Lecture # 5: Diagrams for Conceptualization, Explanation, and Presentation

Four types:

*Causal-loop diagrams* (influence diagrams)
Far better with loops named in some descriptive, explanatory, or evocative way:
Causal loop diagrams with stocks explicit, but flows implicit in the arrows:

The picture is complete and quantifiable, and may be easier for some audiences to take in because it leaves out the visual complexity of explicit flows as pipes. On the other hand, the fact that the flows are captured as arrows means that the diagram contains less visual information than the same diagram with flows drawn as pipes.

Below is a more complex example of the same idea. Here, pipes would undoubtedly have been too much. The diagram could make sense only as “unfolded,” piece by piece.
Funding for tobacco control programs

Gov't income

Tobacco control programs

Smokers

Public awareness of tobacco health risk

Pressure on tobacco companies to reduce marketing activities

Tobacco marketing activities

Tax revenues from smokers

People quitting smoking

Smoking as a social norm

People starting smoking

Tobacco products availability

Tobacco grower revenues

Tobacco company revenues

Trend in tobacco company revenues

Anti-tobacco legislation

Anti-tobacco constituents

Govt. willingness to act against tobacco

Gov't funding of tobacco control

Govt. funding of tobacco control programs

Funding to support tobacco control efforts

Funding for tobacco control research

Researchers' awareness of tobacco health risk

Health care costs

Funding to support tobacco quitting efforts

Funding to support tobacco research

Public awareness of tobacco health risk

Pro-tobacco constituents

Tobacco taxes

Anti-tobacco litigation

Tobacco grower awareness of tobacco health risk

Tobacco product availability

Pressure on tobacco companies to reduce marketing activities

Tobacco marketing activities -
Causal-loop diagrams with explicit stocks and flows (“stock-and-flow/word-and-arrow” diagrams).

This sort of diagram was almost unheard of when Richardson and Pugh proposed it as a “hybrid” diagram (part causal loop diagram, and part “stock-and-flow/feedback” diagram) and suggested it was probably the most appropriate diagram to use for most purposes. Now, of course, it is the standard we experience in Vensim.
All of these loop diagrams are improved by naming the loops: see Sterman, p. 748 for another example.

The structure below is a “concept model” used in a group model building effort focusing on problems in the polypropylene/polyethylene industry (essentially a commodity cycle model).

The diagram on the next page is a more complex example, with prominent loops named. It comes from a Center for Technology group modeling effort focusing on CTG’s work to facilitate teamwork and information integration in interagency information technology projects.
Sector overview diagrams
These are maps to models, a kind of navigational aid. Be sure to name the links between sectors. Avoid showing too much. See also Sterman, p. 606, for another example.

Exhibit 4. Model overview
Policy structure diagrams
See also Sterman, p. 710, for another example.