Guided Documentation of the Modeling Process

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Documenting the Modeling Process

- Different than documenting a model
- Case Study Research
  - *Tying model structure and values to source(s)*
  - *Separating source data from inference and conclusion*
  - *Inspection of modeling process*
- Advantages Include:
  - *Additional transparency*
  - *Share source data without inferences and conclusions*
  - *Scaffold best practice methods*

Prior Work

Incorporate this modeling practice into an online software tool using a standardized database structure.

Example: DynamicVu

- ■ Database Structure:
  - – *Farr WW, Allen SD, Tomoaia-Cotisel A, Hovmand, PS. (2022)*
  - – *'Documenting the modeling process with a standardized data structure described and implemented in DynamicVu',*
  - – *System Dynamics Review, 38(3), 264-291.*
  - – *Capture and contextualize*

- ■ Best Practice Method:
  - – *Tomoaia-Cotisel A, Allen SD, Kim H, Andersen DF, Chalabi Z. (2022)*
  - – *'Rigorously Interpreted Quotation (RIQ) Analysis for Evaluating Causal Loop Diagrams in Late-Stage Conceptualization',*
  - – *System Dynamics Review, 38(1) 41-80.*
  - – *Build CLDs from dialog and text*

DynamicVu

On-line multi-user software built using the
Apple Claris Filemaker platform

- ■ Document "Artifacts" in Context
  - – *Project*
  - – *Session*
  - – *Participant(s)*
  - – *Citation*
  - – *Description*
  - – *Image (attached file)*
  - – *Category*
  - – *Tag(s)*
  - – *Sources (Artifacts)*
  - – *Uses (Artifacts & Variables)*
- ■ No Duplicating or Reformatting of Data
- ■ Data Dynamically Linked

Rigorously Interpreted Quotations

Best Practice:

FROM: Qualitative text

TO: Causal Loop Diagram

1. SOURCE DATA:

   Collect qualitative research, interview notes, etc.

2. QUOTATIONS:

   Identify "Quotations" within the source data that individually tell a cohesive story about causality

3. PHRASES:

   Identify "Phrases" within the Quotations that describe a CLD element

4. VARIABLES:

   Name and code specific CLDS Variables within the Phrases

5. CAUSAL CHAINS:

   Build causal chains from the identified variables. Support these with source evidence and coder interpretation

6. REVIEW & IMPROVE:

   Review the resulting CLD iteratively for accuracy and consistency. Identify possible improvements.

QUOTE   PHRASES   VARIABLES

172-001	Phrases	Variables
"ID 01: 'If you set something up and it just goes into a black hole and no one ever sees it you have problems. Not only are clinicians not interested in it, but the data you get will be rubbish. You need that loop, you need that feedback, so that the people who are entering the data can see the value of it and they start acting on it, and they start making sure the data is of a high quality when it goes in"	• can see the value of it • it just goes into a black hole and no one ever sees it you have problems. Not only are clinicians not interested in it	Perceived Internal Evidence about LHS's Benefits for Patient Care
	• acting on it	Clinical Staff's Operations Capabilities
	Perceived Internal Evidence about LHS's Benefits for Patient Care →+ Adoption of Improved Practices into Care	
	When patient care data is perceived by clinical staff as excessively faulty, it merely serves oblivion. When patient care data is perceived as evidencing improvement, it informs improvement.	

CAUSAL LINK and

INTERPRETATION

Artifact CRIQ Workspace

Save   Refresh

Quote Artifact (title / index / text / alt text):

172-001

QUOTE

"ID 01: 'If you set something up and it just goes into a black hole and no one ever sees it you have problems. Not only are clinicians not interested in it, but the data you get will be rubbish. You need that loop, you need that feedback, so that the people who are entering the data can see the value of it and they start acting on it, and they start making sure the data is of a high quality when it goes in"

Highlighting ALL Phrases

Source Artifacts:

172

Phrase: Title / Text / Key Variable List: **Index:**

172-001-001

PHRASE

VARIABLE

✏ <-- Edit associated Key Variables

172-001-002

can see the value of it

✏ <-- Edit associated Key Variables

172-001-003

acting on it

New Phrase/Quote ...   Highlight Font   **Phrase/Quote Count: 9**

✏ Patient Care Value (Experience and Cost) [2] -----> (+) Perceived Internal Evidence about LHS's Benefits for Patient Care (Experience, Cost and Equity) [2]   ✕

CAUSAL LINK

The actual effects of changes to patient care may interest clinicians in the merits of the change, or they may not.

INTERPRETATION

✏ Perceived Internal Evidence about LHS's Benefits for Patient Care (Experience, Cost and Equity) [2] -----> (+) Adoption of Improved Practices into Care [1]   ✕

When patient care data is perceived by clinical staff as excessively faulty, it merely serves oblivion. When patient care data is perceived as evidencing improvement, it informs improvement.

New Causal Link ...   Highlight Font   Causal Link Count: 9   Close

Click "New Phrase ..." hanging button. Select and copy text from the Quote (left). Paste into new Phrase (right). DEFAULT values will be given to any new Phrases.

Key Variable Picker Worksheet

LIST OF VARIABLES

LINKED VARIABLES

DEFINITION CATEGORY UNITS PRIORITY

KeyVariable Search:
perceiv

New

This Artifact Supports the KeyVariables below:
172-001-002

Available KeyVariables:
- Gap between Expected and Perceived
- Gap Between Expected and Perceived
- Perceived Clinical Staff's Operations
- Perceived External Evidence about
- Perceived Internal Evidence about
- Time to Perceive Clinical Staff's
- Time to Perceive External Evidence
- Time to Perceive Internal Evidence

8 Key Variables are in this Project

KeyVariable Title:
Perceived Internal Evidence about LHS's

Priority

Unit of Measure:

Category:

KeyVariable Definition:
Perceived reminds us that changes to practice depend on interpretation of evidence by a healthcare organization's stakeholders (e.g., health plans, physicians, patients) in a social process in which evidence matters to the extent that people are confident and agree that it is adequately useful for their decision-making. Internal evidence is information collected from various sources internal to a

Linked KeyVariables:
- Patient Care Value (Experience and Cost)
- Perceived Internal Evidence about LHS's Benefits for

Close

Select KeyVariable (left); link with '+'. Search for desired KeyVariable (top left); create with 'New'. Unlink KeyVariable with 'x' (right).

QUOTE

PHRASE

VARIABLE

CAUSAL LINK

INTERPRETATION

Artifact CRIQ Workspace

Save   Refresh

Quote Artifact (title / index / text / alt text):

172-001

"ID 01: 'If you set something up and **it just goes into a black hole and no one ever sees it you have problems. Not only are clinicians not interested in it**, but the data you get will be rubbish. You need that loop, you need that feedback, so that the people who are entering the data **can see the value of it** and they start *acting on it*, and they start making sure the data is of a high quality when it goes in"

Highlighting ALL Phrases

Source Artifacts:

172

Phrase - Title / Text / Key Variable List: **Index:**

172-001-001   ✕

people who are entering the data

Collecting Data on Patient Care [1]

172-001-002   ✕

can see the value of it

Perceived Internal Evidence about LHS's Benefits for Patient Care (Experience, Cost and Equity) [4]; Patient Care Value (Experience and Cost) [2]

172-001-003   ✕

acting on it

New Phrase/Quote ...   Highlight Font   Phrase/Quote Count: 9

Patient Care Value (Experience and Cost) [2] -----> (+) Perceived Internal Evidence about LHS's Benefits for Patient Care (Experience, Cost and Equity) [2]   ✕

The actual effects of changes to patient care may interest clinicians in the merits of the change, or they may not.

Perceived Internal Evidence about LHS's Benefits for Patient Care (Experience, Cost and Equity) [2] -----> (+) Adoption of Improved Practices into Care [1]   ✕

When patient care data is perceived by clinical staff as excessively faulty, it merely serves oblivion. When patient care data is perceived as evidencing improvement, it informs improvement.

New Causal Link ...   Highlight Font   Causal Link Count: 9   Close

Click "New Phrase ..." hanging button. Select and copy text from the Quote (left). Paste into new Phrase (right). DEFAULT values will be given to any new Phrases.

QUOTE   **1,100+**   PHRASES   VARIABLES   **70+**

172-001	Phrases	Variables
"ID 01: 'If you set something up and it just goes into a black hole and no one ever sees it you have problems. Not only are clinicians not interested in it, but the data you get will be rubbish. You need that loop, you need that feedback, so that the people who are entering the data can see the value of it and they start acting on it, and they start making sure the data is of a high quality when it goes in"	• can see the value of it • it just goes into a black hole and no one ever sees it you have problems. Not only are clinicians not interested in it	Perceived Internal Evidence about LHS's Benefits for Patient Care
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	Perceived Internal Evidence about LHS's Benefits for Patient Care ➜+ Adoption of Improved Practices into Care	
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CAUSAL LINK and

INTERPRETATION

TITLE

DEFINITION

SUPPORT

Perceived Internal Evidence about LHS's Benefits for Patient Care (Experience, Cost and Equity)
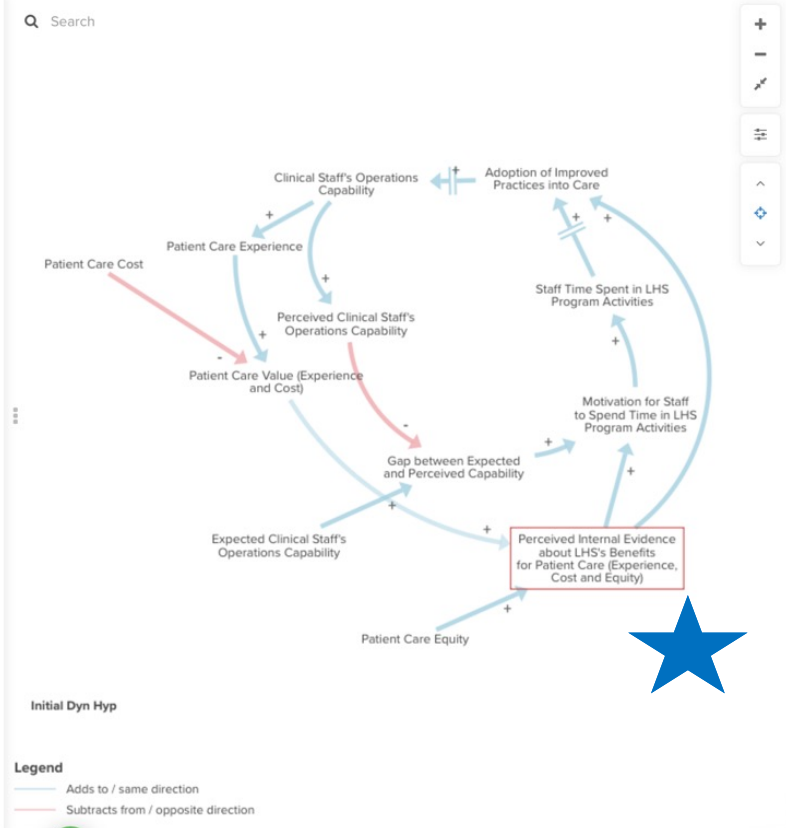
ADD ELEMENT TYPE

Perceived reminds us that changes to practice depend on interpretation of evidence by a healthcare organization's stakeholders (e.g., health plans, physicians, patients) in a social process in which evidence matters to the extent that people are confident and agree that it is adequately useful for their decision-making. Internal evidence is information collected from various sources internal to a health service delivery organization that describes the attributes of a given set of healthcare services provided to patients including appropriateness for use among the individual's particular patient population, and provision in a harm-free, timely and preferred way (Experience), cost to the community (Cost), and fairness in experience and cost across populations (Equity). Perceiving internal evidence more accurately improves awareness of the causal effect of LHS and thus provides support for continuing it, including awareness of new potential improvements.

- **172-001-006:** *it just goes into a black hole and no one ever sees it you have problems. Not only are clinicians not interested in it:*

Q Search

Clinical Staff's Operations Capability

Adoption of Improved Practices into Care

Patient Care Experience

Patient Care Cost

Staff Time Spent in LHS Program Activities

Perceived Clinical Staff's Operations Capability

Patient Care Value (Experience and Cost)

Motivation for Staff to Spend Time in LHS Program Activities

Gap between Expected and Perceived Capability

Expected Clinical Staff's Operations Capability

Perceived Internal Evidence about LHS's Benefits for Patient Care (Experience, Cost and Equity)

Patient Care Equity

Initial Dyn Hyp

Legend

Adds to / same direction

Subtracts from / opposite direction

TITLE

DESCRIPTION

SUPPORT

Perceived Internal Evidence about LHS's Benefits for Patient Care (Experience, Cost and Equity) -----> (+) Adoption of Improved Practices into Care

As clinical staff perceive a greater quality of internally-created evidence of what works, they are more likely to act on it and thus to improve their practices.

- **172-001:** When patient care data is perceived by clinical staff as excessively faulty, it merely serves oblivion. When patient care data is perceived as evidencing improvement, it informs improvement.

- **172-015:** It is implied that a formal structure which replaces individual social ties also improves patient care, plausibly through improvements to patient care tracking, which improves the quality of perception of what works, and thus makes it possible to apply more improvements to patient care.

- **7799-004:** As the whole system understands the effects of its proactiveness, more evidence is embedded into practice.

- **7799-008:** As the clinical decision-makers perceive more accurately how well their practice conforms to the best evidence, there is a greater likelihood of adopting improved practices which they are not currently using, facilitating better patient care processes.

Q Search

Clinical Staff's Operations Capability

Adoption of Improved Practices into Care

Patient Care Experience

Patient Care Cost

Staff Time Spent in LHS Program Activities

Perceived Clinical Staff's Operations Capability

Patient Care Value (Experience and Cost)

Motivation for Staff to Spend Time in LHS Program Activities

Gap between Expected and Perceived Capability

Expected Clinical Staff's Operations Capability

Perceived Internal Evidence about LHS's Benefits for Patient Care (Experience, Cost and Equity)

Patient Care Equity

Initial Dyn hyp

Legend
— Adds to / same direction
— Subtracts from / opposite direction

Advantages

- Source Data becomes
  - *Sortable*
  - *Searchable*
  - *Shareable*
  - *Savable*
- Integration
  - *Export*
  - *Import*
- Credibility
  - *Strong ties to sources*
  - *Repeatability*
- Multiple Views of Data
  - *Data Collection and Entry Task*
  - *Review and Improve Task*
  - *Present to Client Task*
- Scaffold Best Practices
  - *Expert efficiency*
  - *Novice support*

Challenges

- Documenting the modeling process takes more time than NOT documenting the modeling process

- Adopting new methods requires effort

- Documenting requires additional project resources

- Consistent coding of source data

Future Opportunities

- XMILE export of variables to support modeling SW (Stella, Vensim, etc.)
- Saturation Analysis
  - *Are key variables sufficiently supported?*
  - *How many unique sources support this model structure?*
- Network analysis
  - *Do certain concepts tie back to (participant) influencers?*
  - *Which participants are most highly connected to the source data ultimately selected to support the model?*

Thank You!