To Main Proceedings Document

Systems Dynamics Model of Collaborative Decision Making with Information Technology Tools

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Abstract

- ***How do tools and attitudes affect collaborative decision-making? Information technology provides tools which enhance communication and collaboration for virtual teams working in complex decision systems. A before-and-after survey of virtual teams who designed a distributed decision-support environment identifies two distinct communication tool preferences: pro-information technology and anti-information technology. One participant type showed decreased preference for online tools which automatically create structured archives of data and information; the other participant type showed an increased preference.***

Abstract continued

- ***If some team members don't prefer (and won't use) communication tools which automatically create structured data, then the development of data, information and propositions leading to team decision making may be slowed. Having a team develop a systems dynamics model of its decision system should improve each member's understanding of the effect tools have on process, and thereby performance of the system. This should improve adoption of those communication tools which enhance the decision process.***

Communication, Information Building for Team Decision Support

- **Team members' Attitudes toward Communication Tools/Processes affects success of decision process**
- **Decision process is necessarily a team process**
- **Decision system success depends on effective flow of**
  - ***Decisions* <--*Propositions* <-- *Information* and *Data* generation**

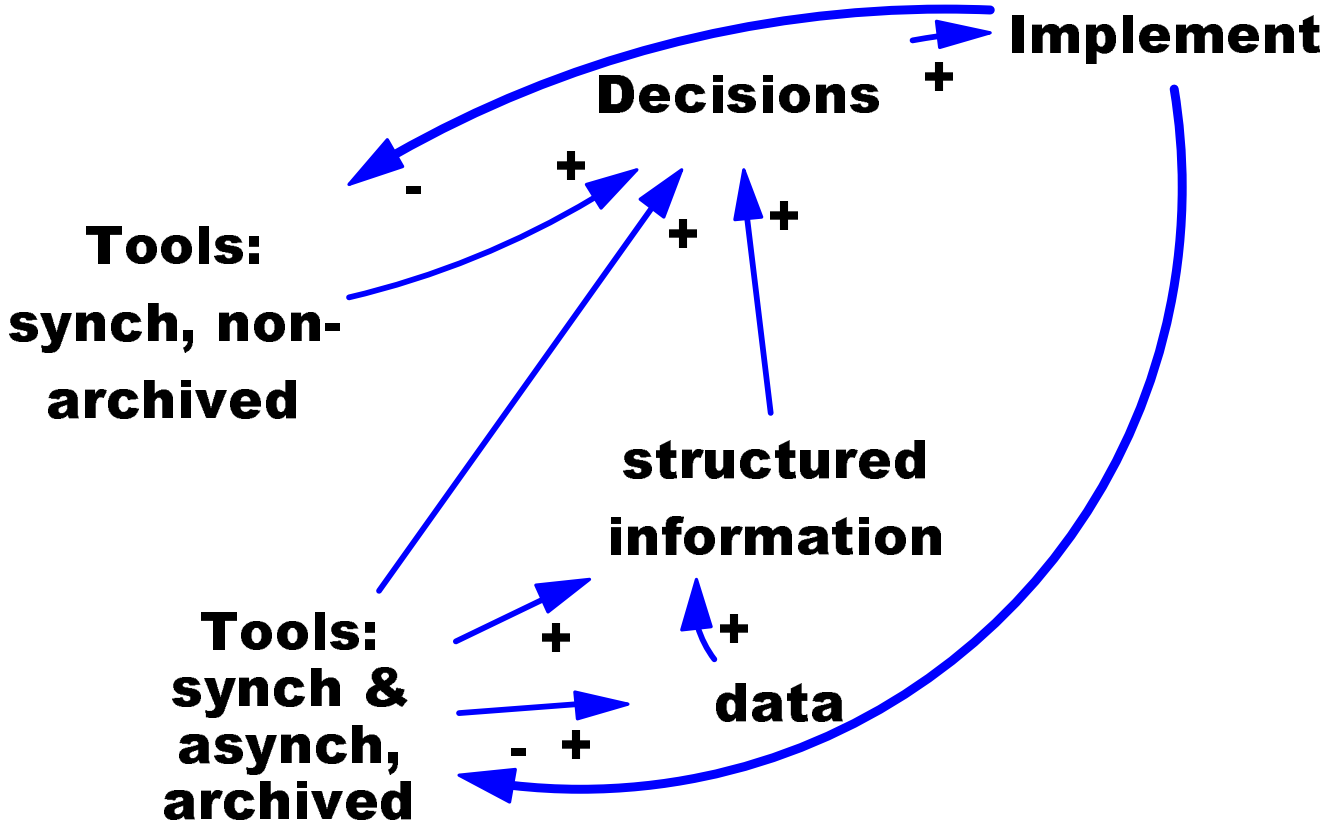
Participant's need to simplify

- **Overwhelming evidence for individual's need to simplify complex task/system (Ho & Weigelt, 1996)**
- **Simplification is not necessarily appropriate!**

Virtues of Virtual Teams

- **Online Decision Support Environment is essential for a virtual team**
- **Online environment supports dynamic development of information and "switching" or "satisficing" (Mowshowitz, 1997)**

Communication tools and Decision System Vensim (tm) graphic



Impact of Attitude on Communication Tool Preferences

- Stronger than expected individual differences
- Participants: decision makers in Silicon Valley organizations --all info tech savvy and all professionally experienced in virtual team activities
- Task: as a team, design "virtual team decision-support environment"
- Experience: face-to-face and virtual team activities, (5 to 6 members in a team)

Virtual Team Communication Tools Classification

	Timing	
Archiving Level	**Synchronous**	**Asynchronous**
Ephemeral	**Face-to-Face Telecon**	
Some automatic archiving, limited structure	**Chat sessions**	**Fax email**
Automatically structured		**Bulletin Board with Threads**

Attitude Survey Design

- **Survey instrument designed to be quick, non-intrusive**
- **10 questions address participants' use of communication tools in projects**
- ***Before* (first meeting) and *After* the class (end of seventh week)**
- **10 questions presented in terms of actual *Work* experience, and in terms of *Preferred***
- **(2 Before/After)x (2 Work/Preference) x (10 questions) x (17 participants)**

Two Factors: Communication Tools Preferences

	Factor 1	Factor 2
1. decision making is team process	-22	
2. use online > face-to-face	-82	
3. use electronic documents > hard-copy		
4. use telephone or telecon > written		+29
5. use face-to-face meetings > telecon		+64
6. use video conf for meetings	+29	
7. use computer-based decision support and workflow tools	+32	
8. teams generate creative ideas		
9. team-based decision making lets everyone contribute		-29
10. team decision-making is fast and productive		-39

Two distinct types of participants:

- (a) prefer info-tech (larger group): showed increased preference for info-tech enhanced communication
- (b) anti info-tech (smaller group): increased preference for face-to-face and telecon, and dislike of online tools
- analysis of variance of the interaction of (Before/After) with (Work/Prefer) supports consistent, separate groups

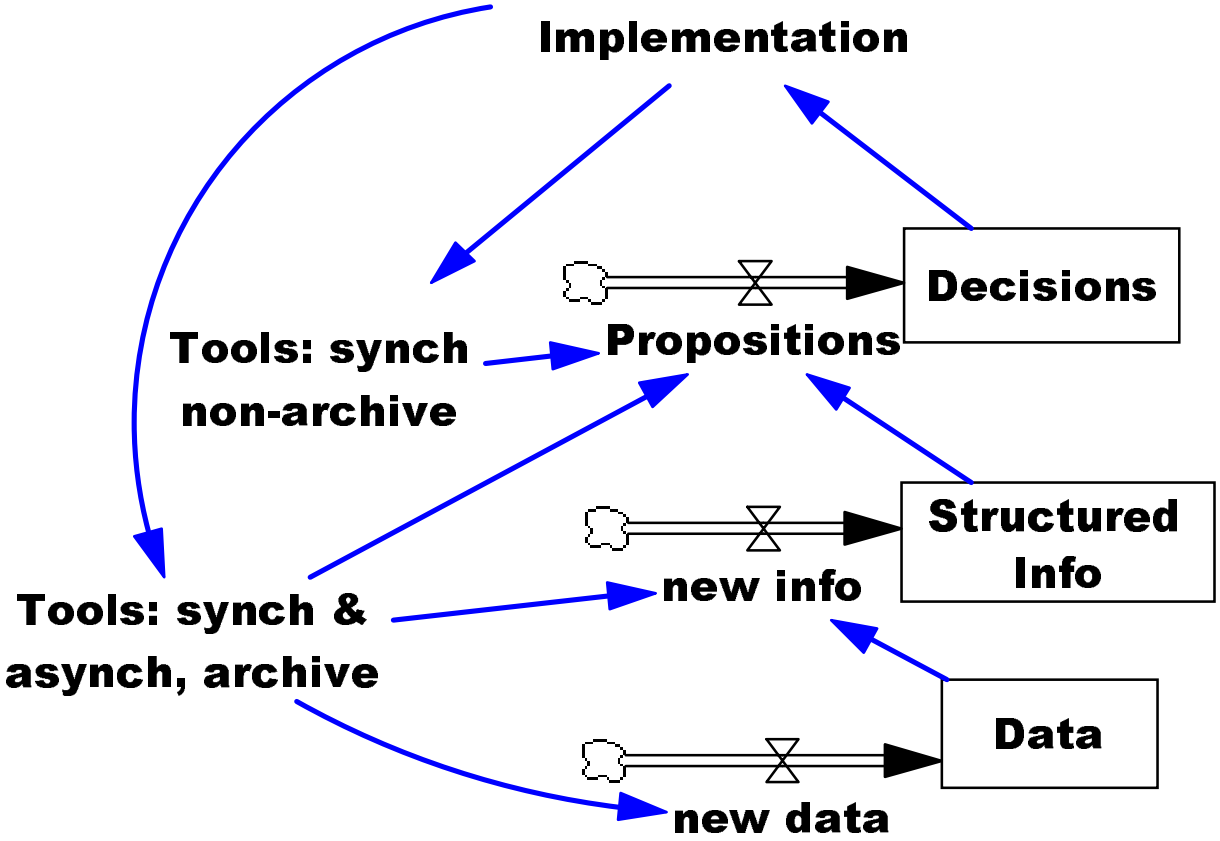
Consequences of two types

- **Anti info-tech's attitude makes team's use of info tech difficult (Akkermans & Vennix, 1996)**
- **If info-tech tools contribute towards creating Information from Data**
  - **then reliance on synchronous, non-archiving tools means a slow-down in archiving and creating Data, Information, and Propositions.**

Decision System Questions: Do different communication tools perform differently in decision system?

Tool	*Poor*	*Good*
Face-to-Face, Telecon (no archive)	generate Data, or transform to Information	single-step Propositions and Decisions
Chat, Fax, email (semi-structured archive)	make Decisions	generate Data, transform to Information
Bulletin Board with Threads (Automatically structured)	make Decisions	generate Data, transform to Information, transform to Propositions

System Dynamics Model: Can these rates be quantified? (Vensim, 2000)



Developing the SD Model

- **There are two types of participants in tool preference/use**
- **Suggest different communication tools contribute to different processes in system**
- **Can “usage” of different tools serve as quantitative indices for New Data, New Information, New Propositions?**

Implications for Decision Process Management: where info tech helps

- Participant preferences must be acknowledged -- they are real
- Complex innovation management decision making is supported by information technology (Milling, 1996)
- “poor, informal strategic judgement may be the root cause of many project failures” while formalized understanding improves mental model of decision system (Rodrigues & Bowers, 1995).

Decision Team understands its Decision System

- **Improved participant's understanding of info tech's role in process support should improve use (Marakas & Elam, 1997)**
- **Participants' mental model of the decision system should clarify relationship between tools and process (Doyle & Ford, 1999)**
- **Conclusion: The team should design a systems model of its planned decision system, creating as-is and should-be representations (Shafto, et al, 1996)**

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