Scriptapedia 5.0: A Tool for Designing "Scripted" Group Model Building Workshops

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History scripts

- Andersen, D. F., & Richardson, G. (1997). Scripts for group model building. *System Dynamics Review, 13(2), 107-129.*

- Richardson, G. P. (2013). Concept models in group model building. *System Dynamics Review, 29*, 42-55.

- Luna-Reyes, L. F., Martinez-Moyano, I. J., Pardo, T. A., Cresswell, A. M., Andersen, D. F., & Richardson, G. P. (2006). Anatomy of a group model-building intervention: Building dynamic theory from case study research. *System Dynamics Review, 22*(4), 291-320.

- Ackermann, F., Andersen, D. F., Eden, C., & Richardson, G. P. (2010). ScriptsMap: A tool for designing multi-method policy-making workshops. *Omega, 39*, 427-434.

- Hovmand, P. S., Andersen, D. F., Rouwette, E., Richardson, G. P., Rux, K., & Calhoun, A. (2012). Group model building "scripts" as a collaborative tool. *Systems Research and Behavioral Science, 29*, 179-193.

- Hovmand, P.S. (2014). *Community based system dynamics.* New York, NY: Springer.

ScriptsMap
(Andersen, Richardson, Ackerman and Eden)
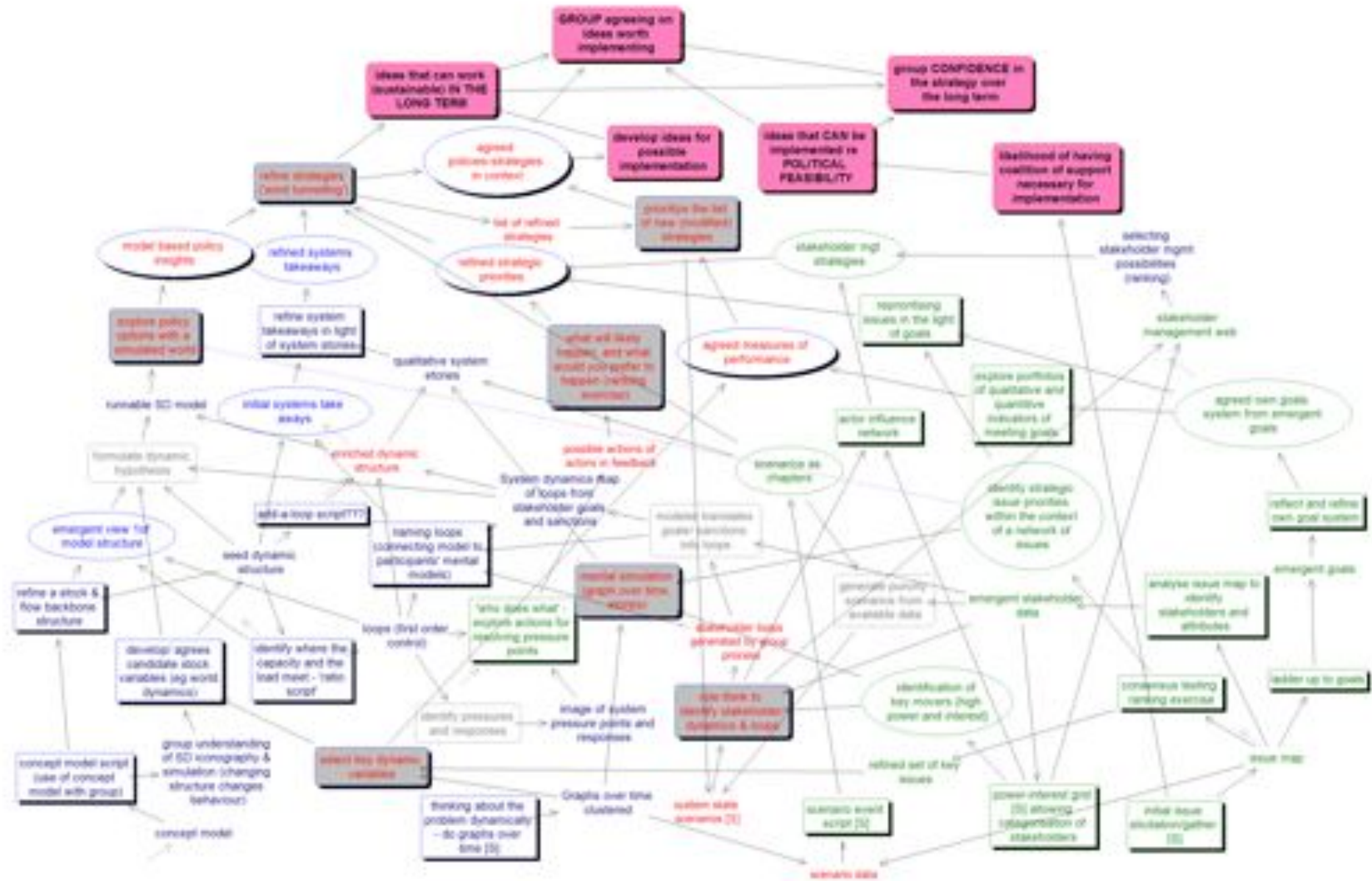
Cf. Ackermann, Andersen, Eden, and Richardson, 2011: 429

Scripts as the basic building blocks of GMB sessions

– A GMB project is described by a process map of *sessions*

- A session is described by a *detailed agenda of scripts*

  – A script is a predefined set or pattern of behavior that has (Andersen and Richardson 1997):

    (1) a well defined input and output, and

    (2) one primary group task (convergent, divergent, evaluative, and presentation).

Motivations for documenting GMB scripts

- Improving practice
  - Facilitation more art than science (Andersen, Richardson, and Vennix, 1997)
  - Increased transparency is one of the key challenges for the field of facilitated modeling (Eden and Ackermann, 2006; Westcombe, Franco, and Shaw, 2006; Checkland, 2006)
  - Moving from novice to expert (Keys, 2006)
  - Comparing facilitator approaches and increasing knowledge, i.e., toward an evidence-based practice of GMB

- Research on modeling effectiveness
  - Small differences in context of modeling sessions leading to large difference in modeling effectiveness (Rouwette, Vennix, and Van Mullekom, 2002; Franco and Rouwette, 2011)

Designing and documenting scripts

A script was designed to identify and prioritize stakeholders in a project on the dynamics of childhood obesity.

Scripts can also be used to document existing best practices using in group model building.

Tailoring scripts to specific communities

Scripts were used to tailor group model building exercises for residents from low income communities to understand the dynamics of banking in a project supported by the St. Louis Federal Reserve Bank.

Training professionals to facilitate

Scripts were used to train professionals in facilitating group model building exercises in a project to develop a community violence prevention strategy for veterans with trauma and their families.

Scripts have also been used to train graduate students in facilitating group model building.

Documenting group activities and exercises

Scripts were used to document new group activities in a workshop with Foundation for Ecological Security (FES) Rajasthan Cell in Udaipur, India.

The Word template provided was easy to use and provided a framework for staff to document the script.
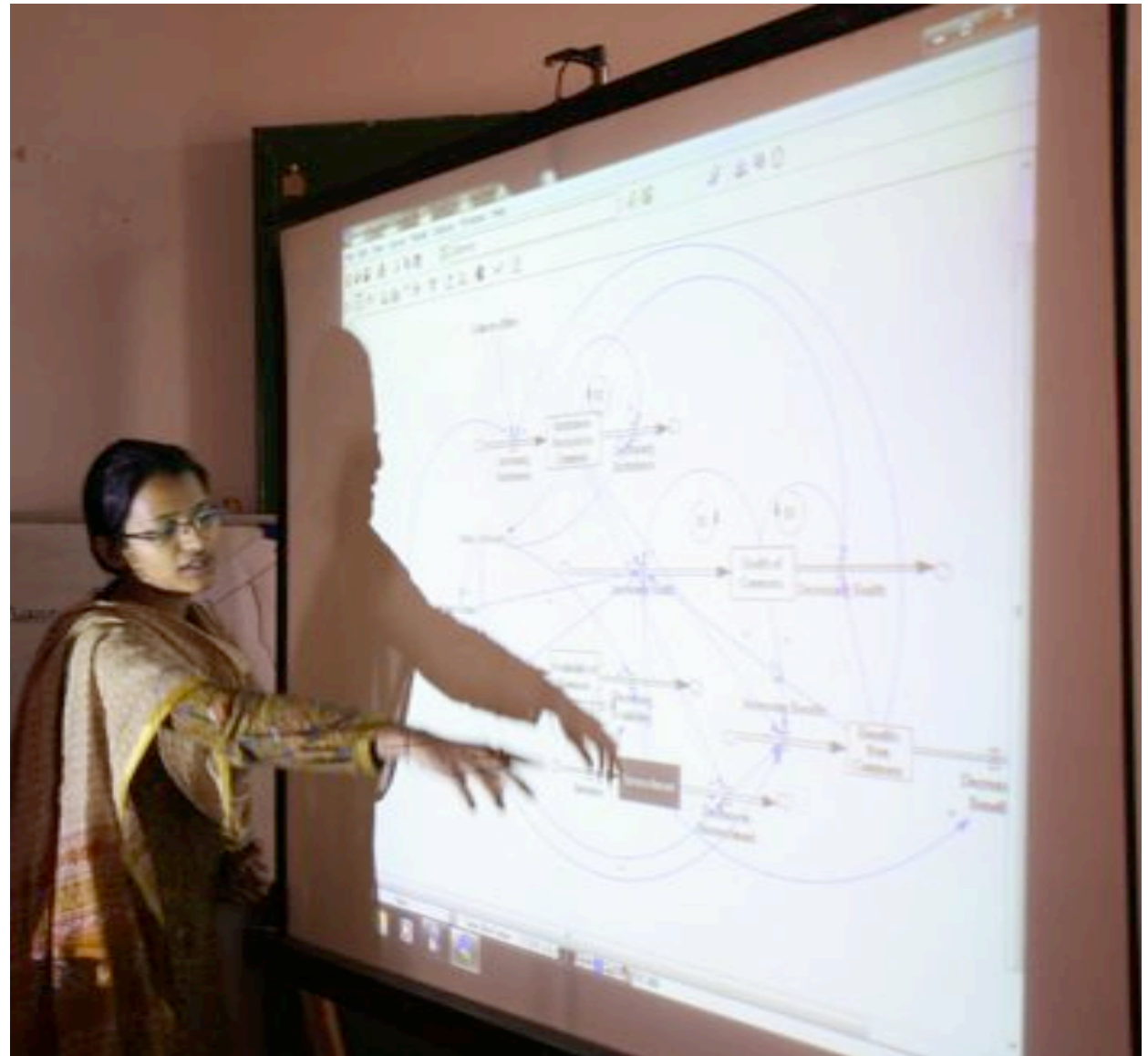
Contents of Scriptapedia handbook

- Scripts
  - Best practices
  - Promising practices
  - Under-development
- Glossary of terms
- Roles in group model building
- Script template
- Additional readings
- System dynamics modeling software and online resources
- Examples of GMB sessions and projects using scripts

http://tools.systemdynamics.org

Elements of scripts

- Name
- Context
- Description
- Status
  - Best practices, promising practices, and under development
- Purpose
- Primary nature of group task
  - Divergent, convergent, evaluative, and presentation
- Time
- Materials needed

- Inputs
- Outputs
  - Deliverables and products
- Team roles required
- Who is in the room
- Steps
- Evaluation criteria
- Authors
- History & basis for script
- Revisions
- References

Graphs over Time Script

Graphs over Time

Description:	Participants produce sketches of key variables over time, which are clustered by the modeling team
Purpose of script:	Framing the problem, initiating mapping, eliciting variables, and input to deciding the reference modes for the study
Primary nature of group task:	Divergent
Time:	Prep time: 10 minutes Time during session: 45-60 minutes Follow-up time: N/A
Materials:	• Camera or other method to capture the graphs • Stacks of 8.5x11 white paper with axis drawn on them • Large blank wall (8'x10') • Fat markers • Glue sticks, blue tack, or tape
Inputs:	None
Outputs from this script:	Candidate variables for the dynamic model or the map
Roles:	• *Modeler facilitator* to work with the group with some experience with SD • *Modeler* listening to what is being graphed and the way people are talking about the graphs who must also be able to conceptualize early seeds of system structure. • *Wall builder* to cluster graphs and talk about themes with little or no experience in SD • *Runner (optional)* to brings the graphs from the *community facilitator* if the group is large • *Recorder* to document the session and photograph the clustered graphs
People in the room:	All members of the core modeling team and participants
Steps:	1. Based on group size, decide whether to break participants into subgroups. In smaller groups N<10, allow individuals to work and present independently. In larger groups N >10, divide participants into groups of roughly N/10. Ask the subgroups to sit together. 2. Modeling team hands out sheets of white paper to each participant 3. Facilitator gives example of how to draw a graph over time. Carefully labeling X axis with "Time", start and end times, and now with a vertical dashed line. Label Y axis with variable name. Sketch the behavior. 4. Facilitator then asks participants to draw one variable over time per piece of paper. Give participants the option of including hoped for behavior, expected behavior, and feared behavior on the same graph. 5. Facilitator and wall-builder walk around and help participants with the task if they need it. (Allow 15 minutes or until the group runs out of steam) 6. Reconvene as large group. a) If N<10, facilitator takes one graph at a time from each participant, holds it up in front of entire group and asks him/her to talk about it. Ask for participants to share the "best stuff" first. Clarify timescale, variable names, etc. b) if N>10, instruct subgroups to share their graphs with each other and choose the ones they think are most important. Facilitator then goes to each subgroup and holds the first graph they have selected up in front of entire group. Subgroup spokesperson talks about graph. Ask subgroups to share the "best stuff" first. Clarify timescale, variable names, etc. 7. Facilitator then hands the graph to the person building the wall. 8. Facilitator repeats steps 6 and 7 with each participant or subgroup, taking one graph at a

(continued)

	time until all graphs are shown or time has run out. Finish by asking if any participant has something else that really ought to be shown. 9. During steps 7-8, each graph is posted on the wall. Wall builder tries to cluster the graphs meaningfully on the fly, based on themes and variables. 10. Facilitator asks wall builder to explain the clusters of graphs on the wall. Wall builder tries to summarize dynamics that help to characterize the problem that emerges from the participants' graphs. 11. Facilitator enables the participants to talk about the clusters and the characterization of the problem they imply. 12. Consider labeling the clusters based on themes or related variables 13. Potential for modeler to close by highlighting the beginnings of feedback thinking in the dynamic problem.
Evaluation criteria:	• Interesting, self-sustaining group discussion after clusters described by the wall builder • Meaningful clusters are possible to see • Graphs tend to converge to a clear dynamic problem • Some key dynamic variables emerge from reflecting on the graphs and clusters • Modeling team can begin to see key stocks and perhaps important feedback loops • Members of the group appear to have better understandings of the issues of interest to other members
Authors:	George Richardson [gpr@albany.edu], David Andersen (david.andersen@albany.edu)
History:	n/a
Revisions:	n/a
References:	Andersen, D. F., & Richardson, G. P. (1997). Scripts for group model building. *System Dynamics Review, 13*(2), 107-129.

Examples of Scripts

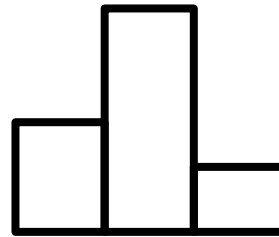*** = best practices, ** = promising practices, * = under development

- Hopes and Fears***
- Graphs over Time***
- Concept Model***
- Ratio Exercise***
- Initial Policy Options***
- Scheduling the Day***
- Creating a Shared Vision of Modeling Project**
- GMB Process Mapping**
- Debriefing**

- Variable Elicitation**
- Building CLD with Paper Variables**
- Causal Mapping**
- Transition from CLD to Stocks and Flows**
- Places to Intervene**
- Reflector Feedback**
- Structure Elicitation**
- Places to Intervene*
- Community Snapshot*

Designing sessions/ combining scripts
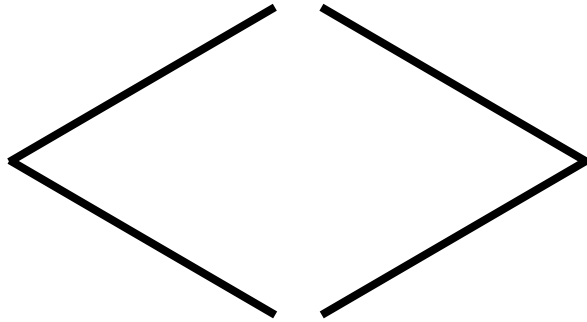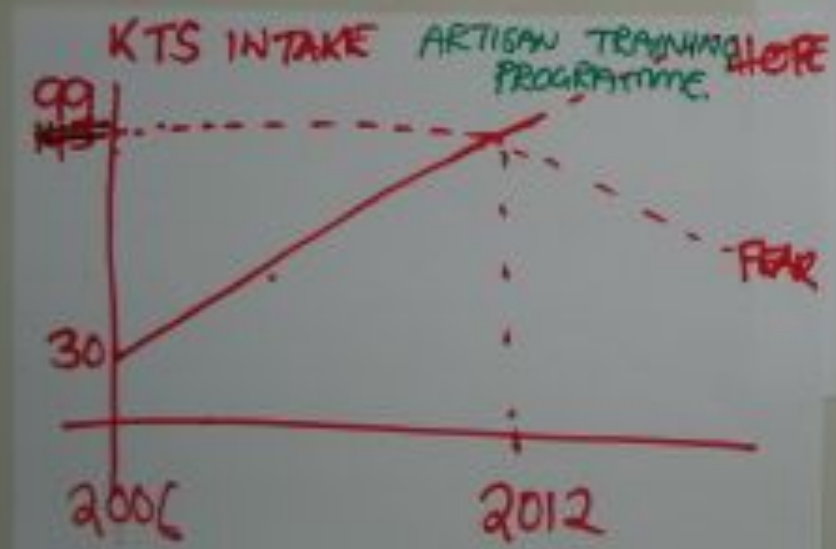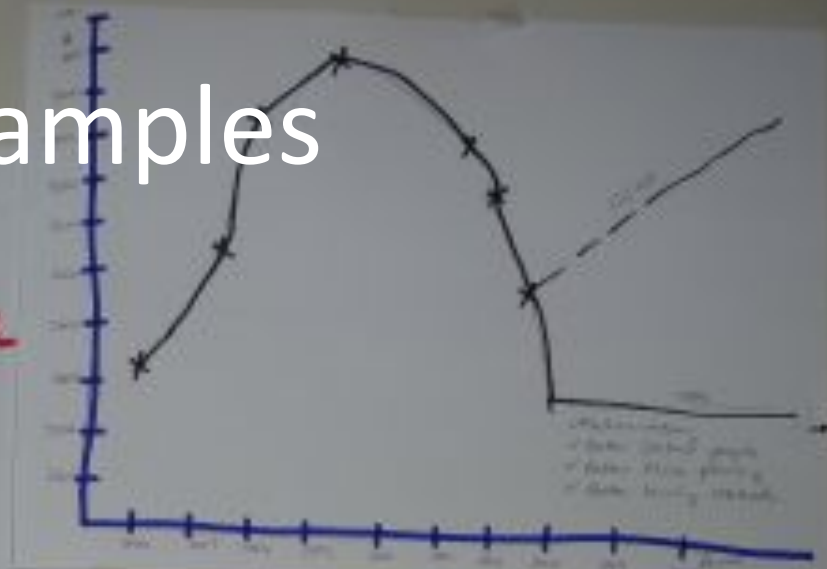
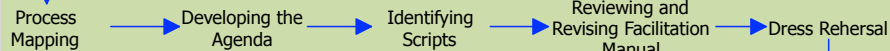Divergence   Convergence   Prioritising

Examples

Examples

Examples

Examples

Example of a GMB Session: Veterans, Trauma, and Battering Behavior Project

Community Based System Dynamics ScriptsMap[1]

Small group of 2-4 people meeting over a total of 2-3 hours

Introduction to SD → Developing a Modeling Project Description

Core modeling team: small group of "process tolerant" 4-8 people meeting over a total of 10 hours, first meeting is face-to-face and training is often day or week before first session

Process Mapping → Developing the Agenda → Identifying Scripts → Reviewing and Revising Facilitation Manual → Dress Rehearsal

Connection Circles → Causal Loop Diagrams from Connection Circles

Graphs over Time → Defining Reference Mode → Presentation of Causal Map from Discussion

Room Setup → Hopes and Fears → Causal Mapping with Seed Structure → Causal Map Review → Causal Map Synthesis → Community Presentation

Formulate Scoping Models → Simulation Model Review

Identifying Potential Leverage Points → Formulate Research Model → Policy Analysis

Action Ideas

Activities

Microworlds

Boardgame

Concept Model → Stock and Flow Diagramming in Small Groups

Varies, from series of 90-minute sessions to 5 days or more

[1]Ackermann F, Andersen DF, Eden C, Richardson GP. ScriptsMap: A tool for designing multi-method policy-making workshops. *Omega* 2010;39:427-434.

Consider different session designs with respect to desired outcomes ("story boarding")

90 minute agenda

- Agenda:
  - Welcome
  - Causal mapping exercise
  - Closure
- Outcomes:
  - Causal loop diagram

120 minute agenda

- Agenda:
  - Welcome
  - Behavior over Time Graphs (BOTG)
  - Break
  - Causal Map from BOTG
  - Closure
- Outcomes:
  - Behavior over time graphs
  - Causal loop diagram

180 minute agenda

- Agenda:
  - Welcome
  - Intro to SD
  - Behavior over Time Graphs
  - Break
  - Causal Map from BOTG
  - Identifying Stocks
  - Structure Elicitation
- Outcomes:
  - Behavior over time graphs
  - Causal loop diagram
  - Important stocks
  - Things affecting stocks

The facilitation team arrives and sets up the room for a four hour group model building session with approximately 15 providers. The tables are arranged in a U-shape to encourage discussion among participants. A white board is positioned in front of the room. Refreshments are provided at the left.

The gate keeper/meeting opener starts off the session with introductions, background to the project, and review of the agenda for the session.

The modeler facilitator (left) and community facilitator (right) introduce the first group model building exercise, Hopes and Fears, asking participants to write their hopes (on blue sheets) and fears (yellow sheets) about the session with one hope or fear per sheet.

Participant shares a hope (blue sheet) from the Hopes and Fears exercise while the modeler facilitator holds the fear (yellow sheet). Each sheet has one hope and fear, and participants share one hope and one fear in a round-robin fashion.

A wall builder clusters the sheets of paper from the Hopes and Fears exercise. Each sheet of paper is individually taped to the wall using blue painters tape so that papers can be easily rearranged into new clusters as they emerge.

A wall builder then shares with the group how the sheets have been clustered and asks the participants if the clusters make sense or if there are some that need to be rearranged.

The modeler Facilitator introduces the graphs over time exercise using an example unrelated to the topic. Participants are then asked to draw graphs over time of things that affect or affected by the main variable of interest.

After participants have generated graphs over time, the community facilitator (right) asks participants to share their most important graph over time that has not yet been shared. The community facilitator holds the graph while the participant explains the story behind the graph.

After participants have generated graphs over time, the modeler facilitator/wall building places each graph and arranges the graphs in clusters by themes. Using the blue painters tape with each sheet being individually taped to the wall allows the wall builder to rearrange the clusters as they emerge.

The modelers (left) sketch causal structures as the participants share their graphs, and the recorder (right) is takes notes on a laptop. These notes will be used after the session to check the diagram. An observer (back) interested in learning more about group model building and system dynamics sits behind the recorder.

During the break, a modeler has drawn the casual diagram mapped from the conversations and reviews the structure with participants. The modeler takes care to explain the meaning of the arrows, plus and minus signs, and delay signs. The modeler then leads a discussion and revision of diagram.

Participants clarify and elaborate on the causal loop diagram that has just been presented. Disagreements often surface about the meaning of some variables, which are then negotiated and resolved as part of the facilitated discussion.

As participants clarify and elaborate the diagram, the modeler revises the diagram while the modeler facilitator helps ensure that what is being drawn corresponds to what was said.

Participants identify some of the potential solutions that they would like to see evaluated with the resulting simulation model along, potential uses of the diagram that has just been developed, and provide feedback to the modeling team about the session.

After the session has ended and participants left, the facilitation team meets to debrief the session focusing on what went well, what could have been improved, and next steps.

Benefits and caveats of scripts

Benefits

- Repeatable
- Builds up a set of best practices
- Enables communication with client

Caveats

- Doesn't address generic facilitation issues
  - Difficult persons
  - Working with co-facilitator/ modeler
  - Starting question