DATA FOR THE 99%
Unlocking the Value of Big Data for the Masses

University of Minnesota-SEng Seminar Series
November 3, 2018

BEN SCHEIN, VP, Domo Center for Data Curiosity and Innovation
@benfromminn
DATA NEVER SLEEPS...

... but how can we make it useful
MAKING DATA USEFUL

• Unlocking and enabling data curiosity

• Organizing for agility in a data world

• Building partnership across business and tech teams

• Creating exciting, relevant and useful content
SESSION FORMAT

• Sharing my experience, frameworks and other wisdom

• Intermittent exercises
  • Reflection time on your own
  • Discuss with a partner/small group
  • Share with broader group (I am always collecting data)

• Questions, questions and more questions

• Data is our lens but lessons are universal about how to use technology to empower teams
FIRST, A LITTLE ABOUT ME
(evolution of a data dork)

Philosophy, Politics and Economics (no data)

6 years at database software start up: training, coding, selling (and cleaning the bathrooms)

MBA

5 years breaking things in finance at Target (push the envelope of what is given to me)

5 years building analytic solutions at scale (stop breaking things and start building a bigger envelope)
  • Target.com Business Intelligence Analytics and Testing (2013-2015)
  • Enterprise Data BI and Analytics (EDABI) Center of Excellence (2015-2018)

Domo: VP, Center for Data Curiosity and Innovation (June 2018 - present)
Unlocking and enabling data curiosity

Organizing for agility in a data world

Building partnership across business and tech teams

Creating exciting, relevant and useful content
THE CORE BI DILEMMA

Why does it always seem so hard to get the data and insight you need to solve a business problem?
EXERCISE 1: YOUR DATA STORY

Take a few minutes and write down your story of a time you could not get the data you needed. Focus on what was so frustrating, how you felt and what you had to do to push forward with solving your problem.
DATA IS EMOTIONAL

- Broken promises
- Wasted investment
- Disappointing your partners
- Interesting but not useful
- Not having what you need
A REAL LIFE EXAMPLE, CIRCA 2016

Subject: Re: Storage and Org Event Reporting

From: "amy.smith@target.com"
Date: Wednesday, December 5, 2016 at 9:22 PM
To: "ben.schein@target.com" <Ben.Schein@target.com>
Subject: Storage and Org Event Reporting

Ben,

I wanted to reach out to see about some additional support for the storage and organization merchandising team. You may not be aware but the week after Christmas is like the Christmas or black Friday for our business with huge sales in storage bins and other product. I know it is still small compared to Thanksgiving or Black Friday or Cyber Monday but for us it is a big deal. We really loved the real time reporting available this year over Black Friday and were hoping we could do something similar for the storage event, even if it had to be scaled down or not as comprehensive. It would be very relevant for our team to monitor sales and adjust our strategies as needed. Any increased visibility would make a huge difference.

The total business is $XX million with potential incremental sales this year of $XX million compared to our baseline. We would expect 20 users of the reporting and could impact up to $X million in inventory decisions. I have reviewed these numbers with our Vice President and she is willing to support any needed work or prioritization. I know we only have a few weeks until the event but wanted to know what the process was for getting approval to develop new reporting for our event and if this was even a possibility for this year.

Thanks for your time and consideration.

Amy Smith
Senior Buyer, DEPT 002: Storage and Organization
EXERCISE 2: WHAT IS AMY FEELING?

Amy’s e-mail reveals a lot about her own experience with data/BI projects and how she thinks things get done. What are some of the emotions Amy shows in this e-mail? Why? How are they revealed? Have you felt this way before?
YEARS OF BEING DISAPPOINTED AND NOT GETTING THE DATA YOU NEEDED:

Subject: Re: Storage and Org Event Reporting

From: "amy.smith@target.com"
Date: Wednesday, December 5, 2016 at 9:22 PM
To: "ben.schein@target.com" <Ben.Schein@target.com>
Subject: Storage and Org Event Reporting

Ben,

I wanted to reach out to see about some additional support for the storage and organization merchandising team. You may not be aware but the week after Christmas is like the Christmas or black Friday for our business with huge sales in storage bins and other product. I know it is still small compared to Thanksgiving or Black Friday or Cyber Monday but for us it is a big deal. We really loved the real time reporting available this year over Black Friday and were hoping we could do something similar for the storage event, even if it had to be scaled down or not as comprehensive. It would be very relevant for our team to monitor sales and adjust our strategies as needed. Any increased visibility would make a huge difference.

The total business is $XX million with potential incremental sales this year of $XX million compared to our baseline. We would expect 20 users of the reporting and could impact up to $X million in inventory decisions. I have reviewed these numbers with our Vice President and she is willing to support any needed work or prioritization. I know we only have a few weeks until the event but wanted to know what the process was for getting approval to develop new reporting for our event and if this was even a possibility for this year.

Thanks for your time and consideration.

Amy Smith
Senior Buyer, DEPT 002: Storage and Organization
WHAT DOES AMY FEEL?

• Fear that her work is not important/too small
• Willingness to settle for less or subpar product
• Need to develop complex business case and valuation
• Advocacy and pushing from senior executives required to get anything done
• Glad to just have request considered/heard

I wanted to reach out to see about some additional support for the storage and organization merchandising team. You may not be aware but the week after Christmas is like the Christmas or black Friday for our business with huge sales in storage bins and other product. I know it is still small compared to Thanksgiving or Black Friday or Cyber Monday but for us it is a big deal. We really loved the real time reporting available this year over Black Friday and were hoping we could do something similar for the storage event, even if it had to be scaled down or not as comprehensive. It would be very relevant for our team to monitor sales and adjust our strategies as needed. Any increased visibility would make a huge difference.

The total business is $XX million with potential incremental sales this year of $XX million compared to our baseline. We would expect [20 users] of the reporting and could impact up to $X million in inventory decisions. I have reviewed these numbers with our Vice President and she is willing to support any needed work or prioritization. I know we only have a few weeks until the event but wanted to know what the process was for getting approval to develop new reporting for our event and if this was even a possibility for this year.

Thanks for your time and consideration.

Amy Smith
Senior Buyer, DEPT 002: Storage and Organization
I WAS TIRED OF BEING DISAPPOINTED AND DISAPPOINTING OTHERS...

2013:

“May I please have another $2 million for digital promo data?”

2016:

“Yes, Amy, we can get that set up tomorrow in a couple of hours and create your own Domo page with real time data.”
I WAS TIRED OF BEING DISAPPOINTED AND DISAPPOINTING OTHERS...

2013: End-to-End

2016: End-to-Almost-End
FULLY END-TO-END BI SOLUTION DEVELOPMENT

PRIORITIZATION
(“pick one problem”)

LONG DEVELOPMENT CYCLE
(“wait a long long time”)

SOLUTION “COMPLETE”
(“hopefully”)

Some problems no longer exist, are no longer relevant or have less importance. Others just never were solved...

... New business problems emerge while waiting for end-to-end solution
EXERCISE 3: END-TO-END PROS AND CONS

Review the diagram of an end-to-end BI solution approach. What is good/helpful about this approach? What are some of the challenges with this approach?

<table>
<thead>
<tr>
<th>THE GOOD</th>
<th>THE BAD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FULLY END-TO-END BI SOLUTION DEVELOPMENT

No wonder our friend Amy the buyer felt the way she did.

Some problems no longer exist, are no longer relevant or have less importance. Others are never solved...

... New business problems emerge while waiting for end-to-end solution
WHY SHOULD WE CARE?

(ESPECIALLY IF WE ARE WORKING ON THE MOST IMPORTANT PROBLEMS)

• Lost business value from the **orphaned business problems** we pass over.

• Need to build a **culture of data curiosity** (don’t discourage people from asking for new data and analytics).

• The **fallacy of self service** (everyone needs some guidance, help, teaching, configuration).

• **Nothing is ever “complete”** (by their very nature, business problems will constantly evolve and change).
WHY IS CURIOSITY IMPORTANT?

• Fewer decision-making errors

• More innovation and positive changes in both creative and noncreative jobs

• Reduced group conflict

• More-open communication and better team performance

DUDE’S LAW (DAVID HUSSMAN)

Even if the “why” seems small (orphaned business problem) . . . when we can make the “how” continuously smaller (easier, self service platform) . . . then we can see large increases in value.

Source: http://www.devjam.com
Solving the Problem: END-to-ALMOST-END

---End-to-End---

Picking one or two major problems and spending long development cycles to “solve”. No longer viable in a modern data organization.

---END-to-ALMOST-END---

Build platforms that let non-engineers (business people, analysts, executives) create the last mile of insight delivery.

---END-TO-ENGINEER---

Build architecture that allow engineers to build solutions to many different problems.

---END ONLY---

Focus on tools with maximum flexibility that allow users to control everything (excel, Access, other).
EXERCISE 4: THEN WHAT?

**End-to-End**

**END-TO-ENGINEER**

Build architecture that allow engineers to build solutions to many different problems.

**END ONLY**

Focus on tools with maximum flexibility that allow users to control everything (excel, Access, other)

**END-to-ALMOST-END**

Build platforms that let non-engineers (business people, analysts, executives) create the last mile of insight delivery.

Examples, Pros, Cons, Concerns
END-TO-ALMOST-END SOLUTIONS

• Build tools that get “almost to the end”

• The last mile of insight delivery happens very close to the business problem (sometimes dedicated BI, sometimes within the business)

• Solving business problems is always the inspiration but engineers aim for just short of the actual problem (solve the problems of people solving the problems)

• Maintain engineering rigor on the last mile without engineers (automation, dependency, logging, backup, usage tracking)
GET THEN RIGHT DATA TOOLS

- **Speed to market**: quickly deliver new data and insight without needing an engineer. Easy to use with minimal training. Mobile ready.

- **Scalability**: Deliver data at scale that makes sense for the business problem at hand and has enough flexibility for future business problems.

- **Collaboration**: Share insights and content across teams and build a conversation around data.

I was tired of constantly being forced to make trade offs!
SHARE, SHARE AND SHARE SOME MORE
Unlocking and enabling curiosity

Organizing for agility in a data world

Building partnership across business and tech teams

Creating exciting, relevant and useful content
AGILE

- Manifesto for Agile Software Dev.
  - Individuals and interactions over processes and tools
  - Working software over comprehensive documentation
  - Customer collaboration over contract negotiation
  - Responding to change over following a plan
MULTIPLE PRACTICES AND APPROACHES
MODERN AGILE CAN BE COMPLICATED

Joshua Kerievsky

For the community and not just for software development

Modern agile is like carrying a big old laptop

One day we'll meet our velocity targets

We're uncovering better ways

Nonsense

Don't use the pedals - learn to balance

Don't pedal quick / balance first then pick up speed

A culture of fear trumps fancy processes or practices

Making software deliver value continuously

People aren't afraid of failure - they're afraid of blame - Seth Godin

Make people awesome

Having psychologically safe meetings is vital

Make safety a pre-requisite

Make up safety a prerequisite

Respect for people

Continuous improvement
I CAN’T BE AGILE, I DO ANALYTICS

- “These things take time. I can’t do it in 2 weeks”
- “Analytics does not lend itself to agile. It is too complicated”
- “Data Science is about slow evolution of ideas. Not fast MVP”
- “My complex problem cannot be broken into small parts.”
- “Agile is just for building digital products”
“OVER” IS DIFFERENT THAN “INSTEAD OF"
IT IS NOT ABOUT THE PRACTICES

Starting next week, our meetings will be "stand-ups" with no chairs, so we’ll be more focused.

So you examined all of the problems in the company and decided the root cause was chairs?

We’re also loosening the dress code.

So our problems are chairs and pants?
FOCUS ON CORE VALUES

An agile approach to BI...

Learn Quickly
(work in short sprints and focus on minimal viability)

Small Teams
that build trust & accountability (matrix across engineering, data science, business analysis, testing)

Transparency
with partners on what is being worked on

... quicker response to changing needs
Even many years later, the takeaway cards used in these agile workshops in Bangalore still resonate (and I carry one in my wallet).
AGILE IS EVERYWHERE:
Learn quickly...in my son’s kindergarten

“When we think we are done, we have just begun”
EXERCISE 5: HOW ARE YOU AGILE?

How do teams learn quickly?

- Learn Quickly (work in short sprints and focus on minimal viability)

How do you support small teams?

- Small Teams that build trust & accountability (matrix across engineering, data science, business analysis, testing)

How do you create transparency?

- Transparency with partners on what is being worked on
EMPOWER YOUR TEAM

- (over) Specialization as the enemy of agility
- Avoiding “I don’ts”
- Minimizing dependency
- Encouraging new skills and learning
HANDLING THE SMALL PROBLEMS

THE MAYO CLINIC

• Working on the “cool” and “important” things
• Expensive equipment and infrastructure
• Highly trained specialists

VS

URGENT CARE CLINIC

• Set up to handle the small problems
• Lower cost
• Staff used to juggling different types of illness
• Applicable to other industries (e.g. Apple Genius Bar)
MANAGING THE CHAOS: INNOVATION VS ALIGNMENT
GOODNESS OF SMALL TEAMS, STRUGGLE WITH ALIGNMENT
GETTING EVERYONE GOING IN THE SAME DIRECTION
EXERCISE 6: BUILDING AN AIRPLANE WITH AGILE

Could you use small agile teams to build an airplane? Where would you encounter problems? How would you ensure safety and alignment? How might you structure the teams?
Unlocking and enabling data curiosity

Organizing for agility in a data world

Building partnership across business and tech teams

Creating exciting, relevant and useful content
INHERENT TENSION WHEN UPGRADING TECHNOLOGY

Ben’s 2006
Toyota Corolla
# THE UPGRADE DEBATE

## KEEP THE CAR
- Low Cost (already paid for)
- Still gets the job done (gets me from A to B)
- Comfortable and familiar
- Some quirks (but I know how to handle them)
- New car features are just gimmicks you don't really need
- **Low Cost (already paid for)**

## GET A NEW CAR
- Not safe in Minneapolis snow storms
- Hard to squeeze three children in the back
- More comfortable (heated seats, more space, satellite radio)
- Safety features (blind spot detection, rear camera)
- Social prestige
THE UPGRADE DEBATE

KEEP THE CAR

• Low Cost (already paid for)
• Not safe in Minneapolis snow storms
• Hard to squeeze three children in the back

Traditional IT/Tech Perspective

(BEN)

GET A NEW CAR

• Low Cost (already paid for)
• Not safe in Minneapolis snow storms
• Hard to squeeze three children in the back

Traditional Business Perspective

(BEN’S WIFE)

• Still gets the job done (gets me from A to B)
• Safety features (blind spot detection, rear camera)
• Some quirks (but I know how to handle them)
• More comfortable (heated seats, more space, satellite radio)
• New car features are just gimmicks you don’t really need
• Social prestige

(For the Good of the Company)
A CONSTANT TUG OF WAR

Traditional IT/Tech Perspective

Traditional Business Perspective

New Data Analytics Perspective
IN MANY WAYS, EVERYONE IS A LITTLE RIGHT AND EVERYONE IS A LITTLE WRONG

Traditional IT/Tech Perspective

Traditional Business Perspective

New Data Analytics Perspective
HOW CAN WE MAKE IT BETTER?

EMPATHY

INTELLECTUAL HUMILITY

TRANSPARENCY
Building partnership across business and technology teams:

EMPATHY
EMPATHY

em·pa·thy

noun

the ability to understand and share the feelings of another.
EMPATHY: COMMON PITFALLS

• Minimizing others concerns and priorities
• Failure to see the pressures on other teams (upstream dependencies, constraints)
• Static view of current environment (do it the same as we always have before)
• Minimal understanding of business or technical context
EXERCISE 7: EMPATHY STORIES

SITUATIONS WHERE YOU HAVE SHOWN (OR BEEN SHOWN) EMPATHY

SITUATIONS WHERE YOU HAVE BEEN (OR FELT) UNEMPATHETIC
FALSE EMPATHY: “Yes, but…”

City Council
Technical Review Meeting

“…but not an endorsement of rushing something from POC to production too quickly.”
EMPATHY: THE CENTRALIZATION DILEMMA

There are many benefits of centralizing IT and data functions:

- Improved reliability and consistency
- Significant reduction in duplication (and expense)
- Align on common tools and principles
- Up the game on technical and analytical skillset (specialization)
- Focus on what is most important

. . . however, centralization can create an empathy gap between the IT/data functions and business functions.
OVERCOMING THE EMPATHY GAP

• Sit with the business

• Embed analysts within product teams

• Create an “urgent care” for IT, data and analytics

• Create small agile teams bringing together needed capabilities
EMPATHY: SPEND A DAY IN SOMEONE ELSE’S SHOES

Understanding how technology is used day-to-day can be invaluable regardless of role.
BUILDING EMPATHY: TIPS AND TRICKS

• Stand up for others when your peers are in the wrong
• Publicly acknowledge when partners have valid concerns
• Over communicate and explain
• Understands partners’ incentives (financial and emotional)
• Avoid “I don’t” (different than being “the best”)
Building partnership across business and technology teams:

INTELLECTUAL HUMILITY
INTELLECTUAL HUMILITY

“...higher levels of intellectual humility are associated with a greater willingness to consider views other than our own. People with more intellectual humility also do better in school and at work. Why? When we accept that our own knowledge is finite, we are more apt to see that the world is always changing and that the future will diverge from the present.”

AVOIDING INTELLECTUAL HUBRIS

• You are not the smartest one in the room
• Be open to new ideas
• Invest in listening
• Value and honor the importance of diverse skills, perspectives and styles
• Have a tool box mentality (not a one tool fits all mentality)
# The Flip Side of Intellectual Humility

## Intellectual Humility vs. Intellectual Hubris

<table>
<thead>
<tr>
<th>Intellectual Humility</th>
<th>VS</th>
<th>Intellectual Hubris</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willingness to consider views other than our own</td>
<td></td>
<td>Only value your own views</td>
</tr>
<tr>
<td>Understand that our personal knowledge is finite</td>
<td></td>
<td>Overestimate the value of what you already know</td>
</tr>
<tr>
<td>World is always changing and that the future will diverge from the present</td>
<td></td>
<td>Constantly use the past to justify the future</td>
</tr>
<tr>
<td>Curiosity to learn what is new and explore other options</td>
<td></td>
<td>Limited desire to learn what is new</td>
</tr>
</tbody>
</table>
VALUE OF DIVERSITY

Diversity of thought
Diversity of skills
Diversity of style
Diversity of experiences
UNDERSTANDING YOUR OWN DIVERSITY

• Know what kind of people compliment your own diversity

• Push yourself to work and think differently

• Self awareness is not enough (you will still drive some people crazy)

• Know your impact on others
WHEN ONE TOOL IS THE WRONG TOOL

Hammer a nail with the handle of a saw...

Split a piece of wood with a hammer...

Shatter an appliance with a hammer...

Scratch a desk with a screw driver...

• Jobs take longer than they should (or do not get done at all or something gets broken)

• Invest more and more money in the wrong tool to ”make it better”

• Empathy can lead to focusing on problems that are not real (bloody hands from holding the saw, softening the wood so a hammer can split it)
TAKING A TOOL BOX (PLATFORM) MENTALITY

• A tool box can be very powerful: interchange tools, add new and adjust as the business needs change

• The power is in switching not in being a one tool expert

• Ideally the end user should not even notice when a tool is switched on the back end

• Requires a differently mentality and mindset from all leaders (business, data and IT)
Building partnership across business and technology teams:

TRANSPARENCY
TRANSPARENCY
trans·par·ent

adjective

easy to perceive or detect.
having thoughts, feelings, or motives that are easily perceived.
(of an organization or its activities) open to public scrutiny.
TRANSPARENCY: THE BLACK BOX

• No one likes a black box (even if the contents are complex)

• “just trust us” syndrome

• People feel like they are not smart enough to have it explained
TRANSPARENCY: SHARING DETAIL

• Explain what you can
• Empower users to plug and play
• Communicate why something may be too complex to fully explain
• Show your work
TRANSPARENCY: SHOW YOUR WORK

Year over year sales growth by hour with complex logic on when stores across the country have finished an hour.

Confusing and hard to explain.

Sharing a view by time zone quickly and visually communicates the logic of the roll up.
You must put all your data in Hadoop...or else!

- Explain why this makes sense
- Show the real benefits early and often
- Consequences (planned and unplanned)
TRANSPARENCY OF BACKLOGS

- Let everyone know what you are working on (and what you are not working on)
- Integrate backlogs into performance reporting (not just sales or conversion)
- Psychological comfort in transparency (not about constant prioritization)
- Do not use backlog as a constant excuse
TRANSPARENCY THROUGH DATA

- Use data to measure your data and IT projects
- Do not manage on myths, anecdotes and stories (test these with data)
- Use data as a tool for empathy
- Accept when the data may tell a different story than you wanted or expected
USING DATA IN YOUR PERSONAL LIFE

Ben’s Fitbit tracks his nightly sleep patterns

Outlier: Trip to Puerta Vallarta with wife and no kids.
Ben’s sleep the last 2 years

Outlier: New job in June 2018, less stress, smaller team, more sleep.
EXERCISE 8: MEASURING YOUR WORK (AND LIFE)

What data do you have/use to measure your work? Are these data points shared? What data do you use to measure your personal life?
Building partnership across business and tech teams

EMPATHY

INTELLECTUAL HUMILITY

TRANSPARENCY
Unlocking and enabling data curiosity

Organizing for agility in a data world

Building partnership across business and tech teams

Creating exciting, relevant and useful content
“If the statistics are boring, you’ve got the wrong numbers.”
GIVE THEM SOMETHING NEW AND EXCITING
BRING STRATEGY TO LIFE VIA DATA
MAKE THE FLEXIBILITY REAL

• Make it real for people. Not just a power point or an e-mail (experience the flexibility first hand and in real time)

• Make it relevant to something that is important to their work

• Be there when it counts
DATA IS PART OF THE JOB (AND THE NEXT ONE TOO)
EXERCISE 9: YOUR DATA GRID

What data do you use in your job? Map it on the grid and think about why it falls there.

How relevant and useful is the data?

Very Relevant

Not Relevant

How often do you use the data?

Never used

Used frequently
USING DATA TO TELL A STORY

Source: Brent Dykes, Domo Director of Data Strategy
5 STEPS FOR BETTER VISUAL STORYTELLING

1. Identify the right data
2. Choose the right visualizations
3. Calibrate visuals to your message
4. Remove unnecessary noise
5. Focus attention on what’s important

Source: Brent Dykes, Domo Director of Data Strategy
STORYFRAMING VS. STORYTELLING

# STORYFRAMING VS. STORYTELLING

<table>
<thead>
<tr>
<th></th>
<th>STORYFRAMING</th>
<th>STORYTELLING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>Exploratory (frames information to generate insights)</td>
<td>Explanatory (explains insights)</td>
</tr>
<tr>
<td><strong>Focus</strong></td>
<td>Broader (key metrics &amp; dimensions)</td>
<td>Narrower (related set of findings that support a main insight)</td>
</tr>
<tr>
<td><strong>Structure</strong></td>
<td>Hierarchical, non-linear layout</td>
<td>Linear sequence</td>
</tr>
<tr>
<td><strong>Preparation</strong></td>
<td>Automated</td>
<td>Curated</td>
</tr>
<tr>
<td><strong>Delivery</strong></td>
<td>Dynamic (rolling)</td>
<td>Static (snapshot)</td>
</tr>
<tr>
<td><strong>Key features</strong></td>
<td>Drills / filters</td>
<td>Annotation / highlighting</td>
</tr>
<tr>
<td><strong>Usage</strong></td>
<td>Multi-use</td>
<td>Single use</td>
</tr>
</tbody>
</table>

Conclusion
THE DATA IS OUT THERE...MAKE IT YOUR FRIEND AND UNLOCK ITS VALUE

• Unlocking and enabling data curiosity: build “end-to-almost-end” platforms to empower your teams

• Organizing for agility in a data world: adopt agile practices around small teams, transparency and learning quickly

• Building partnership across business and tech teams: practice empathy, intellectual humility and transparency

• Creating exciting, relevant and useful content
THANK YOU