The Good, The Bad, and The Ugly

Lessons from an MPC for Social Good Deployment

Gabriel Kaptchuk (BU and UMD)

Jen Benoit-Bryan (SMU)

Kinan Dak Albab (Brown)

Mia Locks (MMF)

Mayank Varia (BU)

START OF COLLABORATION

MUSEUMS MOVING FORWARD

BOSTON UNIVERSITY

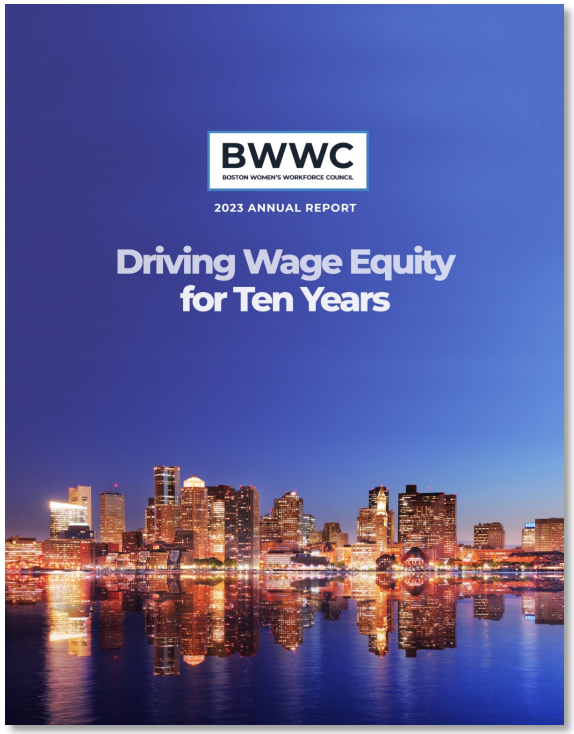
- MMF: independent organization of art museum professionals devoted to envisioning and creating a more just museum sector

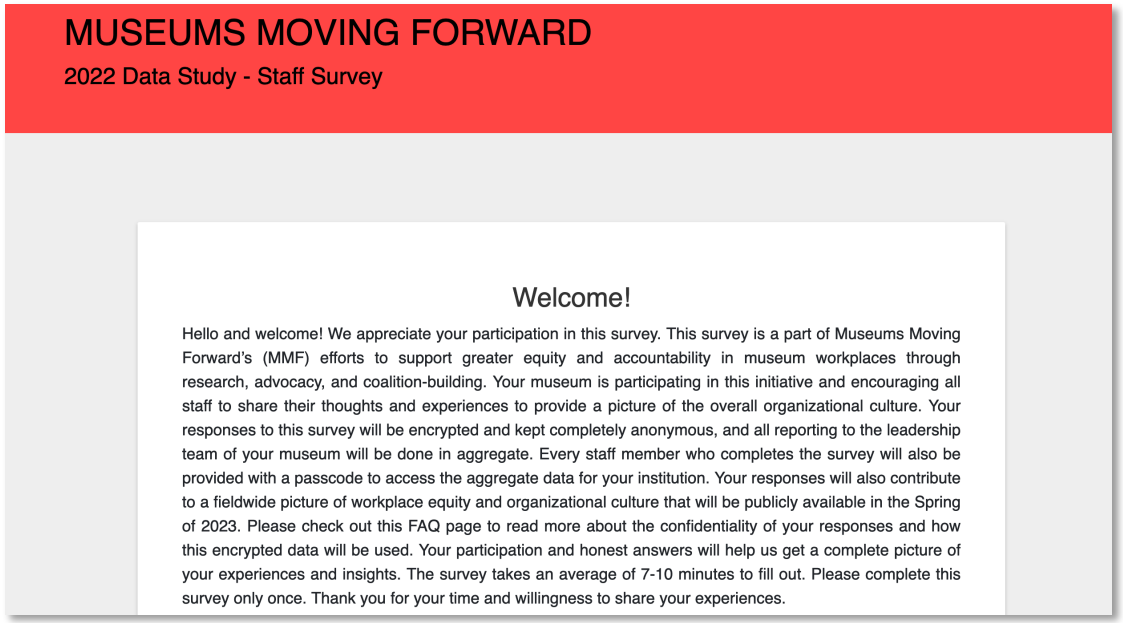
- Wanted to conduct a data study asking sensitive questions
  - Staff survey
  - Director Survey
  - HR Survey

- Required different outputs for different parties

START OF COLLABORATION

SYSTEM CONSTRUCTION




MUSEUMS MOVING FORWARD

2022 Data Study - Staff Survey

Welcome!

Hello and welcome! We appreciate your participation in this survey. This survey is a part of Museums Moving Forward's (MMF) efforts to support greater equity and accountability in museum workplaces through research, advocacy, and coalition-building. Your museum is participating in this initiative and encouraging all staff to share their thoughts and experiences to provide a picture of the overall organizational culture. Your responses to this survey will be encrypted and kept completely anonymous, and all reporting to the leadership team of your museum will be done in aggregate. Every staff member who completes the survey will also be provided with a passcode to access the aggregate data for your institution. Your responses will also contribute to a fieldwide picture of workplace equity and organizational culture that will be publicly available in the Spring of 2023. Please check out this FAQ page to read more about the confidentiality of your responses and how this encrypted data will be used. Your participation and honest answers will help us get a complete picture of your experiences and insights. The survey takes an average of 7-10 minutes to fill out. Please complete this survey only once. Thank you for your time and willingness to share your experiences.

START OF COLLABORATION

SYSTEM CONSTRUCTION

DATA COLLECTION

BOSTON UNIVERSITY

$$s_{BU},\ s_{MMF} \leftarrow \text{SecretShare}(data)$$

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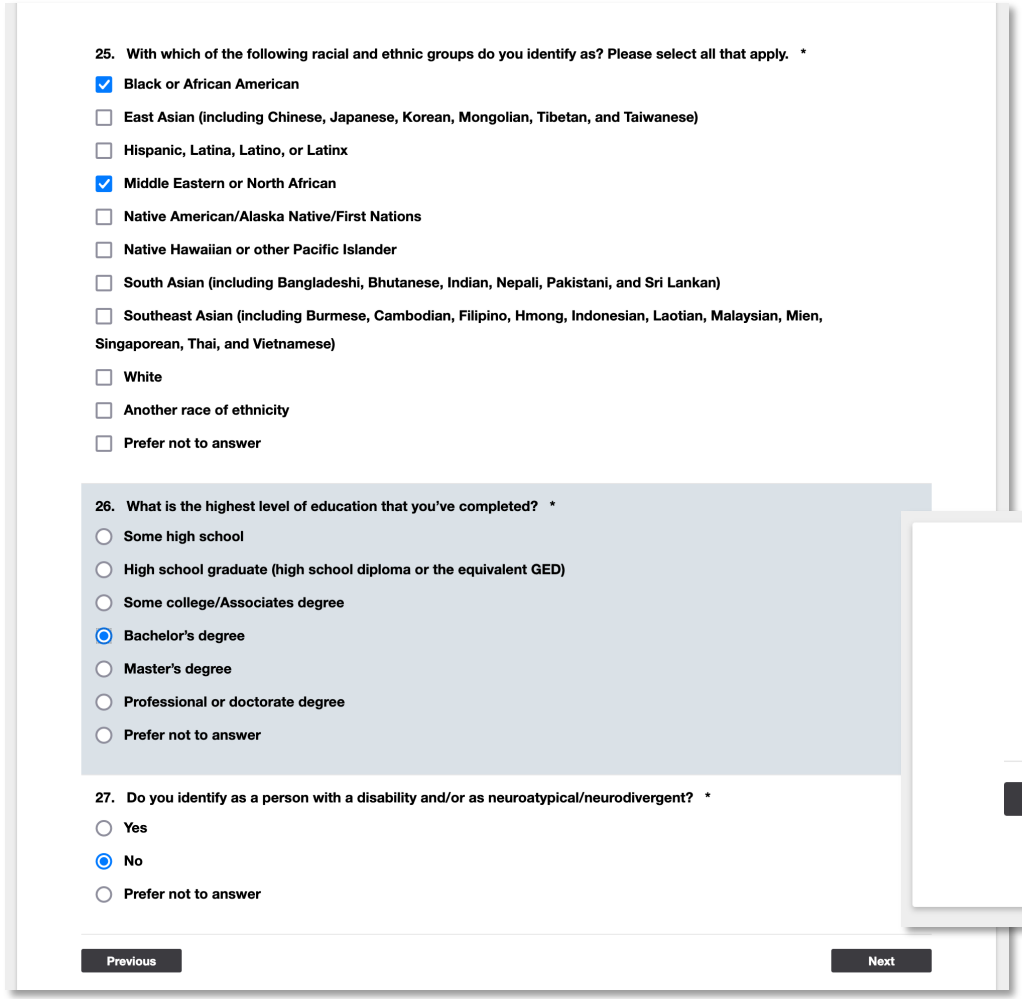

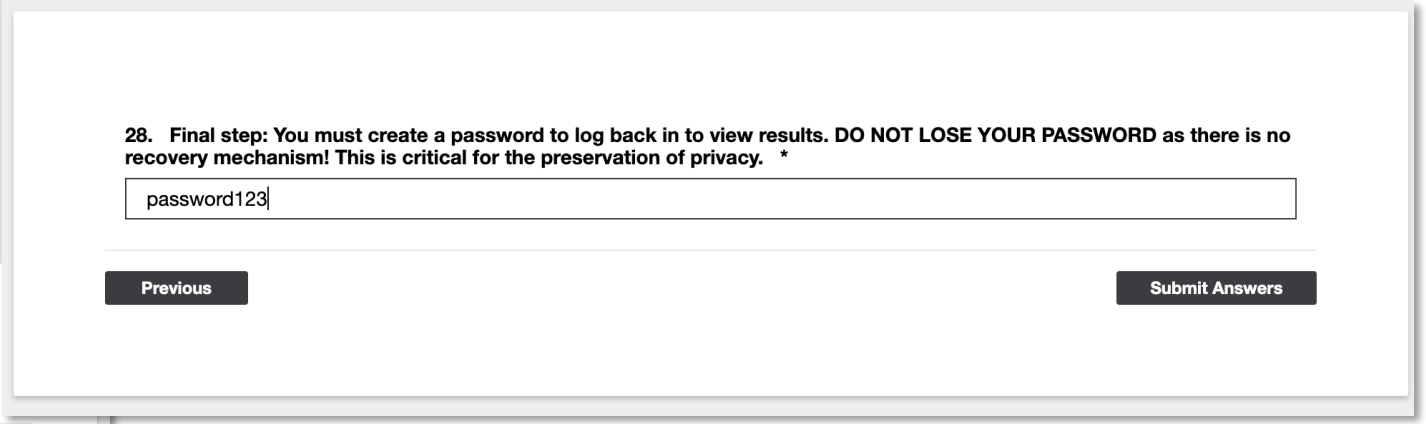

START OF COLLABORATION

SYSTEM CONSTRUCTION

DATA COLLECTION

MPC COMPUTATION

MUSEUMS MOVING FORWARD

$\text{Enc}_{pk_{MMF}}(s_{MMF})$, $\text{Enc}_{pk_{MMF}}(\text{KDF}(password))$

BOSTON UNIVERSITY

START OF COLLABORATION

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MUSEUMS MOVING FORWARD

$\text{Enc}_{pk_{MMF}}(s_{MMF})$, $\text{Enc}_{pk_{MMF}}(\text{KDF}(password))$

Semi-honest, gate-by-gate 2PC

BOSTON UNIVERSITY

START OF COLLABORATION

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MUSEUMS MOVING FORWARD

$\text{Enc}_{pk_{MMF}}(s_{MMF})$, $\text{Enc}_{pk_{MMF}}(\text{KDF}(password))$

Semi-honest, gate-by-gate 2PC

BOSTON UNIVERSITY

$[a], [b], [ab]$

$[a], [b], [ab]$

BROWN

START OF COLLABORATION

SYSTEM CONSTRUCTION

DATA COLLECTION

MPC COMPUTATION

DATA ANALYSIS

Art museum are more dissatisfied than US workers overall

60% of art museum workers are thinking about leaving their jobs

68% are considering leaving the field altogether.

More than a quarter of art museum workers have experienced discrimination at their current workplaces.

Only half of workers report discrimination because they feel nothing will be done about them

START OF COLLABORATION

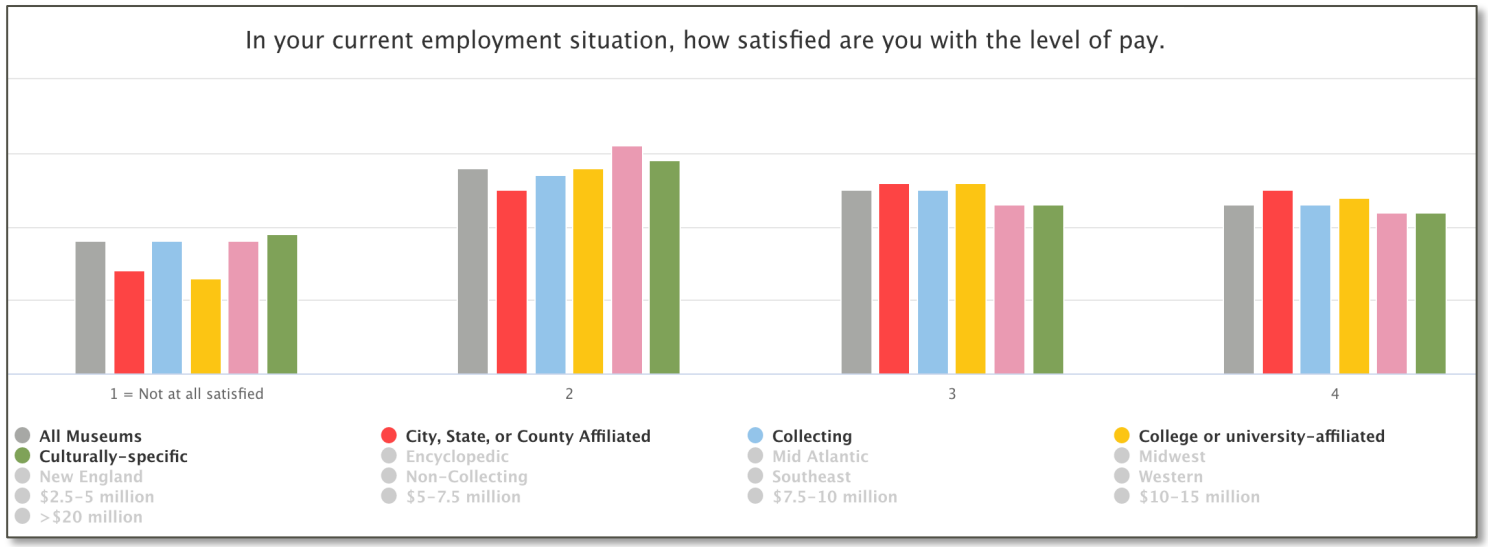
SYSTEM CONSTRUCTION

DATA COLLECTION

MPC COMPUTATION

DATA ANALYSIS

DATA RELEASE

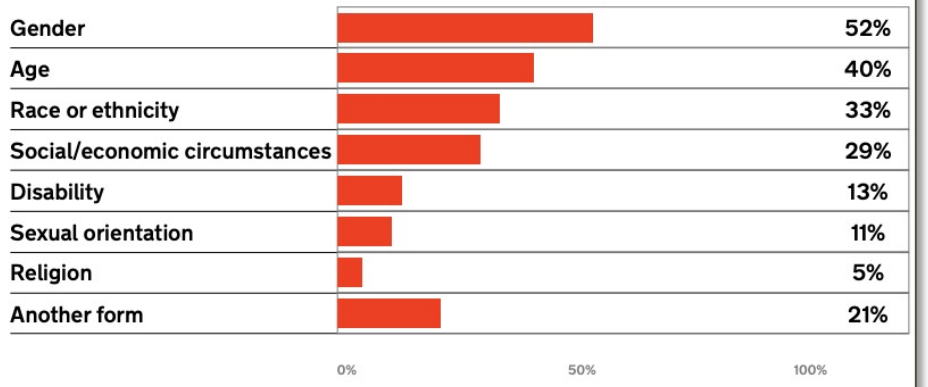


Types of Discrimination

Discrimination in art museums is most commonly based on gender, age, and race or ethnicity (see fig. 46). Workers facing discrimination experience an average of two types in their workplaces. The more senior a worker is in the organization, the fewer distinct types of discrimination they experience, with a low of 1.8 among executives up to a high of 2.7 types among entry-level workers.

Types of Discrimination

Which of the following forms of discrimination and/or harassment have you experienced in your current museum workplace? Select all that apply.



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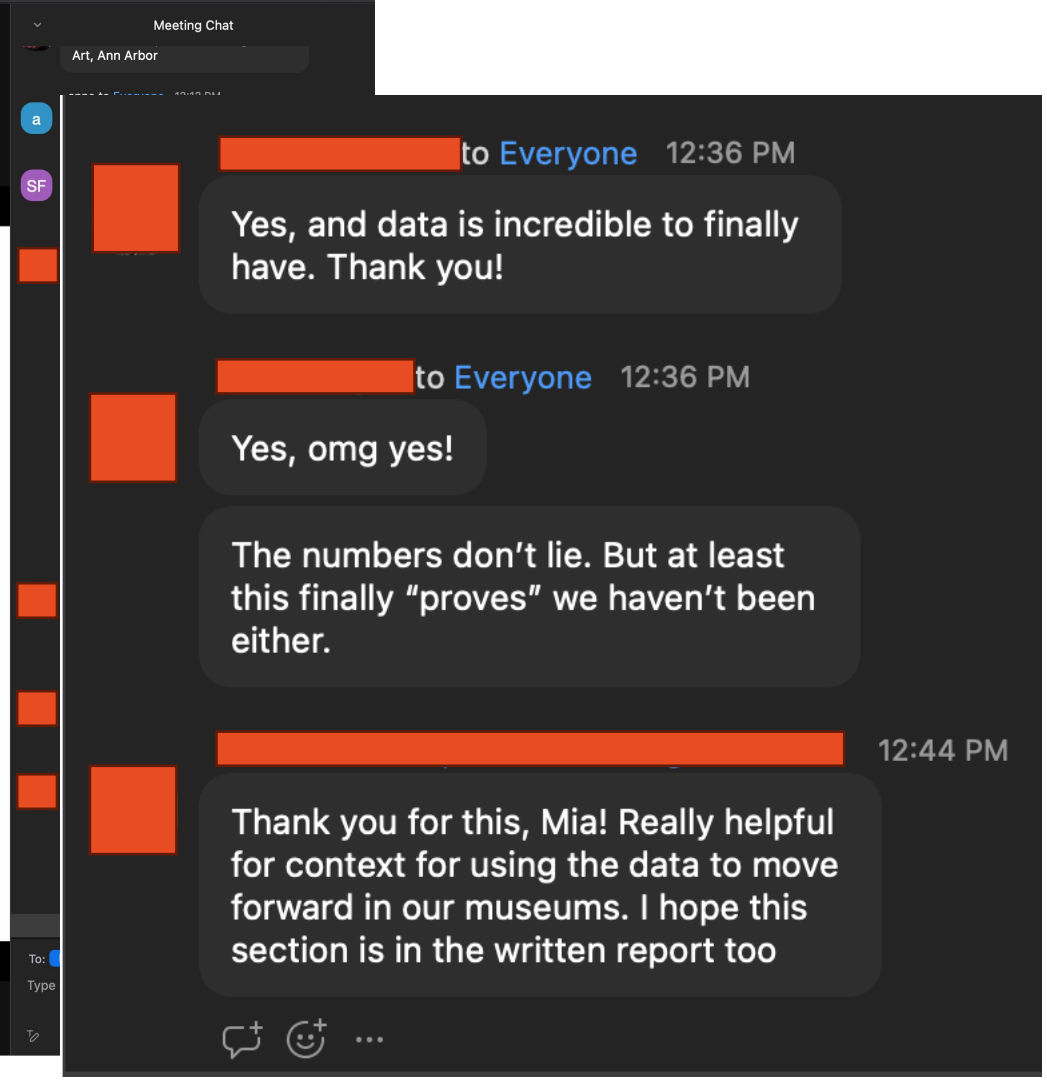
DATA COLLECTION

MPC COMPUTATION

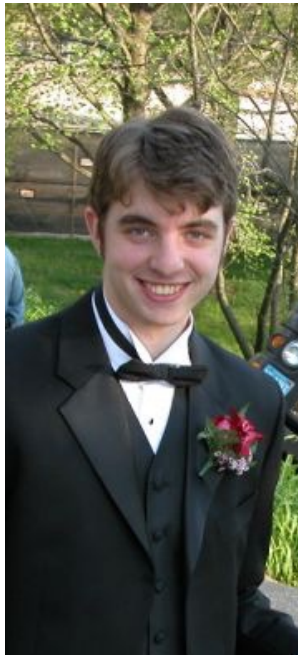
DATA ANALYSIS

DATA RELEASE

FEEDBACK

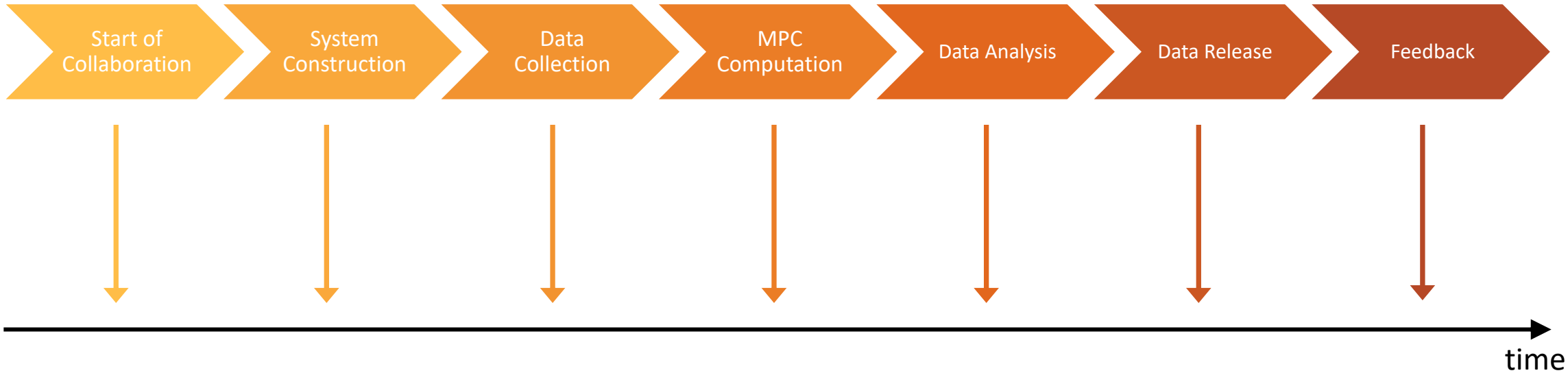


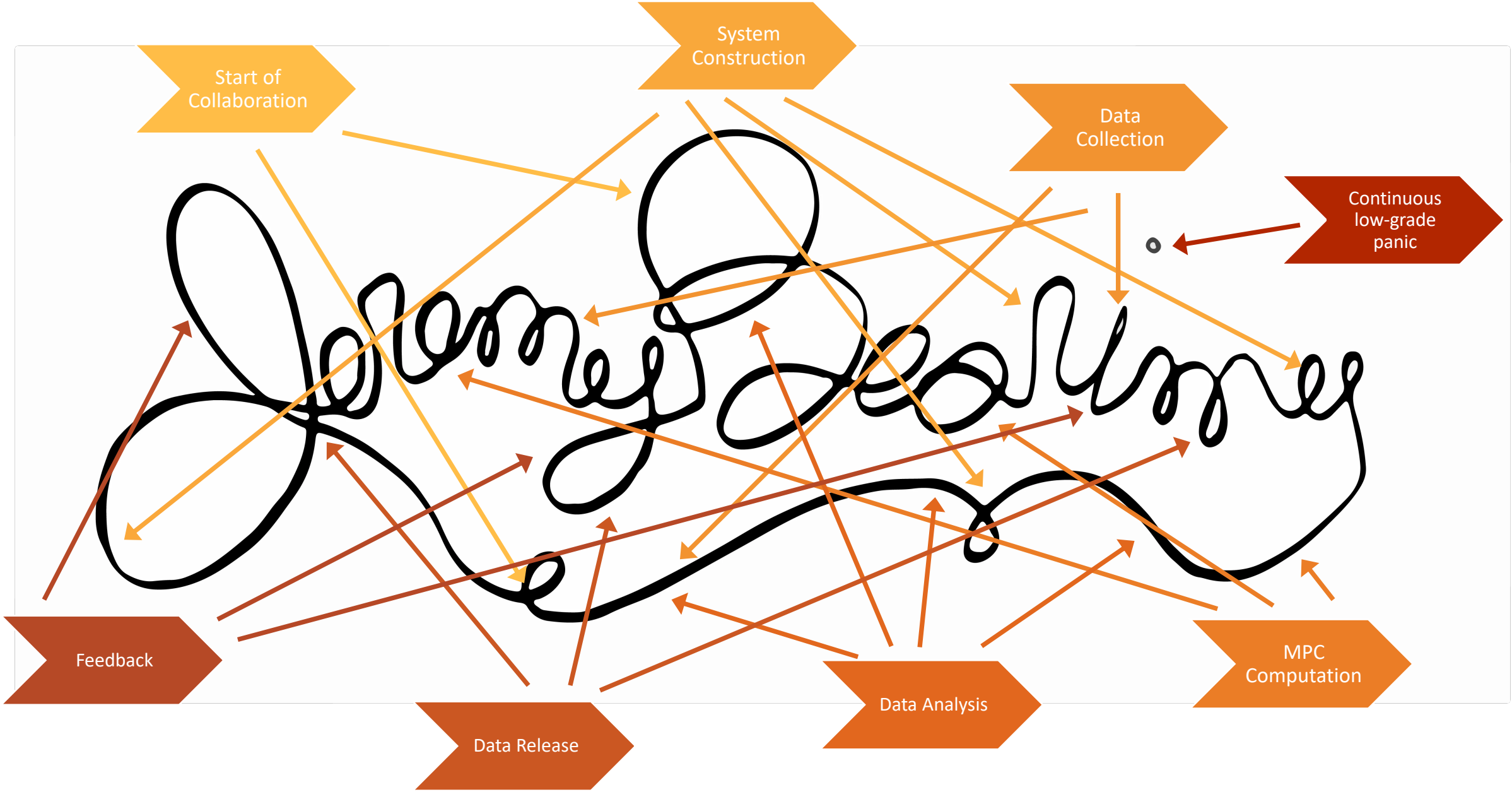
The “Instagram” Version of the Story



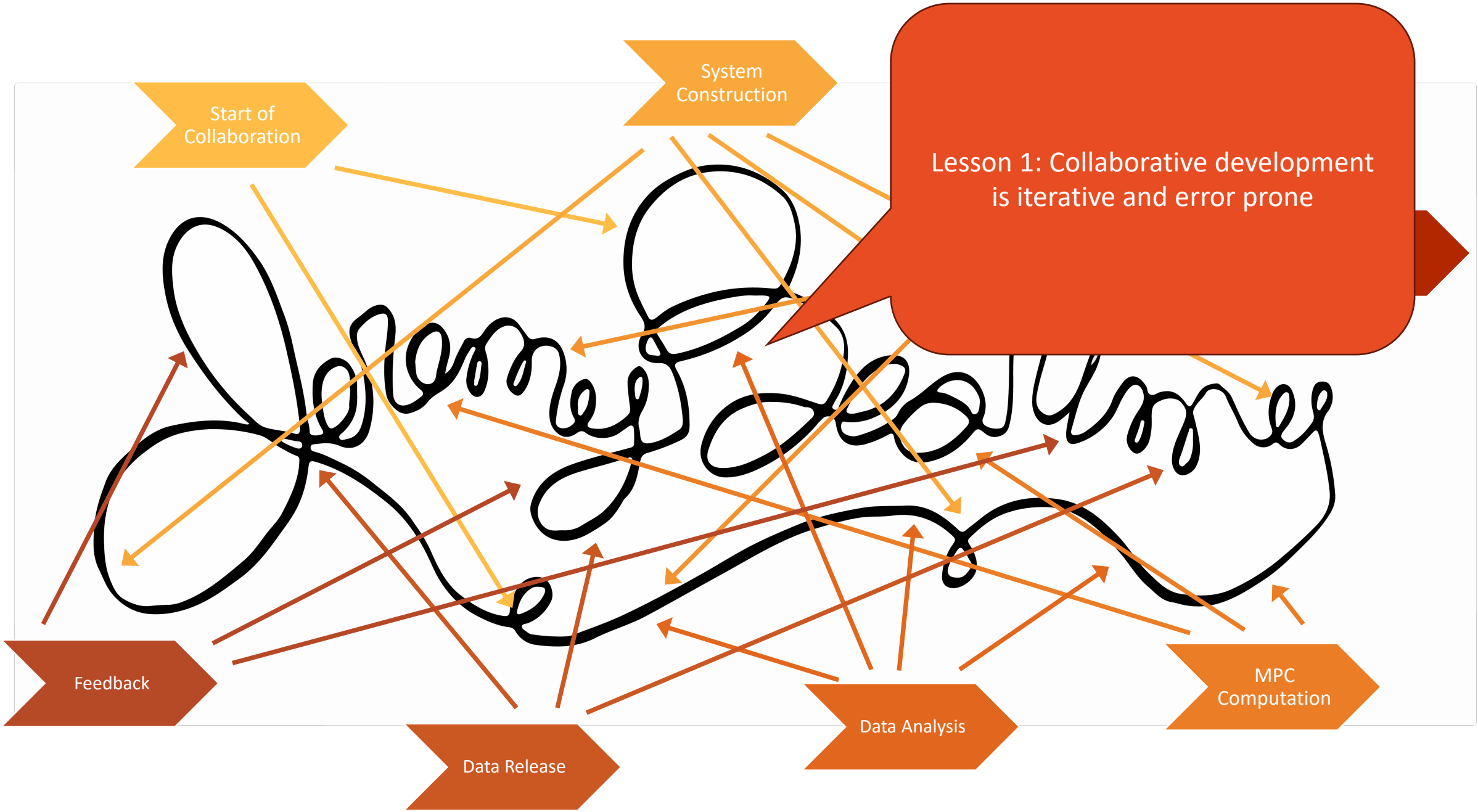
The “Instagram” Version of the Story

Credit: reddit


Start of Collaboration
System Construction
Data Collection
MPC Computation
Data Analysis
Data Release
Feedback
time



Credit: reddit.com/r/TheGoodPlace



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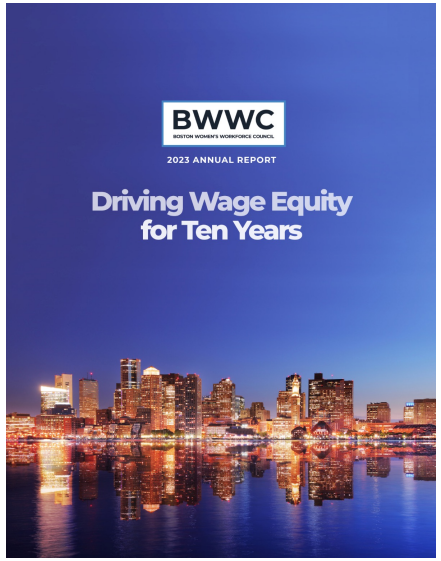
Start of Collaboration

ENGAGE EXTERNALLY

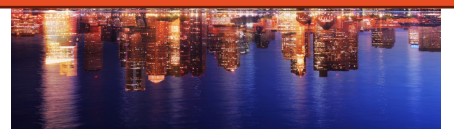


PRIOR VISIBLE WORK ON MPC

Start of Collaboration

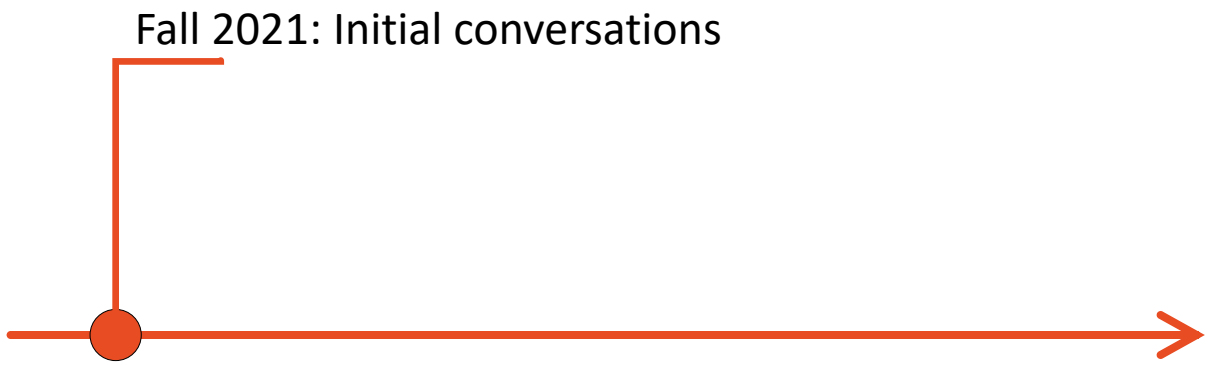
ENGAGE EXTERNALLY

Lesson 2: Spend time in non-CS spaces

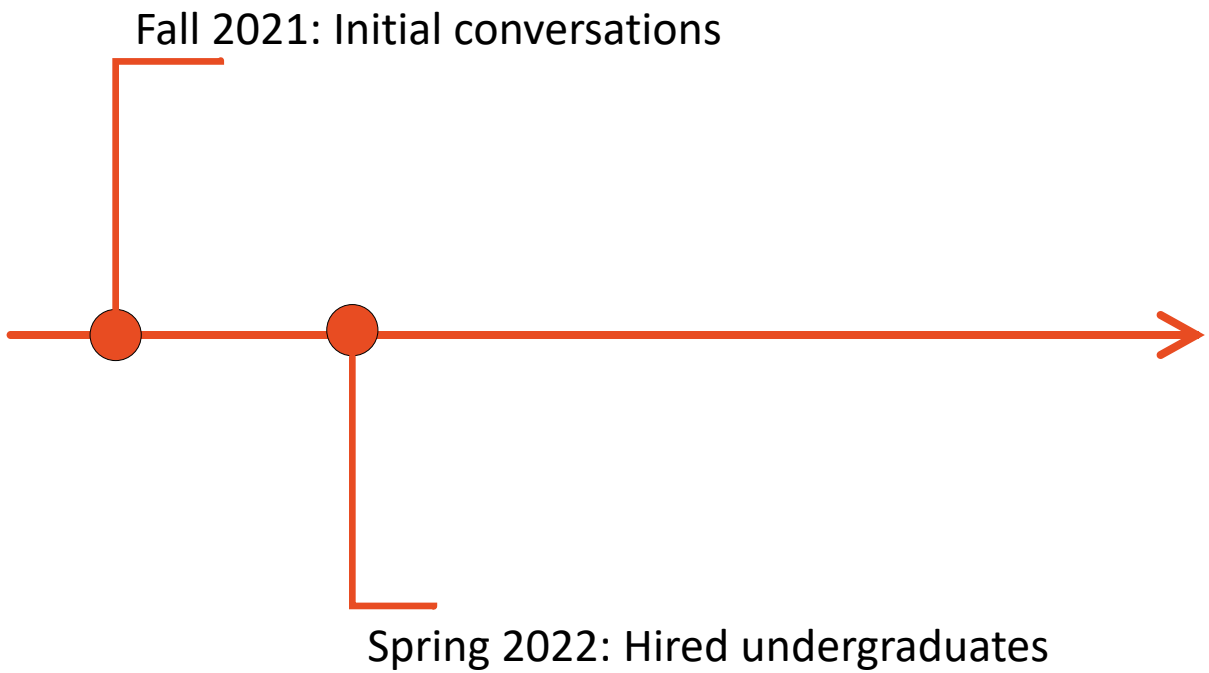


PRIOR VISIBLE WORK ON MPC

System Construction



System Construction



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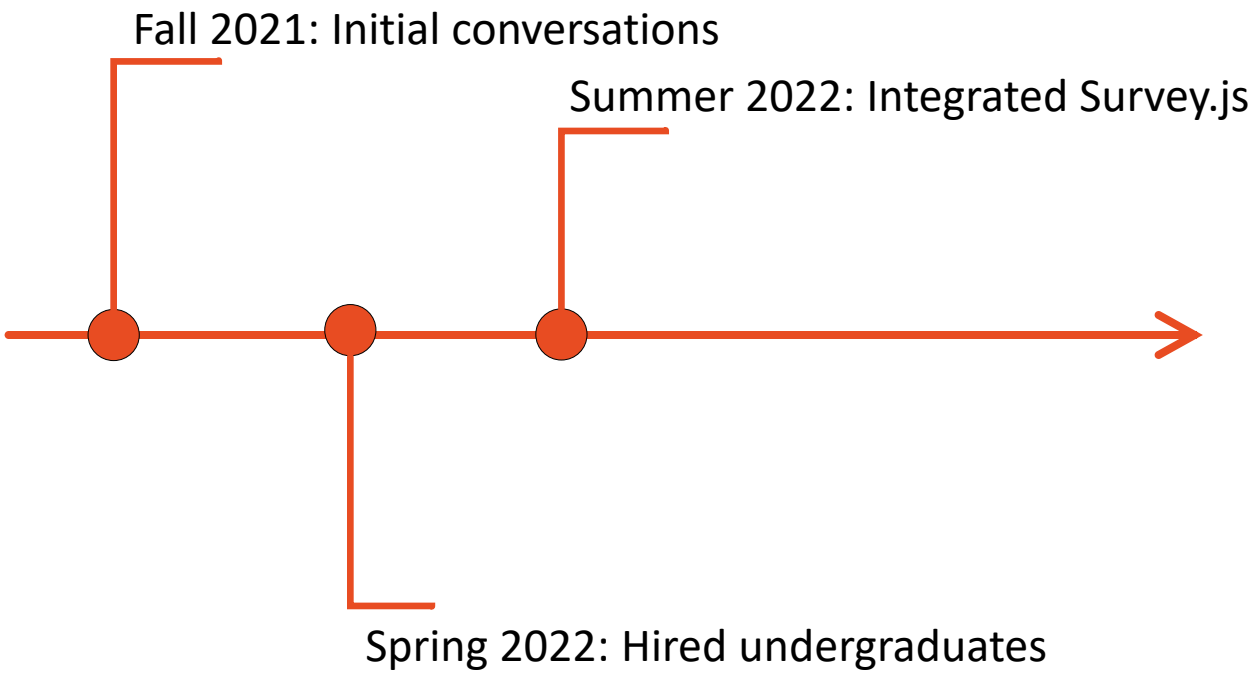

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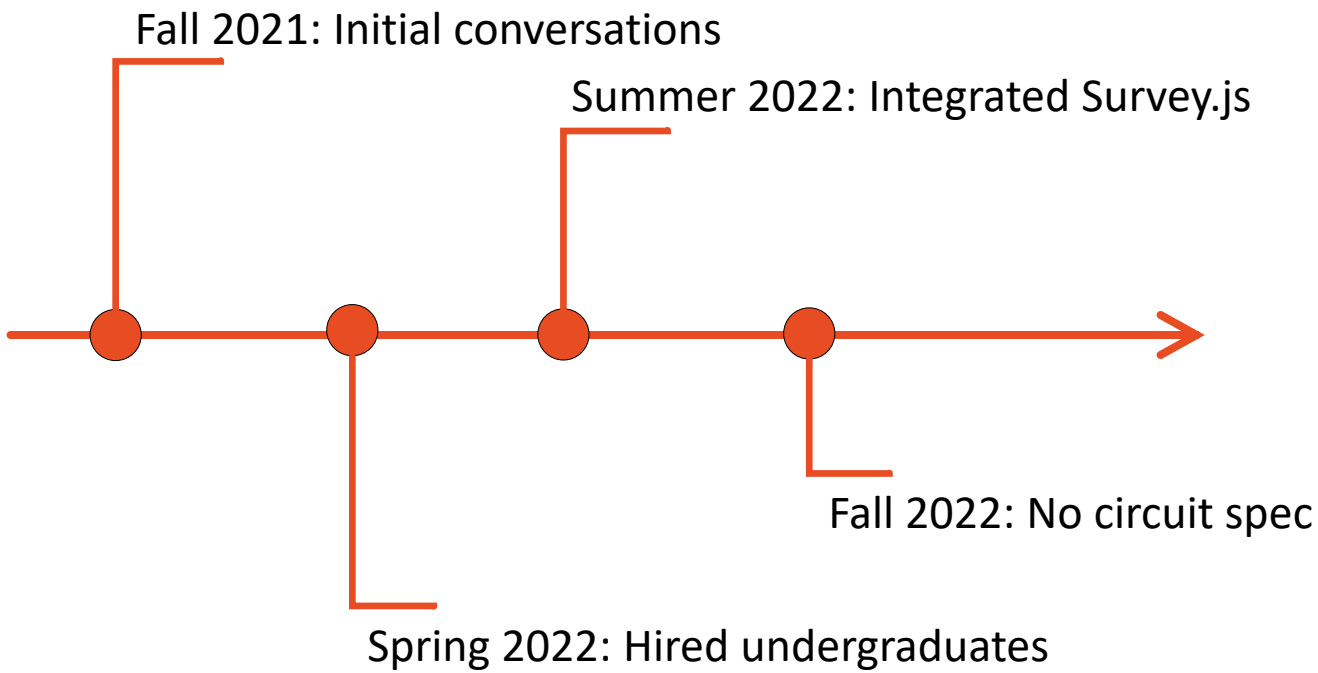

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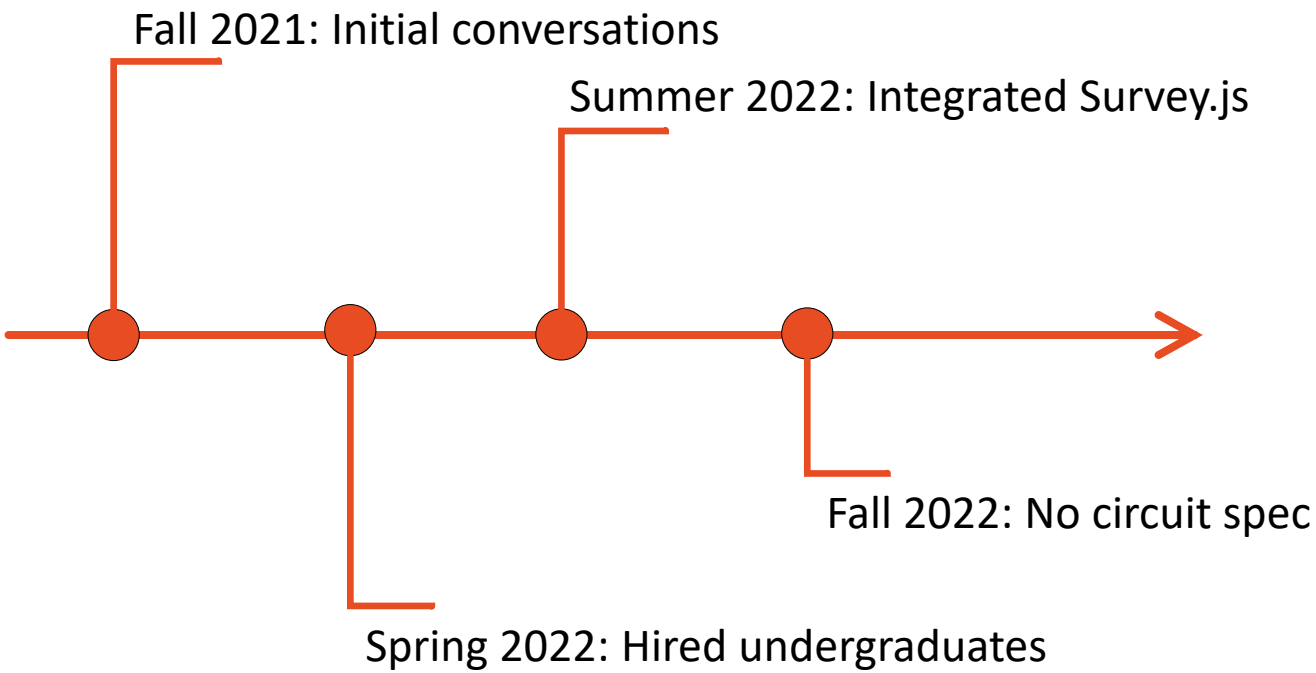


System Construction

Fall 2021: Initial conversations

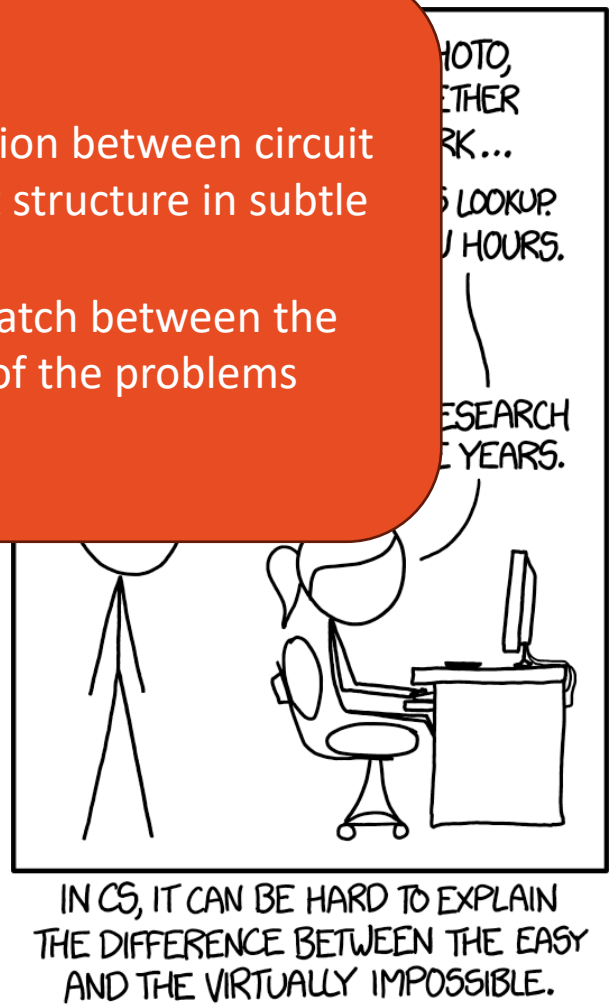
Summer 2022: Integrated Su

Spring 2022: Hired undergraduates

Fall 2022: No circuit spec

Lesson 3: Distinction between circuit inputs and circuit structure in subtle

Lesson 4: Mismatch between the "hard" parts of the problems



Data Collection

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{
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      (If this changes from month to month, please provide an
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      and round to the nearest multiple of 1000.",
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  step: 1000,
  max: 5000000,
  validators: [
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      regex: "^[0-9]+$",
      text: "Please enter a valid number. The response cannot
        include commas, currency symbols, or spaces (e.g. 50000)
        ",
    },
  ],
},
```

Data Collection

```
{
  type: "text",
  name: "question10",
  title:
    "What is your approximate gross anr
      and deductions) from your curre
      (If this changes from month t
      average). Report only your
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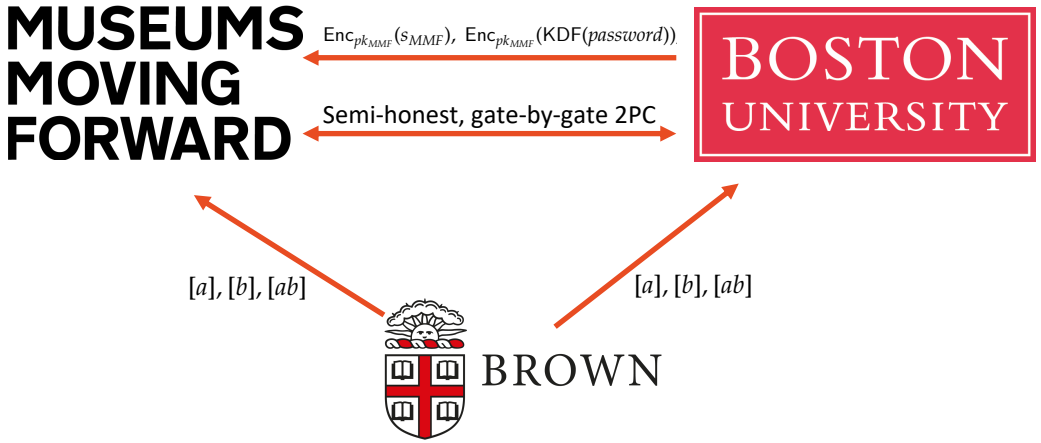
        ",
    },
  ],
},
```

Lesson 5: Testing MPC without circuits is hard. Tight design cycles lead to errors

MPC Computation



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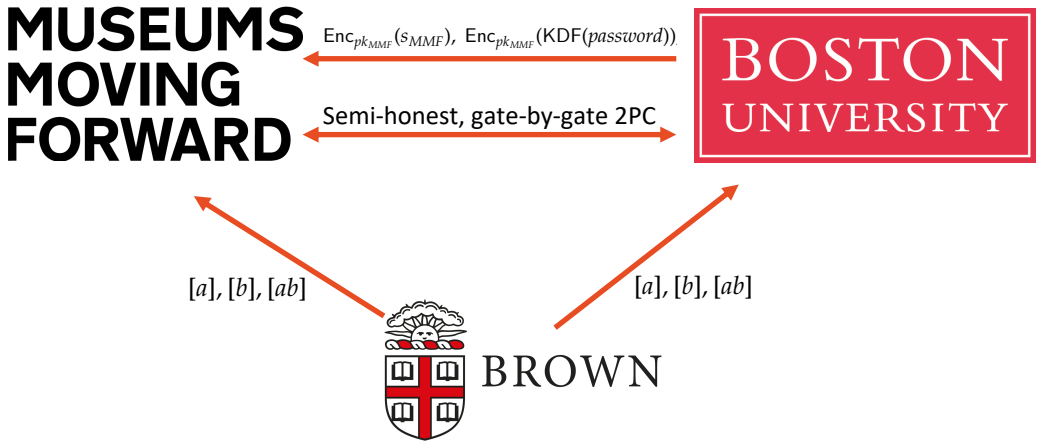
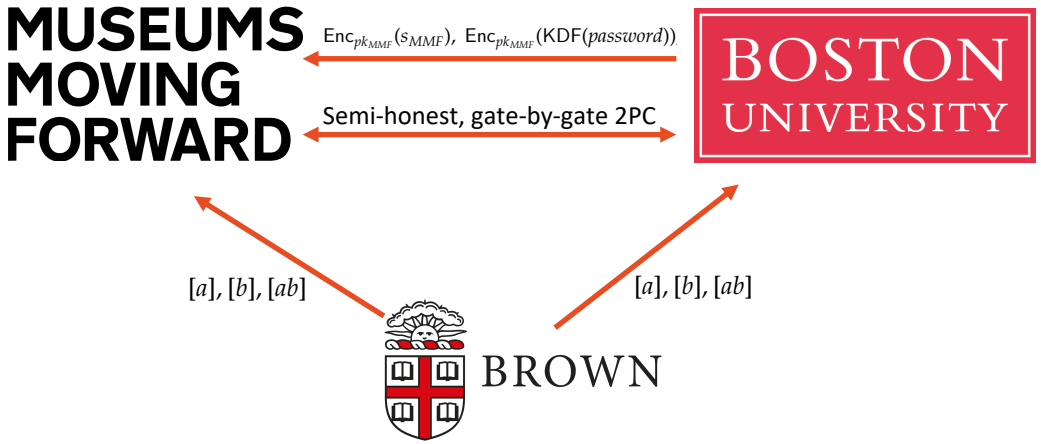


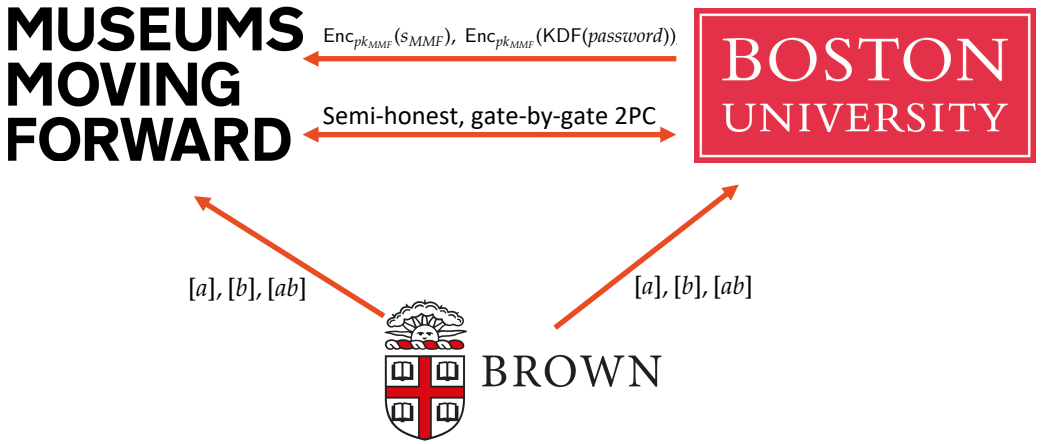
- Very much the WAN setting with consumer-grade internet connection

MPC Computation



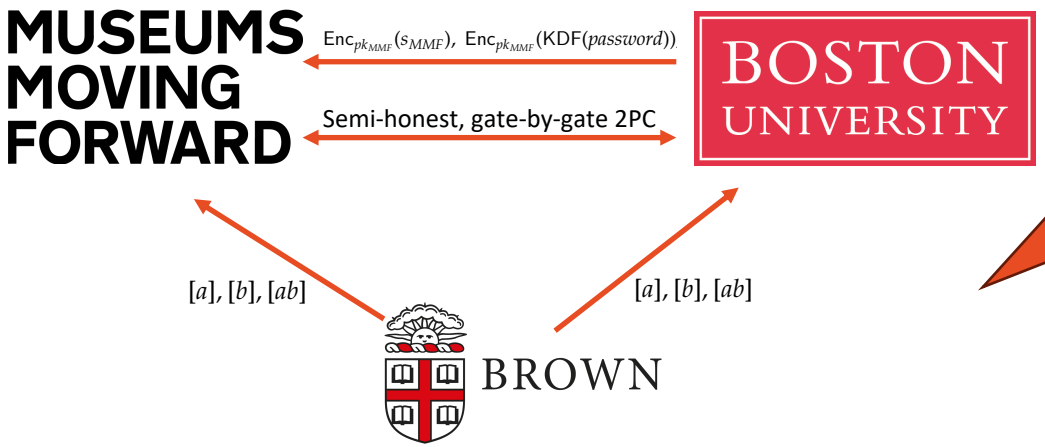
- Very much the WAN setting with consumer-grade internet connection
- Highly non-linear circuits (data filtering, comparisons, etc…) with no “smart” preparations

MPC Computation



- Very much the WAN setting with consumer-grade internet connection
- Highly non-linear circuits (data filtering, comparisons, etc…) with no “smart” preparations
- Runtimes 15-30 hours long with frequent crashes. Computations lasted up to a week

MPC Computation



Lesson 6: Don't defer choosing circuits.

Lesson 7: Academic WAN is still an idealized model

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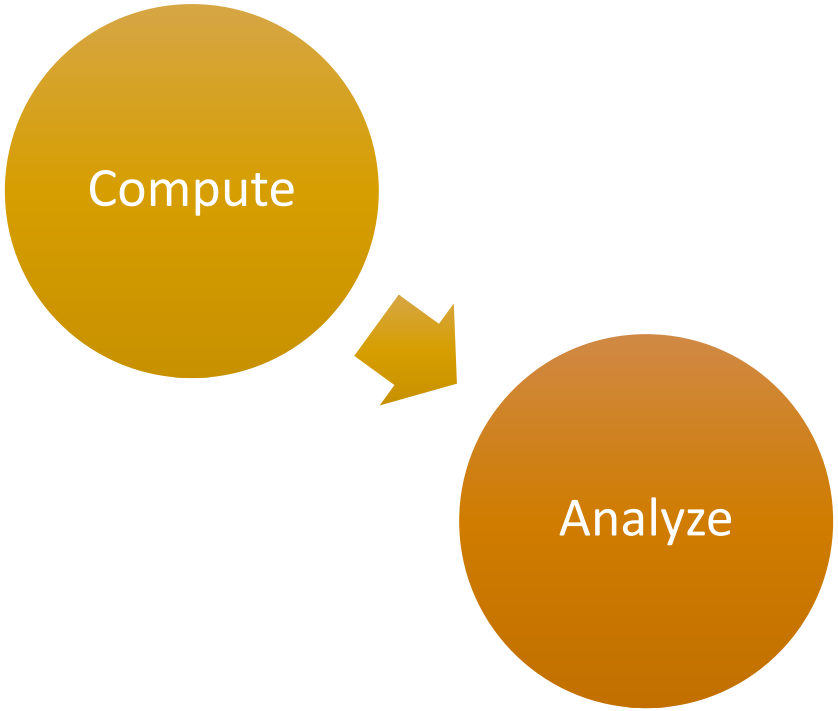
(data

c…)

with no "smart" preparations

- Runtimes 15-30 hours long with frequent crashes. Computations lasted up to a week

Data Analysis



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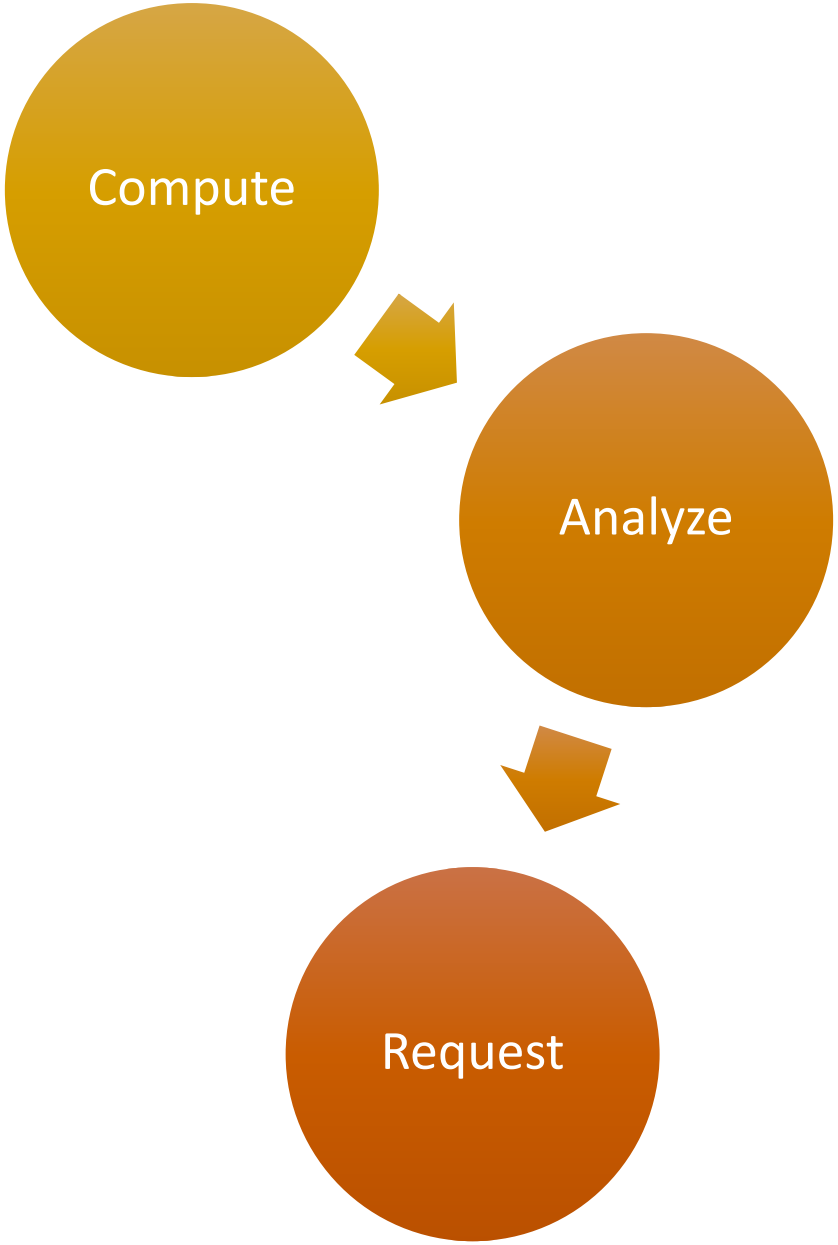

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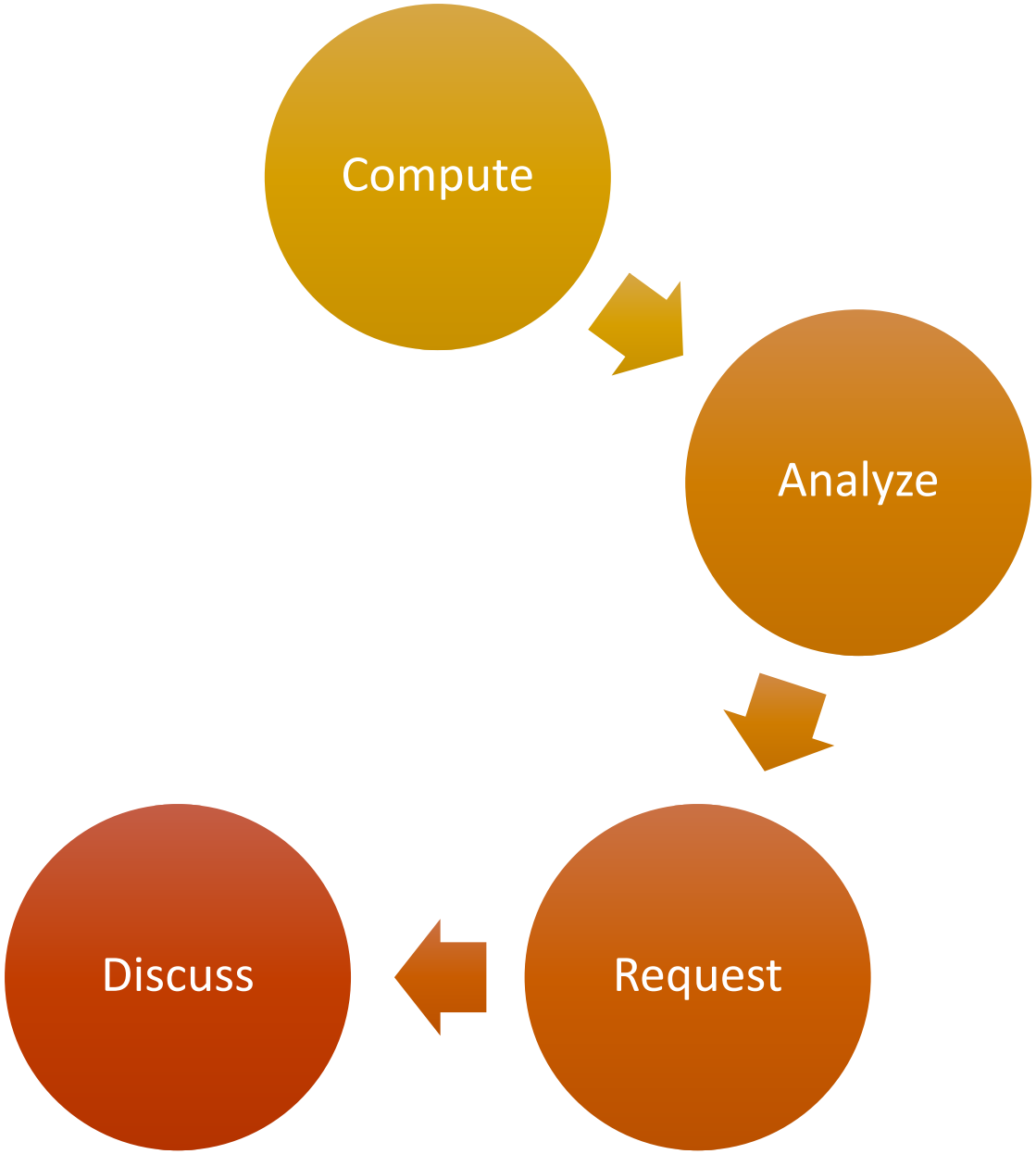

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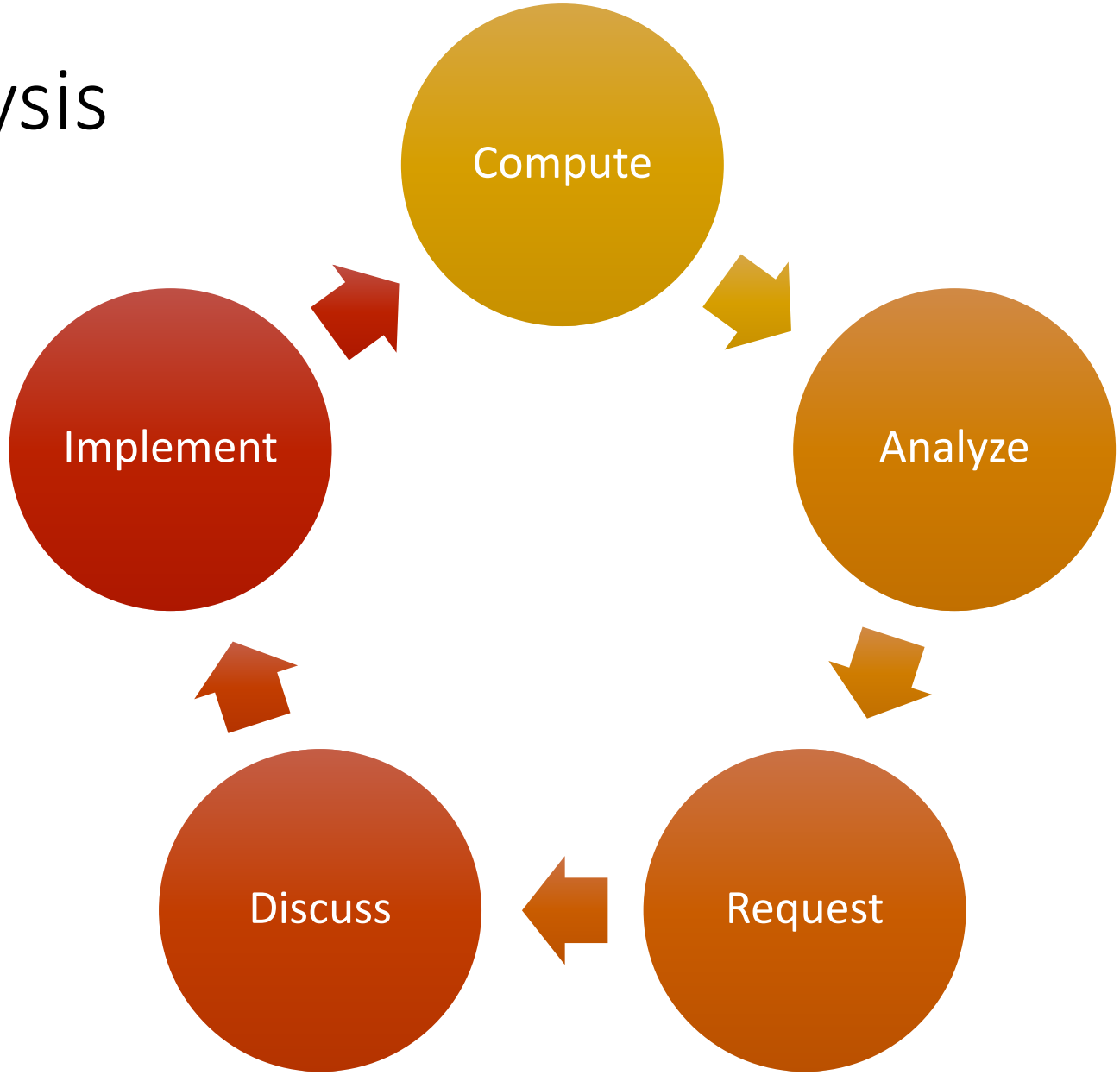

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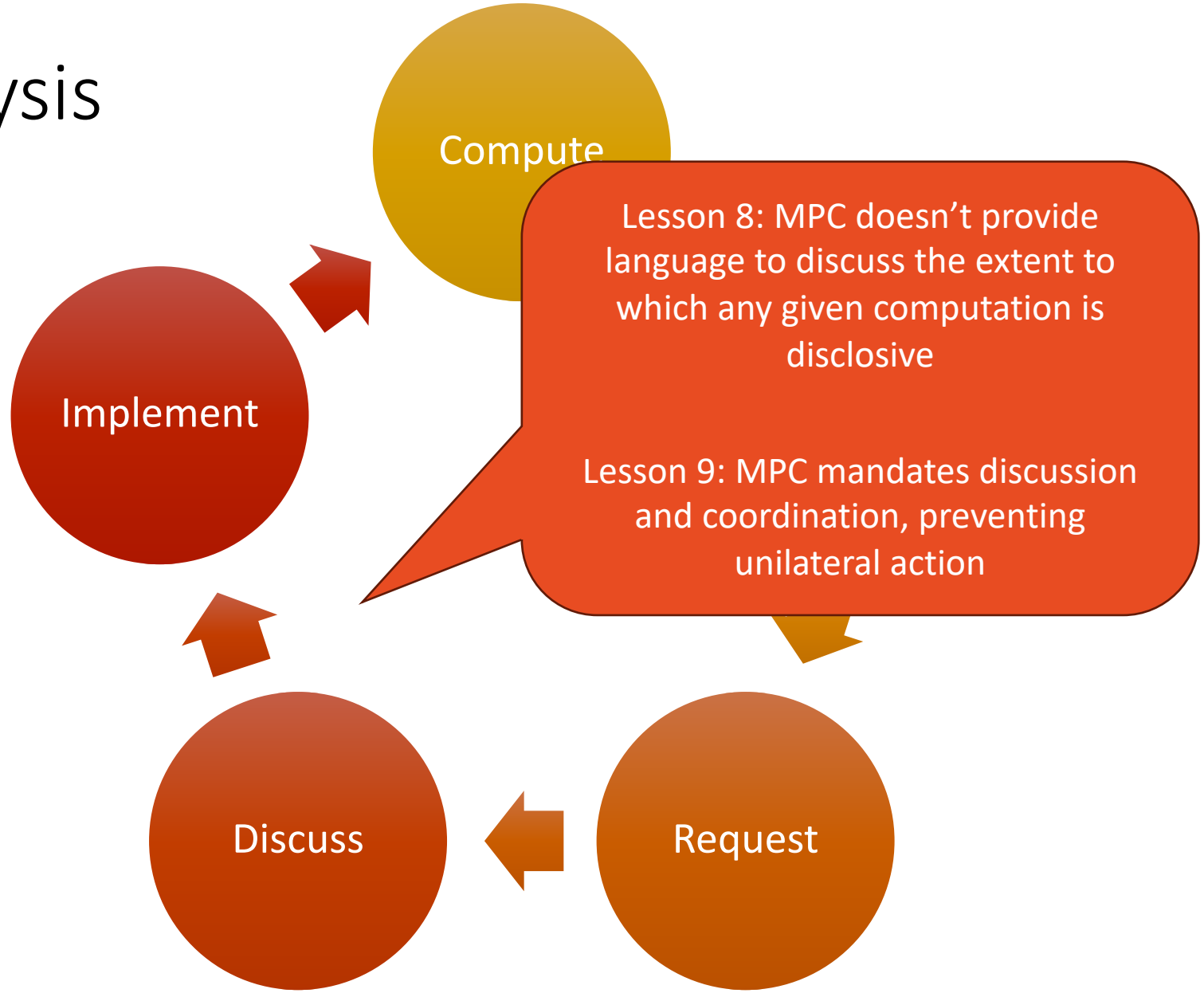
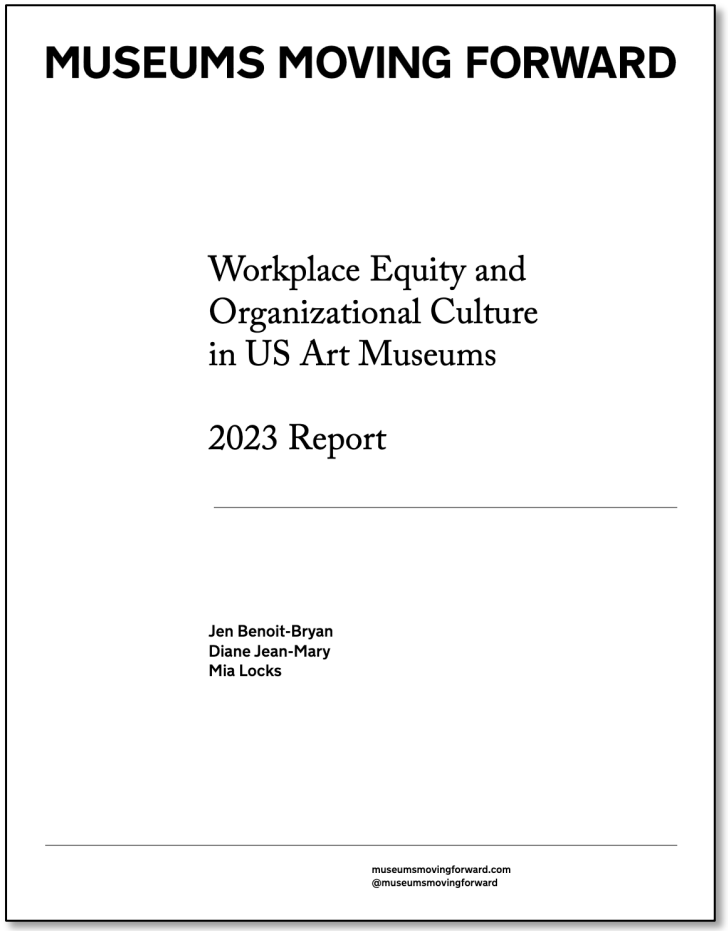


Data Release

- Following norms in the social sciences, MMF wanted to release raw data as an appendix

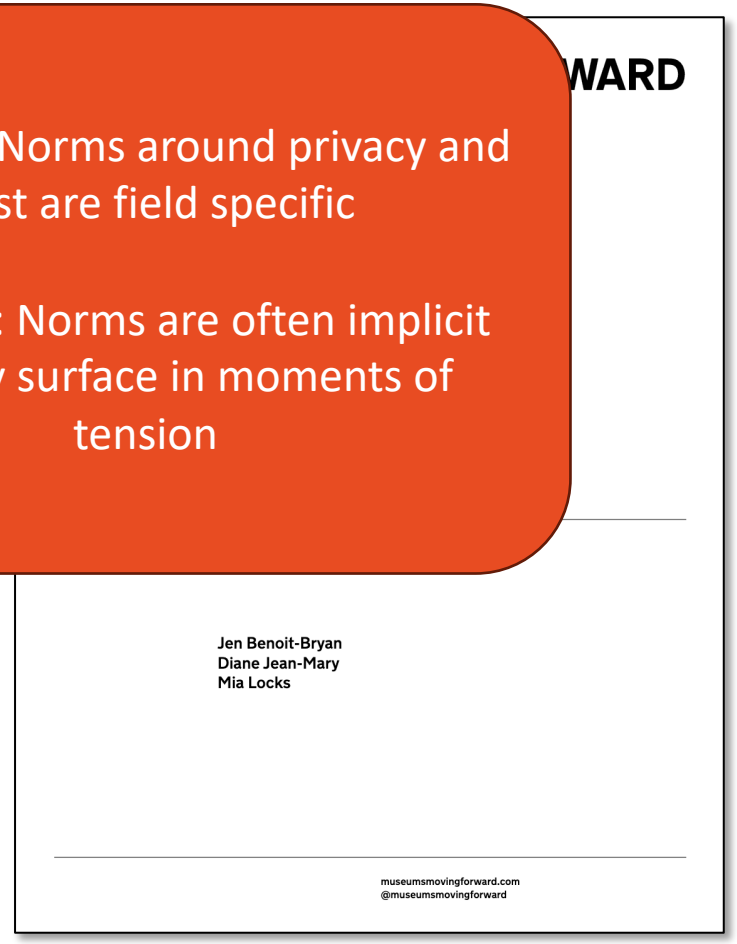


Data Release

- Following norms in the social sciences, MMF wanted to release raw data as an appen

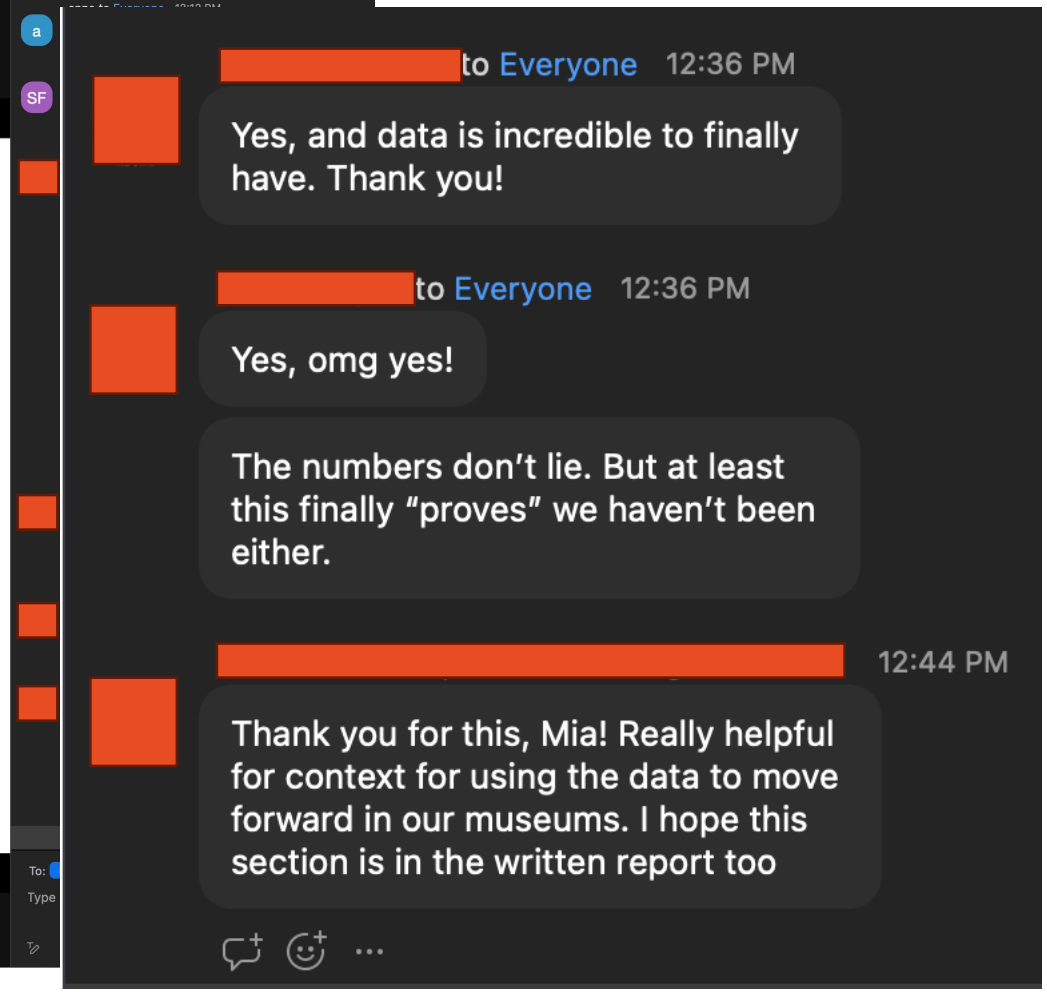
Lesson 10: Norms around privacy and trust are field specific

Lesson 11: Norms are often implicit and only surface in moments of tension

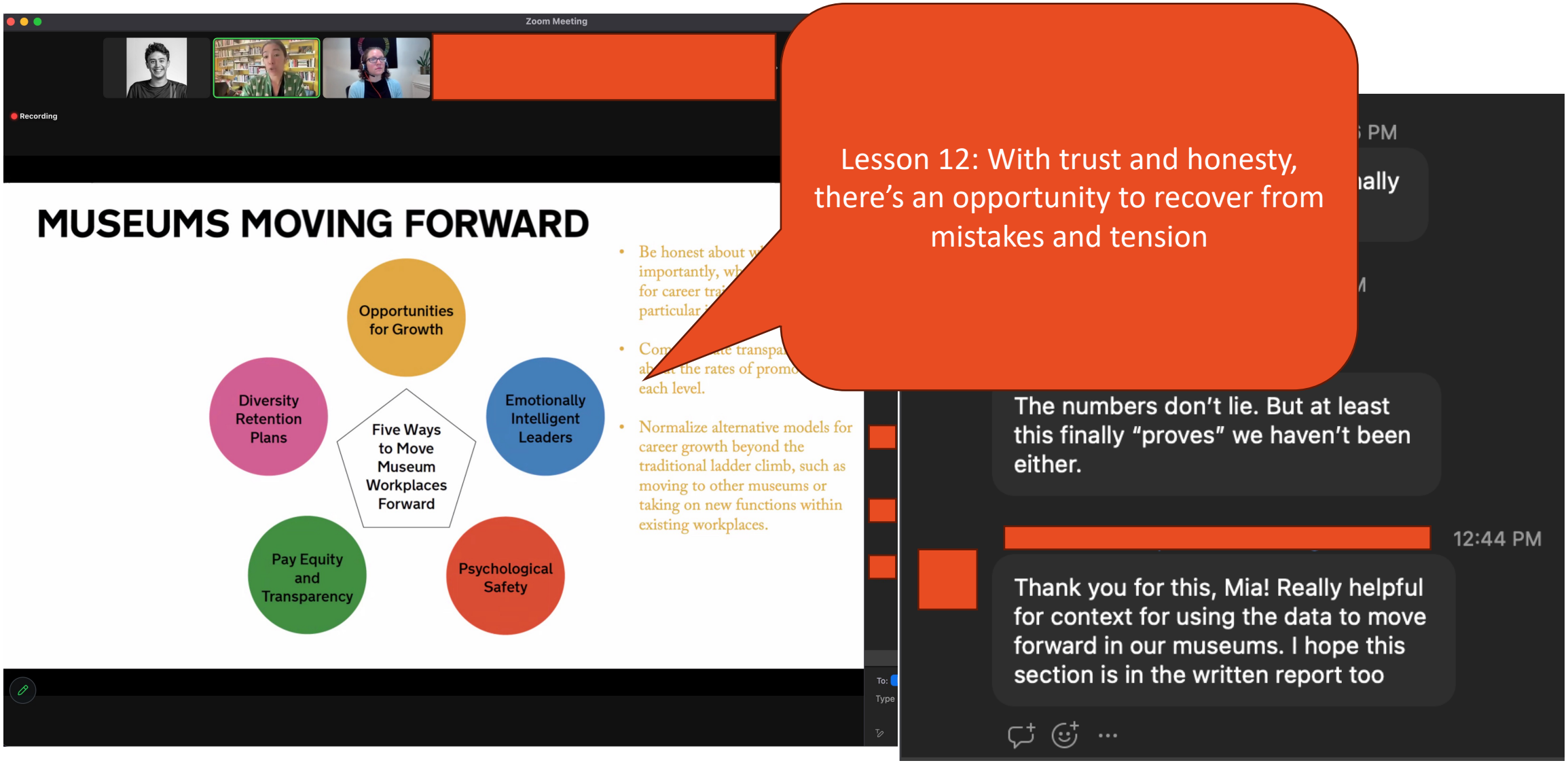


Feedback

Zoom Meeting
Recording
MUSEUMS MOVING FORWARD
Opportunities for Growth
Diversity Retention Plans
Five Ways to Move Museum Workplaces Forward
Emotionally Intelligent Leaders
Pay Equity and Transparency
Psychological Safety
Be honest about what is and, importantly, what isn't possible for career trajectories within a particular institution.
Communicate transparently about the rates of promotion at each level.
Normalize alternative models for career growth beyond the traditional ladder climb, such as moving to other museums or taking on new functions within existing workplaces.


Meeting Chat
Art, Ann Arbor
[redacted] to Everyone 12:36 PM
Yes, and data is incredible to finally have. Thank you!
[redacted] to Everyone 12:36 PM
Yes, omg yes!
The numbers don't lie. But at least this finally "proves" we haven't been either.
[redacted] 12:44 PM
Thank you for this, Mia! Really helpful for context for using the data to move forward in our museums. I hope this section is in the written report too

Feedback


Zoom Meeting
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MUSEUMS MOVING FORWARD
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Normalize alternative models for career growth beyond the traditional ladder climb, such as moving to other museums or taking on new functions within existing workplaces.
Lesson 12: With trust and honesty, there's an opportunity to recover from mistakes and tension
The numbers don't lie. But at least this finally "proves" we haven't been either.
12:44 PM
Thank you for this, Mia! Really helpful for context for using the data to move forward in our museums. I hope this section is in the written report too

Most Important Lessons

Lesson 4: Mismatch between the "hard" parts of the problems

Lesson 8: MPC doesn't provide language to discuss the extent to which any given computation is disclosive

Lesson 10: Norms around privacy and trust are field specific

Thank you!

Link to MMF's Report

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Kinan Dak Albab (Brown)
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Shobhakumar Selvarhaj
Ingi Hong
Ananya Chakraborty
Aykerim Dussikenova
Thachathum Amornkasemwong
Emily Shen (Sharing Educational Resources)