Can We Learn to Manage Uncertainty? Probably!

Robert Herbig
AI Practice Lead

SEP

@RobertHerbig

Stir Trek

Stir Trek

webassembly

NEW UNREADS

fp-domain-modeling

automate-accessibility

js-good-parts

scaling-past-sql

design-patterns

architecture-decisions

1400-sessions

patterns-beyond-micro

rediscover-efcore

home-automation

side-quests

manage-uncertainty

Welcome!

web-components

containers

vs-code

1500-sessions

openapi-swagger

figma-to-code

roles-priv-security

sql-vs-nosql

castle-defense-101

hot-new-html

emerging-languages

temporal-js

manage-uncertainty › Welcome!

Welcome!

April 30, 2025

Robert Herbig OP Yesterday at 1:56 PM

Hello, everyone! Please don't hesitate to ask any questions!

React to Post

Following

Robert Herbig OP Yesterday at 5:48 PM

Or feel free to find me before/after the session. I'll be the person wearing a Riddler costume (yes, like the Batman villain). Come to the talk to learn ***why*** - I promise it'll make sense!

Matt Eland | @IntegerMan Yesterday at 7:00 PM

It's truly a sight to see.

❤️ 1

May 1, 2025

ajbennett 8:51 AM

Makes sense to ask questions ... if we're *uncertain* ... 😉

😆 1 💯 1

Send a message in "Welcome!"

@RobertHerbig

Image by Pexels from Pixabay

“When Will It Be Done?”

“When Will It Be Done?”

Takeaways

Think probabilistically, not deterministically

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Use probabilistic forecasting

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Communicate the uncertainty

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-
-

Case study

Takeaways

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Case study

“I don’t know”

@RobertHerbig

“What makes a decision great is not that it has a great outcome. A great decision is the result of a good process, and that process must include an attempt to accurately represent our own state of knowledge. That state of knowledge, in turn, is some variation of ‘I don’t know.’”

Annie Duke

Thinking In Bets

https://www.annieduke.com/

Takeaways

Think probabilistically, not deterministically

- **Luck and skill both contribute to the actual outcome**
-
-

Use probabilistic forecasting

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-
-

Communicate the uncertainty

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-

Case study

Pure Luck

Pure Skill

Photo by Randy Fath on Unsplash

Photo by Inês Ferreira on Unsplash

@RobertHerbig

Takeaways

Think probabilistically, not deterministically

- Luck and skill both contribute to the actual outcome
- **There is more than one possible outcome**
- **Not all outcomes are equally likely**

Use probabilistic forecasting

-
-
-

Communicate the uncertainty

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-

Case study

@RobertHerbig

https://batman.fandom.com/wiki/Mark_Desmond

Smash Gotham City → Profit

@RobertHerbig

Smash Gotham City → Profit

Smash Gotham City → Stopped by Batman

@RobertHerbig

@RobertHerbig

@RobertHerbig

https://comicvine.gamespot.com/riddler/4005-3718/

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Case study

“When Will It Be Done?”

Probabilistic Forecasting

@RobertHerbig

Probabilistic Forecasting

Courtesy of NOAA

@RobertHerbig

Probabilistic Forecasting

A good forecast:

1. **Shows multiple options**

@RobertHerbig

Probabilistic Forecasting

A good forecast:

1. Shows multiple options
2. **Is clear about the level of uncertainty (confidence)**

@RobertHerbig

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A good forecast:

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3. **Can be tested against the actual outcome**

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4. **Is updated as new information is received**

@RobertHerbig

Probabilistic Forecasting

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Courtesy of NOAA

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Use probabilistic forecasting

- **Show multiple options (with their confidence)**
- **Test the actual outcome against the forecast**
- **Update the forecast with new info**

Communicate the uncertainty

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Case study

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Case study

Initial backlog = 25 stories

Velocity = 3/sprint

Initial backlog =
20-30 stories

Velocity =
2-4/sprint

Initial backlog = 20-30 stories

Velocity = 2-4/sprint

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Initial backlog = 20-30 stories

Velocity = 2-4/sprint

In order to use an average...

Glen Alleman

Increasing the Probability of Project Success

http://herdingcats.typepad.com/my_weblog/2011/03/use-and-misuse-of-the-normal-distribution.html

@RobertHerbig

In order to use an average...

"... the members of the population must be statistically independent - rarely is this the case in engineering or software development."

Glen Alleman

Increasing the Probability of Project Success

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Initial backlog =
20-30 stories

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Initial backlog =
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Velocity =
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@RobertHerbig

The Monte Carlo method

Image by Hans from Pixabay

“Running Monte Carlo is the only way to analyze big uncertain decisions.”

Douglas Hubbard

How to Measure Anything

https://www.hubbardresearch.com/about/hdr-staff/

Focused Objective

Workshops Private Workshops Spreadsheets/To

Forecasting and Metric Spreadsheets

To be honest, you probably know us because of our spreadsheet tools. That's OK, but now consider training :)

Throughput Forecaster: I want to forecast how long a single feature may take

Multiple Feature Cut Line Forecaster: I want to forecast multiple features at once

Team Dashboard: I want to quickly create an team dashboard

Skill and Capability Survey and Matrix: I want to quickly survey teams to understand skill constraints

Time Series Forecasting for Demand

MORE - A lot more on our GitHub repo ....

Simulation Application

https://www.focusedobjective.com/pages/free-spreadsheets-and-tools

Troy Magennis

Predictability At Scale

https://www.focusedobjective.com/

2. How many stories are remaining to be completed?

low guess	90	high guess	120
scope complexity	Clear and understood	(change this list and growth factors in the "Settings" worksheet)	
adjusted scope	90		120

3. Stories are often split before and whilst being worked on. Estimate the split rate low and high bounds.

Often the throughput/velocity in the backlog is pre-split, but captured completed stories post-splitting by the dev team making forecasts optomistic.

low split guess	1.00	highest split guess	1.50

4. Throughput. How many completed stories per week or sprint do you estimate low and high bounds?

Throughput/velocity data or estimate is for 1 week 7 days

worst case	3	most often	5 (optional)	best case	10

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Results

Likelihood	Duration (No. of 1 week intervals)	Date
100%	32	8/13/2023
95%	28	7/16/2023
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85%	26	7/2/2023
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65%	23	6/11/2023
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55%	23	6/11/2023
50%	22	6/4/2023
45%	21	5/28/2023
40%	21	5/28/2023
35%	21	5/28/2023
30%	20	5/21/2023
25%	20	5/21/2023
20%	19	5/14/2023
15%	19	5/14/2023
10%	18	5/7/2023
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0%	14	4/9/2023

Almost certain

Somewhat certain

Less than coin-toss odds. But if you are

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@RobertHerbig

https://shop.highlights.com/

@RobertHerbig

https://en.wikipedia.org/wiki/Goofus_and_Gallant

Goofus has poor code quality and therefore erratic sprint velocity

@RobertHerbig

Historical data:

- 4, 5, 10, 11

Average: 7.5

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Gallant uses best practices to minimize rework and defects

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Gallant uses best practices to minimize rework and defects

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- 6, 7, 8, 9

Average: 7.5

Historical data:

- 4, 5, 10, 11

Average: 7.5

Standard deviation: 3.5

Goofus has poor code quality and therefore erratic sprint velocity

Gallant uses best practices to minimize rework and defects

Historical data:

- 6, 7, 8, 9

Average: 7.5

Standard deviation: 0.5

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Team Gallant

Vel: 6, 7, 8, 9
Average: 7.5
StdDev: 0.5

Team Goofus

Vel: 4, 5, 10, 11
Average: 7.5
StdDev: 3.5

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Takeaways

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- There is more than one possible outcome
- Not all outcomes are equally likely

Use probabilistic forecasting

- Show multiple options (with their confidence)
- **Test the actual outcome against the forecast**
- Update the forecast with new info

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Likelihood	Impact Low	Impact High	Description
50%	20	30	Rewrite the front-end in a new framework

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Case study

“Bet”

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Photo by Michał Parzuchowski on Unsplash

“Bet”

- Cost

“Bet”

- Cost

Joker (2019) by Warner Bros. Pictures

“Bet”

- Cost

https://girloncomicbookworld.wordpress.com/2015/06/24/the-riddler-character-analysis-psychopath/

“Bet”

- Cost
- Odds

https://dc.fandom.com/wiki/Harvey_Dent_(New_Earth)

“No one ever steps in the same codebase twice, for it's not the same codebase and they are not the same developer.”

Heraclitus

Ancient Greek Software Engineer

https://en.wikiquote.org/wiki/Heraclitus

“Bet”

- Cost
- Odds
- Outcome

@RobertHerbig

Batman (1966) by 20th Century Studios

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Communicate the uncertainty

- **Use “bet” language**
- **Bets have: cost, odds, and outcome**
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Case study

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https://omdena.com/chapter-challenges/highway-asphalt-pavement-degradation-classification

Bet #1: Business Model

- Product-market fit
- Time to market
- Unknown unknowns
- Legal framework
- Complexity of their solution

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- Product-market fit
- Time to market
- Unknown unknowns
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- Complexity of their solution

- Cost: 1 hour
- Odds: 100%
- Outcome: Brainstorm risks and feasibility

Bet #1: Business Model

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Bet #2: One week of Discovery

- Cost: 1 week
- Odds: 90%
- Outcome:
  - A plan for the short-term
  - Intersection of startup’s strengths and customer’s needs

Bet #2: One week of Discovery

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Bet #2: One week o

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Bet #3: Two Feasibility Studies

- Cost: 8 weeks
- Odds: 75%
- Outcome: make a go/no-go decision for the big bet

Bet #3: Two Feasibility Studies

<u>Bet #3A: Technical Feasibility:</u>
"Can AI produce good enough budgets in a short enough time-frame?"

- Cost: 8 weeks
- Odds: 75%
- Outcome: make a go/no-go decision for the big bet

Bet #3: Two Feasibility Studies

Bet #3A: Technical Feasibility:
"Can AI produce good enough budgets in a short enough time-frame?"

Bet #3B: Market Feasibility:
"Does the market want this product and how would they use it?"

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Bet #3B: Market Feasibility

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Bet #3B: Market Feasibility:
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- Cost: 8 weeks
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What would it take to bring [product name] to life?

2. How many stories are remaining to be completed?

low guess	90	high guess	120
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adjusted scope	90		120

3. Stories are often split before and whilst being worked on. Estimate the split rate low and high

Often the throughput/velocity in the backlog is pre-split, but captured completed stories post-splitting by the dev team makin

low split guess	1.00	highest split guess	1.50

4. Throughput. How many completed stories per week or sprint do you estimate low and high bc

Throughput/velocity data or estimate is for 1 week 7 days

worst case	3	most often	5	(optional) best case	10

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worst case	1	most often	2 (optional)	best case	5

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5%	9	3/5/2023
0%	7	2/19/2023

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Bet #4: Professional Services

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- Use “bet” language
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https://sep.com/AI

Stir Trek

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webassembly

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fp-domain-modeling

automate-accessibility

js-good-parts

scaling-past-sql

design-patterns

architecture-decisions

1400-sessions

patterns-beyond-micro

rediscover-efcore

home-automation

side-quests

manage-uncertainty

Welcome!

web-components

containers

vs-code

1500-sessions

openapi-swagger

figma-to-code

roles-priv-security

sql-vs-nosql

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❤️ 1

May 1, 2025

ajbennett 8:51 AM

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@RobertHerbig

Bonus content!

“Bet”

A good bet:

1.

https://twitter.com/batman/status/1340341121759764481

“Bet”

A good bet:

1. **Is outcome focused**

@RobertHerbig

https://twitter.com/batman/status/1340341121759764481

“Bet”

A good bet:

1. Is outcome focused
2. **Acknowledges that “losing” is a possibility**

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“Bet”

A good bet:

1. Is outcome focused
2. Acknowledges that “losing” is a possibility
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@RobertHerbig

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4. Forces us to explore our assumptions and beliefs
5. Frames conversations around risk, information, learning, validation, and outcomes
6. **If small, can “buy” learning to inform larger bets**

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https://www.mindtheproduct.com/bets-boards-missions-and-north-stars-by-john-cutler/