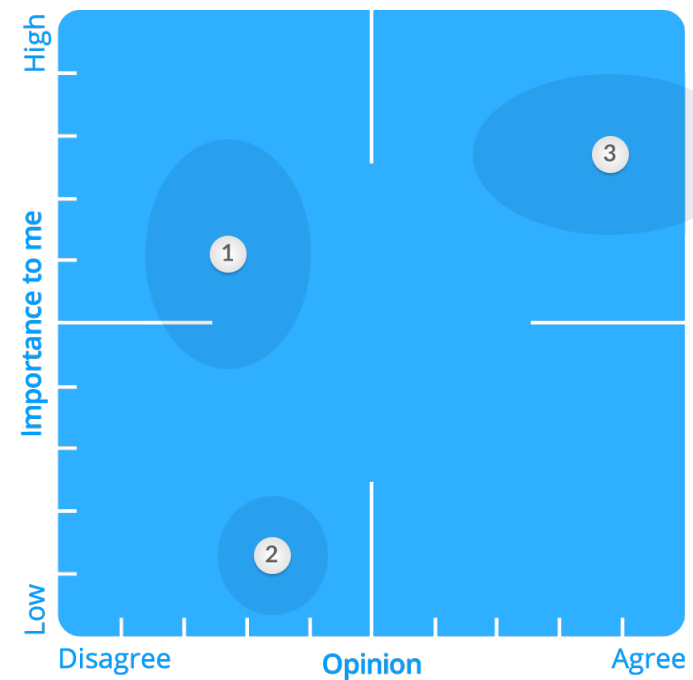
Step 3

In step 3 these normalized average values are normalized once more by using the z-scoring method. The standard deviations remain the same.

Absolute Report



Normalized Report



What happens?

1. Calculate the average value of the responses.
2. Move the average value to the center of the response area..
3. Spread the responses evenly over the entire response area.

Thank you!

We are a Finnish software company, established to help people with decision making. We have had the opportunity to help organizations of all sizes collect data towards organizational development since 1997.

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