Narrowing the Funnel: Making Decisions in a Complex World

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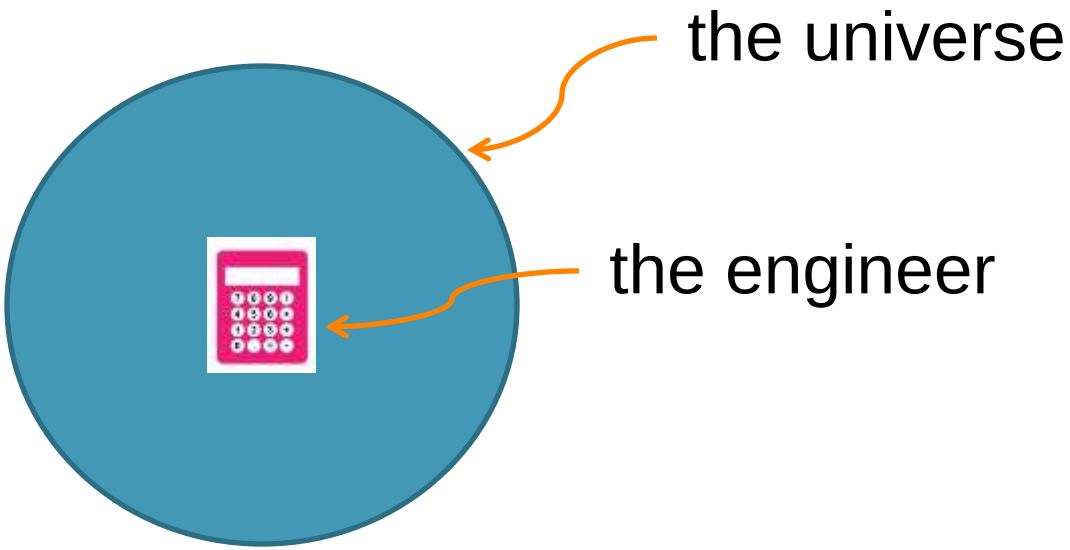
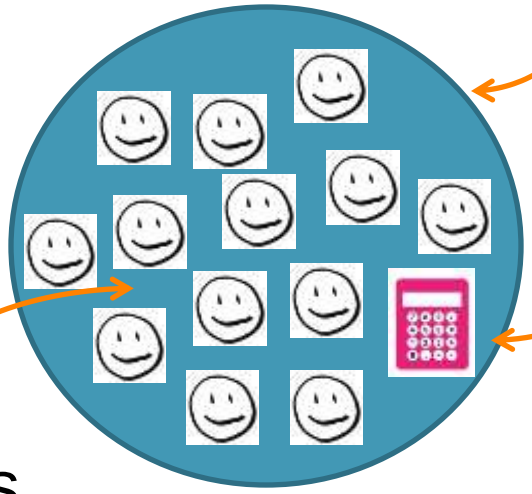
In the beginning, the engineer was at the center of the universe



But then all sorts of people started having opinions and thinking those opinions mattered



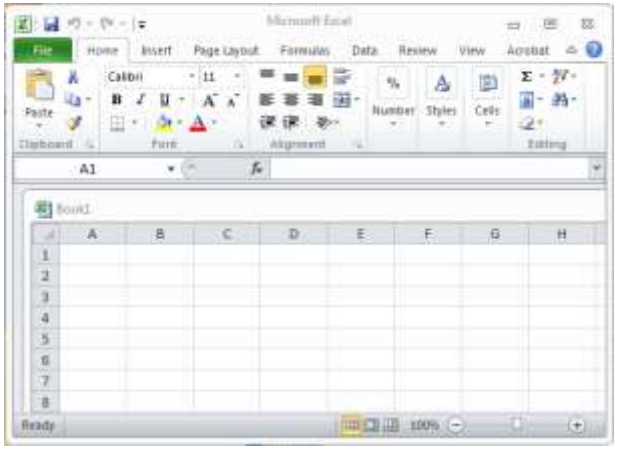
the universe

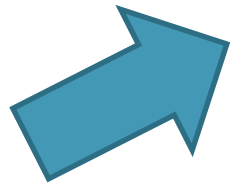
the engineer
(pushed to side)

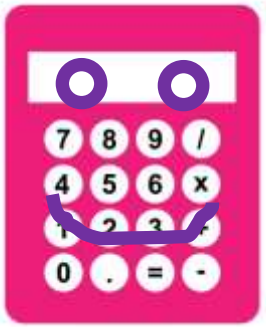
non-engineers
with all sorts of
non-engineering
ideas

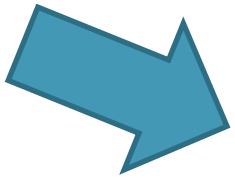
The engineers loved making decisions with MS Excel;

The non-engineers just didn't understand

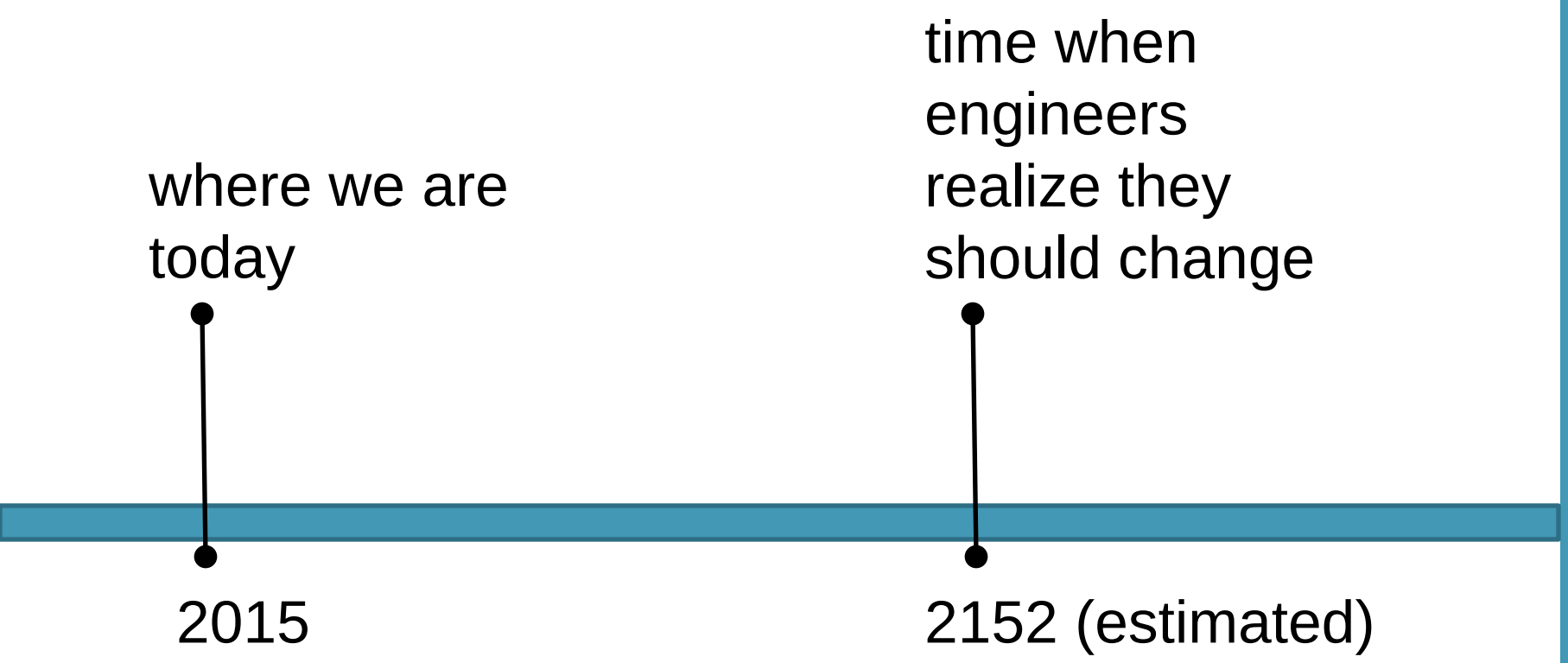




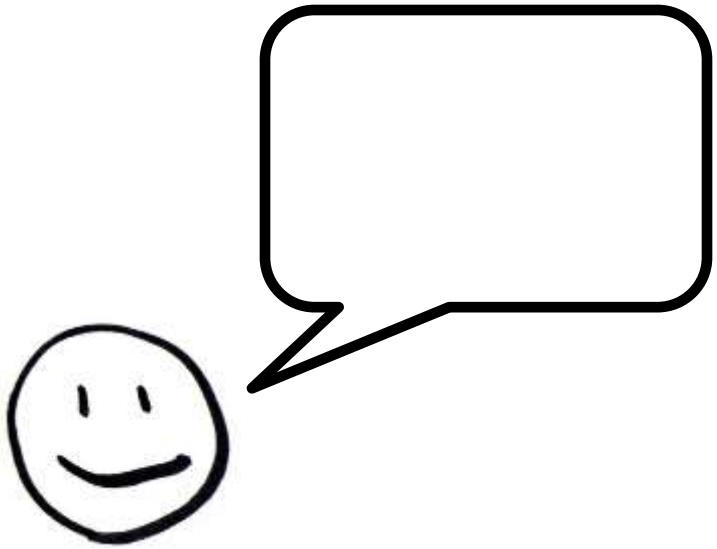




Then the engineers realized they needed to change how they make decisions



Goal for today:
Let's think about how we make decisions in today's world



(decisions people care about outside your organization)

What does the public think about how we make decisions?

The way we make decisions is a reflection of who we are as an organization

- transparent
- easy to understand
- representative

Let's start with the beloved weighted criteria matrix

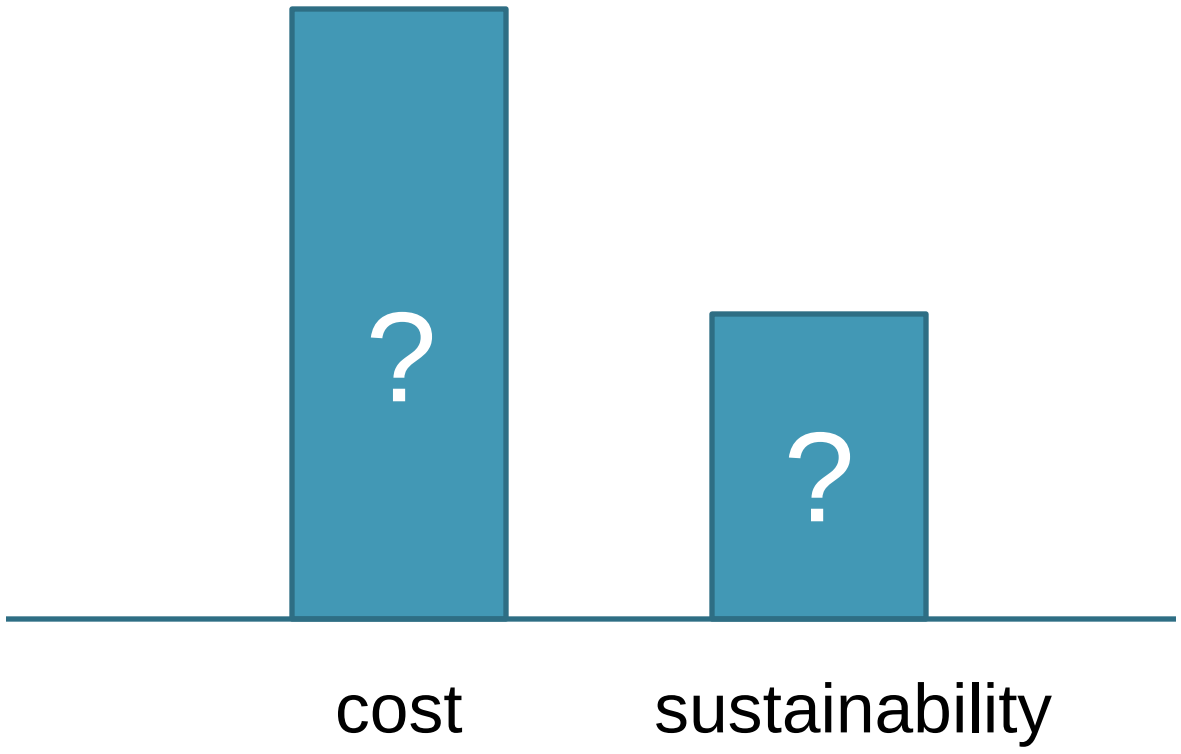
	%	Option A	Option B	Option C	Option D
Criterion 1	10%	8	4	6	5
Criterion 2	2.5%	4	4	8	7
Criterion 3	15%	4	6	8	3
Criterion 4	40%	2	7	6	6
Criterion 5	5%	5	2	7	5
Criterion 6	2.5%	4	4	7	8
Criterion 7	25%	3	7	5	1
Total Score	100	3.4	6.15	6.175	4.225

Conveniently-calculated "answer"

Challenge 1 – These weightings represent values and we don't all share the same values

	%	Option A	Option B	Option C	Option D
Criterion 1	10%	8	4	6	5
Criterion 2	2.5%	4	4	8	7
Criterion 3	15%	4	6	8	3
Criterion 4	40%	2	7	6	6
Criterion 5	5%	5	2	7	5
Criterion 6	2.5%	4	4	7	8
Criterion 7	25%	3	7	5	1
Total Score	100	3.4	6.15	6.175	4.225

And sometimes it's hard (and uncomfortable) to express our values in relative weightings



Challenge 2 – These matrices are inherently lacking in transparency, because humans make lousy calculators

	%	Option A	Option B	Option C	Option D
Criterion 1	10%	8	4	6	5
Criterion 2	2.5%	4	4	8	7
Criterion 3	15%	4	6	8	3
Criterion 4	40%	2	7	6	6
Criterion 5	5%	5	2	7	5
Criterion 6	2.5%	4	4	7	8
Criterion 7	25%	3	7	5	1
Total Score	100	3.4	6.15	6.175	4.225

What was the most important criterion in identifying Option C as the right option?

If you want to believe the outcome you need to buy into all of the individual entries

	%	Option A	Option B	Option C	Option D
Criterion 1	10%	8	4	6	5
Criterion 2	2.5%	4	4	8	7
Criterion 3	15%	4	6	8	3
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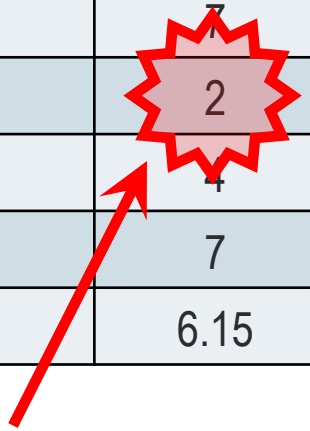


Encourages people to zoom in on individual criteria evaluations they do not agree with, whether or not they affected the outcome

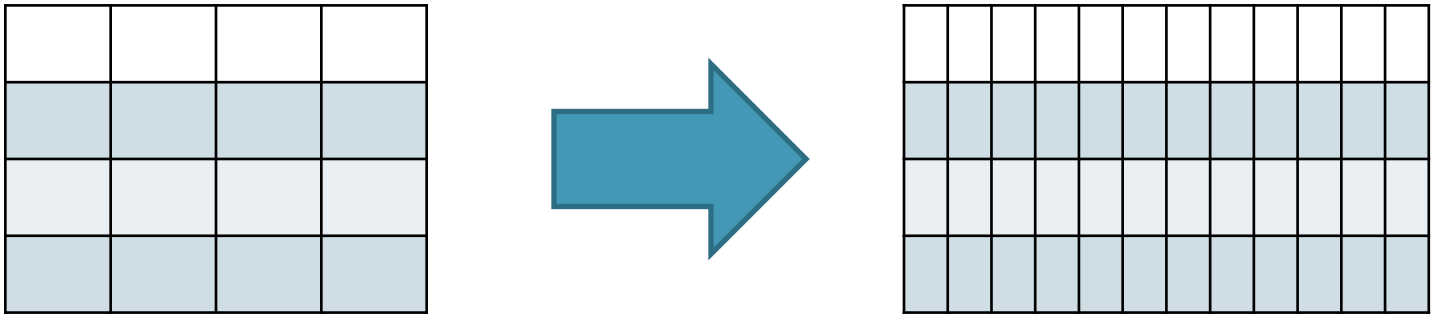
Challenge 3 – These evaluations can be easily manipulated (*sometimes subconsciously)

	%	Option A	Option B	Option C	Option D
Criterion 1	10%	8	4	6	5
Criterion 2	2.5%	4	4	8	7
Criterion 3	15%	4	6	8	3
Criterion 4	40%	2	7	6	6
Criterion 5	5%	5	2	7	5
Criterion 6	2.5%	4	4	7	8
Criterion 7	25%	3	7	5	1
Total Score	100	3.4	6.15	6.175	4.225

* Ever happened to you?

Research in psychology confirms we can be overwhelmed with details when making decisions

Scenario: buying a used car where the information was structured to provide one “best” option



People were able to process information in a 4x4 matrix

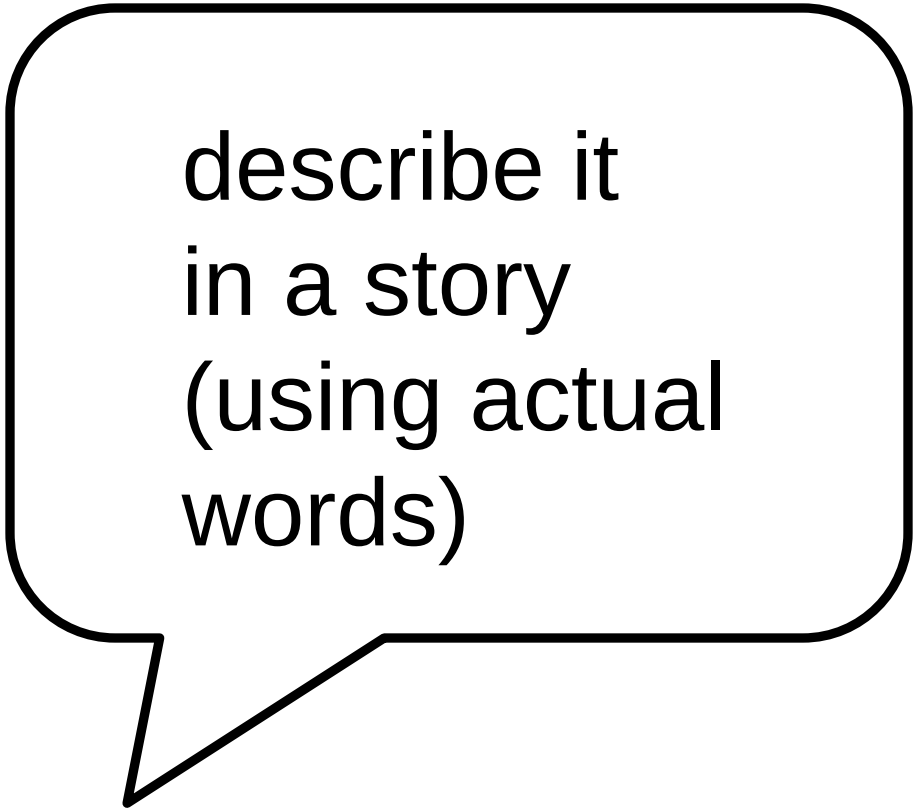
>50% got it right

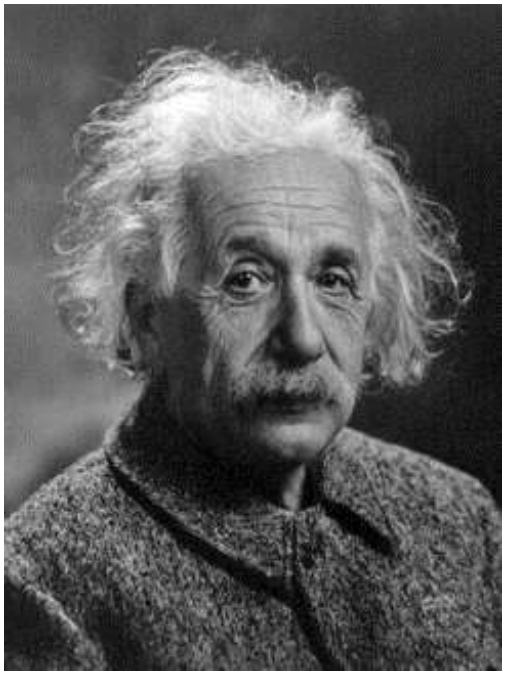
When it increased to 12 criteria, the information got in the way

<25% got it right

Study by Ap Dijksterhuis referenced in “How We Decide” (Lehrer, 2009)

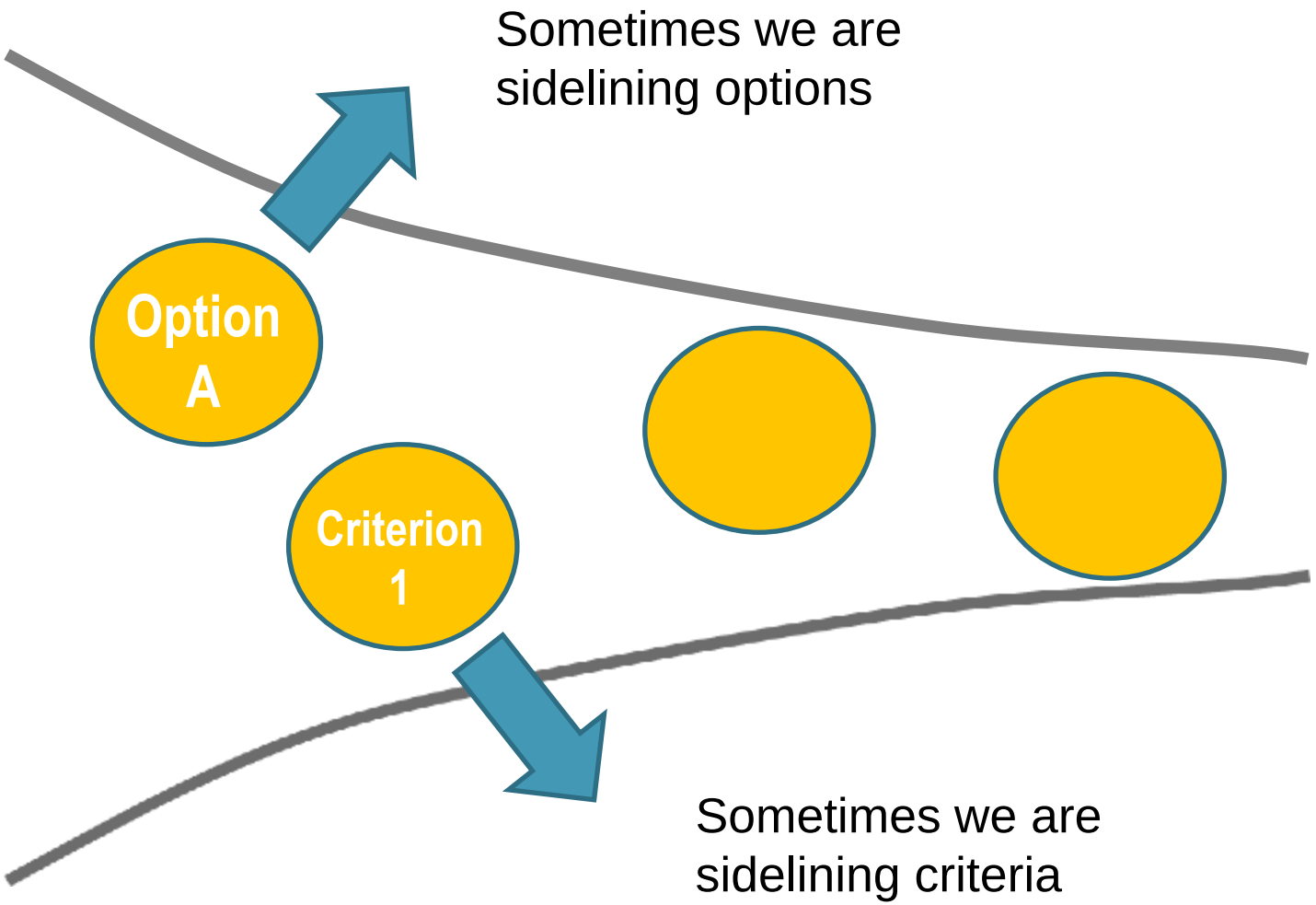
So what ARE you supposed to do?





“If you can’t explain it simply, you don’t understand it well enough”

How do you make it simple?
We apply the funnel



We don’t eliminate options anymore we “sideline” them because engineers are crappy fortune tellers

≠

We do focus our efforts on options that are the most promising based on current information

We start by using a simple scale, so that we focus on the information

Score	Definition
+	The option is beneficial, relative to the other options, in the evaluated category.
0	The option is neutral (neither beneficial or detrimental), relative to the other options, in the evaluated category.
-	The option is detrimental, relative to the other options, in the evaluated category.

We still end up with a matrix, but not quite like the traditional one shown here

Criteria	Option A	Option B	Option C	Option D
Cost	5	2	3	4
Criterion 1	4	2	3	4
Criterion 2	5	1	5	5
Criterion 3	5	3	2	5
Criterion 4	4	1	3	4
Criterion 5	5	2	3	3
Criterion 6	3	5	4	2
Criterion 7	3	3	3	3
Criterion 8	3	2	4	3
Criterion 9	3	1	5	3

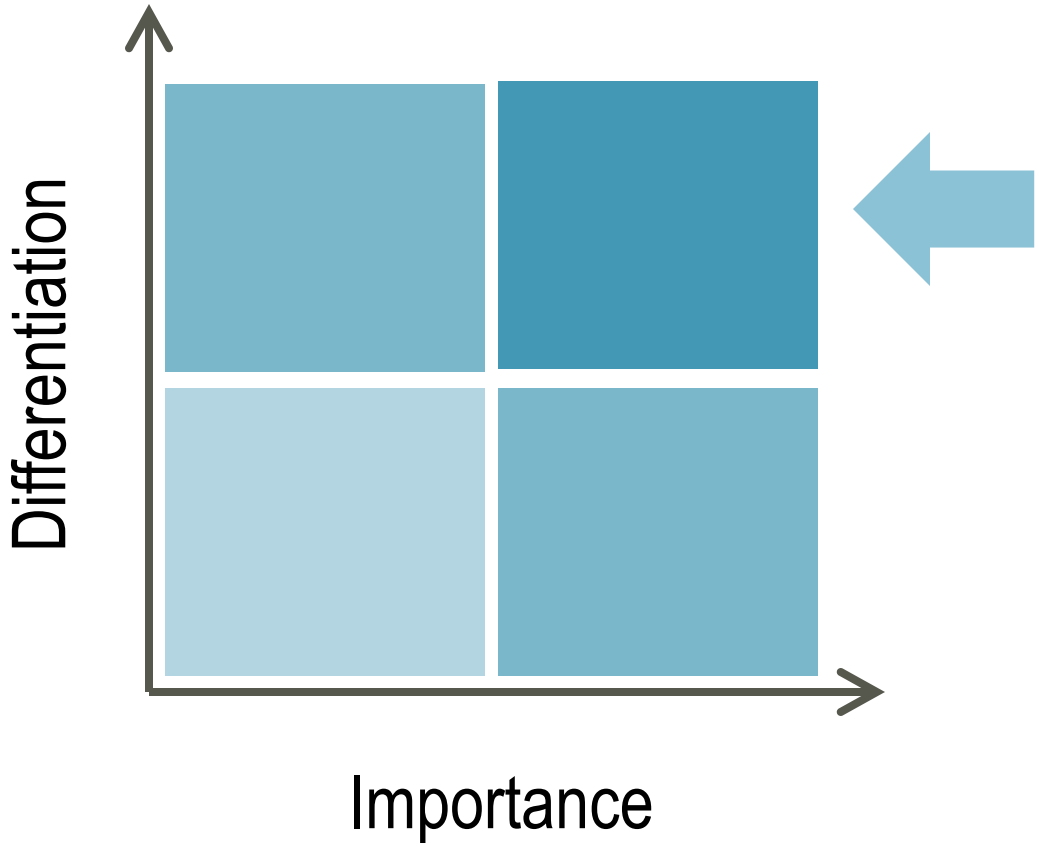
Which of these options looks good to you?

Simplification and color coding makes it easier for our minds to take in the information

Criteria	Option A	Option B	Option C	Option D
Cost	$	$	$	$
Criterion 1	+	-	0	+
Criterion 2	+	-	+	+
Criterion 3	+	0	-	+
Criterion 4	+	-	0	+
Criterion 5	+	-	0	0
Criterion 6	0	+	+	-
Criterion 7	0	0	0	0
Criterion 8	0	-	+	0
Criterion 9	0	-	+	0

This is the same information. Now which options look good?

Now we apply the funnel to focus on the factors that are both important *and differentiating*



How did you go about making your last big decision?

Example from Hillsboro water supply decision

Criteria	Mid-Willamette	Tualatin Basin Water Supply Project	Portland Supply	Northern Groundwater
Estimated Total Project Cost	$870,000,000 Lowest-cost option	$1,080,000,000 +24% ($210,000,000) compared to lowest-cost option	$1,110,000,000 +28% ($240,000,000) compared to lowest-cost option	$1,140,000,000 +31% ($270,000,000) compared to lowest-cost option
Reliability	+	-	0	+
Redundancy	+	-	+	+
Ownership	+	0	-	+
Operational Complexity	+	-	0	+
Implementation Risk	+	-	0	0
Source Water Quality	0	+	+	-
Treated Water Quality	0	-	0	-
Environmental Impacts	0	-	+	0
Responsiveness to Demand Growth	0	-	+	0

Once we had applied the funnel, we ended up with a simplified matrix that we simplified a little more

Criteria	Mid-Willamette	Portland Supply
Estimated Total Project Cost	$870,000,000 Lowest-cost option	$1,110,000,000 +28% ($240,000,000) compared to lowest-cost option
Reliability	+	0
Redundancy	+	+
Ownership	+	-
Operational Complexity	+	0
Implementation Risk	+	0
Source Water Quality	0	+
Environmental Impacts	0	+
Responsiveness to Demand Growth	0	+

Once we had applied the funnel, we ended up with a simplified matrix

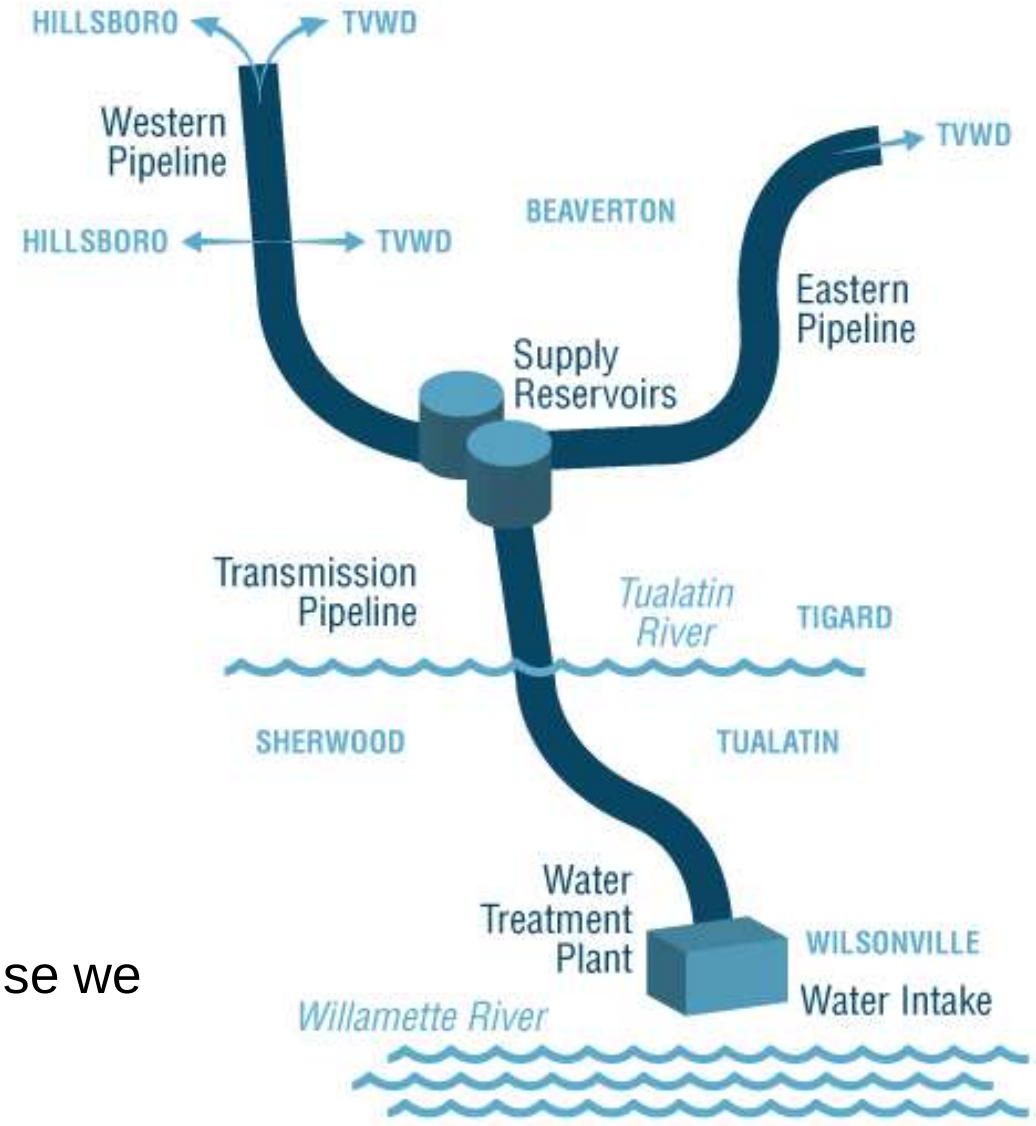
Criteria	Mid-Willamette	Portland Supply
Estimated Total Project Cost	$870,000,000 Lowest-cost option	$1,110,000,000 +28% ($240,000,000) compared to lowest-cost option
Reliability	+	0
Ownership	+	-
Operational Complexity	+	0
Implementation Risk	+	0
Source Water Quality	0	+
Environmental Impacts	0	+
Responsiveness to Demand Growth	0	+

vs.

Criteria	Mid-Willamette	Portland Supply
Estimated Total Project Cost	$870,000,000 Lowest-cost option	$1,110,000,000 +28% ($240,000,000) compared to lowest-cost option
Environmental Impacts	0	+
Reliability	+	0
Source Water Quality	0	+
Ownership	+	-
Operational Complexity	+	0
Responsiveness to Demand Growth	0	+
Implementation Risk	+	0

It really helps to group together the benefits of each option

Now that we are in the preliminary design phase and we are still in the funnel



Life in the funnel is hard because we all want to get to the answer

How do we survive in the funnel?

Live with it

- Beware of the anchoring effect of making presumptive decisions

Work with it

- Be willing to work with stakeholders and evaluate new information fairly

And still be wrong

Questions?